University of Gothenburg

School of Business, Economics and Law

Not A Destiny:

Ethnic Diversity and Redistribution Reexamined.

Author: **Hoang-Anh Ho**

Supervisor: **Ola Olsson**

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University of Gothenburg

Abstract

Existing cross-country studies have increasingly confirmed the negative relationship between ethnic diversity and redistribution. These studies, however, have mainly focused on the measurement of ethnic diversity and have neglected an important perspective in their empirical analyses: before proving ethnic diversity harms redistribution, one has to show that people do identify with their ethnic groups in political decisions regarding redistribution instead of other potentially salient identities. Reinvestigating the hypothesis in a proper framework, I find no evidence that ethnic diversity negatively affect redistribution. I also find evidence of a supportive role of decentralization in promoting redistribution given critically high levels of diversity and segregation of ethnic groups. The findings pose important questions to other empirical studies regarding the impact of ethnic diversity that have paid inadequate attention to its theoretical complexity.

Keywords

Ethnic diversity, Redistribution, Identity.

JEL Classification

H5, H7, Z10.

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Corresponding author

Hoang-Anh Ho: anhhoueh@gmail.com

"The difficulty with the thesis of the clash of civilizations begins well before we come to the issue of an inevitable clash; it begins with the presumption of the unique relevance of a singular classification."

Amartya Sen, 2006: 11.

1. Introduction

Redistribution has been subject to an ongoing debate in public policies not only because of its functional impact on poverty alleviation, economic inequality, and economic growth but also because of its philosophical connection to the debate on social justice. As a consequence, there has been a growing literature, theoretical as well as empirical, aimed at gaining a better understanding of the causes and effects of redistributive policies across countries[1]. And according to more recent empirical studies, ethnic diversity – roughly defined, the probability that two randomly selected persons from a given country do not belong to the same ethnic group – has been singled out as one of the important predictors of cross-country differences in redistribution[2]. These studies have confirmed the existence of a negative relationship between ethnic diversity and redistribution by using various measures of ethnic diversity. Since ethnicity is hard to change, the negative impact appears to be, rhetorically speaking, a destiny. The point is best illustrated in the spirit of a recent study: "The wide variety of indices used in the literature partially stems from the fact that some economic and social outcomes can be explained by societal diversity, whereas others are better captured by polarization... Again, the question of which index does a better job at explaining redistribution is an empirical one" (Desmet et al., 2009, p. 1293). To paraphrase, it is evident that people identify with their ethnicity in political decisions on redistribution, and what researchers have to do is to find an index that best proves the negative impact of ethnic diversity in the statistical contest. I demonstrate in the present paper, however, that the problem in question is more crucial a theory-driven empirical exercise rather than one chiefly concerned with measurement.

[1] See Persson and Tabellini (2000), chapter 6, for a theoretical review; Alesina and Glaeser (2004) and Lindert (2004b) for two comprehensive empirical works. See also Lindert (2004a) for a historical account of the evolution of social spending since the eighteenth century.

[2] They are, by chronology, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999); Alesina, Glaeser, and Sacerdote (2001); Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003); Desmet, Ortuño-Ortín, and Weber (2005, 2009); and Desmet, Ortuño-Ortín, and Wacziarg (2012). See also Stichnoth and Van der Straeten (2013) for a list of other earlier and less powerful evidences.

In a critique of Huntington's (1996) thesis of the clash of civilizations, and communitarian approach to identity in general, Sen (2006, p. 11) asserts: "Indeed, the question "do civilizations clash?" is founded on the presumption that humanity can be preeminently classified into distinct and discrete civilizations, and that the relations *between different human beings* can somehow be seen, without serious loss of understanding, in terms of relations *between different civilizations*. The basic flaw of the thesis much precedes the point where it is asked whether civilizations must *clash.*" His critique applies directly to the case of ethnic diversity and suggests a proper two-steps strategy to verify its negative impact on redistribution: first, identify all the salient identities and prove that people do identify with their ethnicity in political decisions regarding redistribution rather than other identities; second, show that ethnic diversity negatively affects redistribution. Like Huntington, the fundamental flaw of existing studies lies in the fact that they, explicitly or implicitly, accept the first step as a matter of fact and concentrate most of their efforts in tackling with the second one. In other words, they have failed to control for all potentially salient identities in their empirical analyses.

Rather than involving in the dispute over the definition of ethnicity[3], I adopt in the present study the constructivist conceptualization of ethnicity as does Posner (2005). Posner (2005) argues that people own a repertoire of ethnic identities (e.g. language, race, tribe, and religion) whose relevance wax and wane with changes in context. In fact, Posner (2005) employs an equivalent two-steps strategy to the one described above to investigate ethnic politics in Zambia. He first identified the repertoires of potentially mobilizable ethnic identities that people have, and then explained why they choose one of the ethnic identities rather than others in political arena[4]. In the present study, I embrace a broader context of identity competition to examine whether people choose ethnicity in general rather than other potentially salient identities such as income class, age group, and political ideology when making political decisions regarding redistribution.

In addition to the above underlying drawback, scrutinizing the relevant theories on ethnic diversity and redistribution reveals another missing point in existing studies. Intuitively, if two countries have the same level of ethnic diversity, then the country

[3] See Ahlerup and Olsson (2012) for a review of this literature.
[4] See also Caselli and Coleman (2013) for another theoretical model in this literature which relates ethnic identities to the individual cost of switching identity.

whose ethnic groups reside in separate geographical regions which are decentralized the power to decide redistributive policies themselves is expected to tackle ethnic conflicts better and to bring about higher levels of redistribution. Taking into account ethnic segregation and decentralization, therefore, is not only an econometric imperative, but also a policy-driven impetus. The argument relates to a broader literature on the role of federalism in resolving ethnic conflicts in ethnically segregated countries which is often called ethno-federalism[5]. To the extent of my knowledge, however, no empirical studies have investigated the impact of ethno-federalism on redistribution.

The present study aims to amend the two shortcomings of existing studies discussed above by conducting an empirical analysis guided by the two-steps strategy described above. In general, the ultimate conclusion is that ethnic diversity is not destined to a negative impact on redistribution as prevalently demonstrated. The conclusion is founded on two novel findings. First, I find no evidence that ethnically diverse countries have lower level of redistribution on average when all the salient identities are taken into account. Second, I also find evidence of a supportive role of decentralization in promoting redistribution given critically high levels of ethnic diversity and segregation

The rest of the paper is structured as follows. In section 2, I scrutinize important existing cross-country evidences and display in details their shortcomings. In section 3, the relevant theories are systematically investigated in order to detect all potentially salient identities which have not been taken into account in existing studies. Section 4 discusses in details the measurement of the main variables, their econometric problems, and the data sources. Section 5 presents the main findings of the empirical analyses. Finally, section 6 closes the paper with some concluding remarks.

2. Existing Empirical Evidences: A Critical Review

In general, existing empirical studies on the link between ethnic diversity and redistribution can be categorized into three groups which treat redistribution as: (i) an indicator of the quality of government, (ii) a conflict between the rich and the poor, and (iii) a battle between ethnic groups. Obviously, only the third group tackles the problem directly, and it shall be taken up after examining the first two groups.

[5] See, for example, Bunce (2004), Coakley (2003), and Juhász (2005).

The initial evidence is probably discovered by La Porta et al. (1999) who argue that ethnic diversity undermines the size of government because "the [ethnic] groups that come to power fashion government policies that expropriate (or kill) the ethnic losers, restrict their freedom of opposition, and limit the production of public goods to prevent those outside the ruling group from also benefiting and getting stronger" (p. 231). Using the traditional ethnolinguistic fractionalization index[6] (ELF) as a measure of ethnic diversity, the authors showed that higher level of diversity is associated with lower level of redistribution as measured by government transfers and subsidies as percentage of gross domestic product (GDP) while controlling for a bundle of variables derived from the theoretical framework of the quality of government. The negative relationship, however, disappears when GDP per capita and latitude are taken into account. Adopting the same strategy, Alesina et al. (2003) enhance the power of the evidence by constructing another index called ethnic fractionalization which uses language and racial characteristics to categorize ethnic groups. The authors showed that their result is robust when controlling for GDP per capita and population (to capture country size), though not when controlling for latitude. The authors also found that the index is superior to the traditional ELF and religious fractionalization indices as regards empirical performance. In fact, although treating redistribution as an indicator of the quality of government, the two studies do employ the theories of ethnic conflict as their theoretical ground.

In a comprehensive study of redistribution as a conflict between the rich and the poor, Alesina et al. (2001) find a negative relationship between racial fractionalization index and social spending as percentage of GDP. The result is robust after controlling for GDP per capita and a bundle of variables (without latitude) taken from the specifications of Persson and Tabellini (2001) who study the impact of political institutions on fiscal policy outcomes. The theoretical prediction of the finding is that ethnic diversity reduces altruism toward the poor assuming that people care about the consumption of others as well as their own, and in turn reduces redistribution. As shown in the next section, altruism is only one among many potential mechanisms through which ethnic diversity may affect redistribution, let alone may be not the dominant one.

[6] See Easterly and Levine (1997), who are often regarded as the initiators of the research area in economics, for details of the index.

The third group of studies tackles the question by employing a more relevant theoretical framework that link ethnic diversity directly to redistribution. The theoretical discussion, however, is brief; and all studies only concentrate on the measurement issue of ethnic diversity. In general, the authors argue that a measure of ethnic diversity should explicitly take into account the distinctiveness between ethnic groups[7]. Adopting the same list of control variables from La Porta et al. (1999) and Alesina et al. (2003) and adding a small island dummy, Desmet et al. (2005) confirm the negative relationship for the so-called peripheral ELF index which only captures the conflicts emanate from the central dominant group and other peripheral minor groups, not from among the latter groups themselves. The index takes into account the distinctiveness between groups by using lexicological statistics for 95 Indo-European languages which focus on 200 basic meanings to compute the proportion of cognates between each pair languages. Their finding is robust with the presence of latitude. Using the same strategy as Desmet et al. (2005) and adding the fraction of population over 65, Desmet et al. (2009) find a similar result for the traditional ELF index which captures the distance between groups by the proportion of shared branches in linguistic tree diagram. In an extension, Desmet et al. (2012) calculate the ELF index at different levels of linguistic aggregation and find that only high levels matter for redistribution. The authors then conclude: "solidarity travels without trouble across groups that are separated by shallow [ethnolinguistic] gullies, but not across those separated by deep [ethnolinguistic] canyons" (p. 332). The final evidence is, probably, the most powerful one at the moment.

A common pattern of all the studies examined above is that they either rely on improper theoretical frameworks or focus mainly on the measurement of ethnic diversity. The neglect of the pertinent theoretical framework which links ethnic diversity directly to redistribution has, at least, three serious consequences. First, the evidences are unreliable because all the control variables are added based on improper theoretical foundations. In other words, all the above studies have failed to take into account all potentially salient identities to make sure that people do identify with their ethnic groups in political

[7] In fact, all the indices mentioned before implicitly assume the distance between one group and every other is uniformly 1 (Desmet et al., 2009). The assumption means, for example, the distance between Catalan and Spanish speakers in Andorra is the same as the distance between Dutch and French speakers in Belgium which is unreasonable.

decisions regarding redistribution. In the next section, I demonstrate that there are, at least, two important identities which have been omitted. Second, the interaction of ethnic segregation and decentralization has been overlooked. The theoretical framework surveyed below suggests that the interaction is expected to mitigate the negative impact of ethnic diversity on redistribution, if any. Last but not least, lacking a coherent theoretical framework makes the existing evidences difficult to interpret with precision, let alone their policy implications. In particular, I argue in the following sections that the conclusion of Desmet et al. (2012) cited above is fundamentally flawed.

3. Ethnic Diversity and Redistribution: An Appealing Relationship

3.1. Theoretical Framework

Conventional economic analysis often regards redistribution as a political battle between the rich and the poor. The general intuition behind the hypothetical negative relationship between ethnic diversity and redistribution is that people in ethnically diverse societies, both rich and poor, are more likely to build coalitions along ethnic lines to compete for and divert public resources from redistribution to their private benefits because the strategy brings them higher utility. It is exactly the sources of utility that distinguish between different theoretical branches.

The first branch emphasizes the standard source of utility, i.e. the consumption of goods and services. In other words, people only employ their identities as instruments to maximize their economic well-being by building coalitions to fight for public resources. The most general model is probably the one proposed by Fernández and Levy (2008) who study the equilibrium of a game in which coalitions of individuals with different incomes form parties, parties propose platforms, and all people vote, with the winning policy chosen by plurality. The platforms specify the values of two policy tools: a general proportional redistributive tax which is lump-sum rebated and a series of taxes used to fund the specific goods targeted to particular interest groups. The model shows that the amount of targeted goods grows in the expense of overall redistribution as the level of diversity increases because, intuitively, the rich can form coalition with interest groups among the poor to make each better off: the rich incurs lower level of total taxes, and the poor receives higher net gain (lower overall redistribution but higher targeted goods). As

diversity increases further, however, the situation is less sustainable because the cost of providing targeted goods also rises with the number of interest groups which renders the compromise unfeasible. Although theoretically interesting, the situation is unlikely to occur in reality because in face of high degree of diversity in one cleavage, people always have other (less diverse) cleavages to form coalitions. In the model, diversity may arise from differences in preferences (maybe owning to ethnic and religious affiliations), geographic locations, or individual abilities to join special interest groups that participate in the political arena. Another relevant model in the branch is Alesina, Baqir, and Easterly (1999) who employ the median voter framework to study the impact of diversity of preferences on public goods provision.

Following the spirit of Becker (1971) to embrace non-pecuniary motivations into economic reasoning, the second branch highlights altruism as a source of utility – people have stronger feelings of identification towards their own group than other groups[8]. In other words, people gain disutility from voting for redistributive programs which can be enjoyed by the poor members of other ethnic groups. The most relevant model in the branch is the one developed by Lind (2007) who employs the median voter framework to study voting behaviors of people who are members of two distinct groups, with one group is assumed to be richer than the other by the first order stochastic dominance. People are assumed to have social conscience (i.e. they do not only care about their own utility but also the social welfare level) and group antagonism (i.e. they put lower weight or completely ignore the welfare of other groups). These preferences mean that the members of the poorer group would support for redistribution while those of the richer group would not. In a restrictive manner, the model shows that an increase in diversity lowers redistributive tax rate. Furthermore, between groups inequality is demonstrated to have a negative impact on redistributive tax rate, whereas within group inequality has a positive effect on redistributive tax rate. Other relevant models in the branch are Alesina et al. (2001) and Roemer (1998), both also assume, by implication, that one group is richer than the other, at least in the eyes of richer group members, and do not model diversity directly. The first model employs the median voter framework, while the second

[8] The categorization, based on the fact that altruism is modeled as a context-free preference in the models of the branch as does Becker (1971), is just for the convenience of presentation and does not imply that all the authors share the same reasoning with Becker (1971).

uses the multi-dimensional political competition framework to introduce a non-economic issue (e.g. religion or ethnicity) besides an economic one (i.e. income).

Brushing aside many restrictive assumptions adopted in the models of the branch, its context-free approach to non-pecuniary motivations with respect to political decisions on redistribution is still problematic in explaining reality. Consider an illustrative example documented by Posner (2004b) regarding the political divisions of the Chewa and Tumbuka people in Zambia and Malawi: in Zambia, the two ethnic groups are allies while they are adversaries in Malawi. If altruism is at work, one has to explain why the same ethnic groups are altruistic towards each other in one country and antagonistic in the other. The possibility that the same context-free preference can change so easily is hard to be justified. Another possibility to save the approach is to accept that although people have non-pecuniary motivations regarding political decisions, it is the pecuniary ones that matter the most. In fact, the argument is in line with Posner (2004b, 2005) who argues ethnicity is mainly a political instrument, but in contrast with the empirical evidences that the models mentioned above seek to explain.

A more satisfactory approach which has been neglected in existing theoretical models as well as empirical studies, to the extent of my knowledge, is identity economics. In a nutshell, the branch argues for the validity of the so-called identity utility, i.e. people gain utility when their actions conform to the norms and ideals belong to the corresponding social categories that people affiliate with, and lose otherwise (Akerlof & Kranton, 2000)[9]. In their terminology, ethnic groups are social categories (identities) that people identify with, and if forming coalitions to divert public resources from redistribution for the poor to their private benefits is the norm and ideal of each ethnic group, people gain identity utilities by acting that way[10]. The stronger people identify with their ethnic groups, the higher identity utilities they get. Identity utility is context-dependent because it is the norm and ideal that brings about utility. The identity approach can simply offer an answer to the drawback mentioned above of the altruism approach in the sense that there may be different norms and ideals for the Chewa and Tumbuka

[9] People may be or may be not aware of their motivations. See also Akerlof and Kranton (2010) for a more comprehensive introduction to identity economics.

[10] Theoretically, norms and ideals may be exogenously given. But in reality, they are often manipulated by sectarian politicians, so argued Glaeser (2005).

communities in Zambia and Malawi with respect to political decisions. Furthermore, the dependence of identity utility on social context also suggests an important argument for the empirical strategy which is discussed further in the following section.

In summary, all the theories point to a negative impact of ethnic diversity on redistribution and give the empirical investigation three important notes. First, not all the models straightly demonstrate that ethnic diversity matters – there are no apparent differences between having two or many ethnic coalitions. The ambiguity opens an empirical competition between two types of measure of ethnic antagonism: diversity and polarization[11]. Second, the distinctiveness between ethnic groups is also not explicitly shown to be important in all the models. The point is important for choosing the right index and is discussed in details in the next section. Third, all the models use voting as the mechanism to aggregate social preferences which in turn strictly implies that only countries with voting mechanism, or democracy in general, should be considered in empirical investigation. Nevertheless, the models should be interpreted to accommodate a broader notion of political competition, including both formal and informal, because voting is hardly the only mechanism in reality that determines public policies. The argument is in line with Acemoglu and Robinson (2008) who show public policies are influenced by the interplay between de jure political power (allocated by political institutions) and de facto political power (investments to influence the course of politics).

3.2. Competing Identities

The above theoretical framework apparently suggests that people may identify with any identities besides ethnicity when making political decision regarding redistribution as long as they can gain higher utility. As a consequence, all the potentially salient identities in the context of political decisions on redistribution have to be controlled for in the empirical analysis in order to show that people do identify with their ethnic groups. Although existing studies have accidentally included some of them (e.g. age groups), it is still not exhaustive. In particular, there are two more salient cleavages should definitely be taken into account.

[11] See Bossert, D'Ambrosio, and La Ferrara (2011) for the characterization of the generalized diversity index as well as comparison with other indices, and Esteban and Ray (1994) for the characterization of polarization index.

First, all the models mentioned above are built on the idea that the presence of ethnicity dilutes or even changes the political competition for redistribution from a conflict between the rich and the poor into a battle between ethnic groups. Therefore, one must control for income inequality in order to empirically test this hypothesis. In other words, before proving that ethnic diversity matters, one has to assure that people do identify with their ethnic groups instead of income classes. Theoretically, identity utility may also exist when people identify with their income classes. Surprisingly, no cross-country studies have included income inequality in their regressions given the large amount of empirical studies regarding its impact on redistribution[12].

Second, the most important, although subtle, difference between the two approaches to non-pecuniary motivations regarding political decisions on redistribution is that if altruism is the only source of utility at work, poor people in the richer group will definitely vote against redistribution; but if identity is the only source of utility, the outcome is not necessarily the same. This is because ethnicity is not the sole social category that people may affiliate with, and gaining utility by conforming to the norms and ideals of their ethnic groups also means that people get disutility by not conforming to the other social categories whose norms and ideals are opposite to the ones of their own ethnic groups. In other words, if people vote against redistribution just because they do not want members from other ethnic groups to receive the benefits, they are getting disutility if they identify with any other social categories outside their own ethnic groups whose norms and ideals are equivalent to, for example, "all men are created equal" regardless of their ethnicity. Thus, the stronger identification people have with the relevant social categories, the less likely they identify with their ethnic groups, and the more likely they vote for redistribution. Undoubtedly, there is one social category contains the norm and ideal in question which should be termed "anti-discrimination". Similar to income inequality, before showing that ethnic diversity negatively affects redistribution, one has to demonstrate that people do identify with their ethnic groups instead of anti-discrimination.

But does identity utility exist? Or are all the non-pecuniary motivations are just context-free altruism? Akerlof and Kranton (2010) document a huge amount of narrative

[12] See Bénabou (1996) and Milanovic (2000) for two reviews of this literature.

accounts from sociology as well as experimental evidences from sociological psychology and behavioral economics which convincingly prove the existence of identity utility in many social contexts. In the context of redistribution, Klor and Shayo (2010) conduct an interesting experiment based on Minimum Group framework to show the significant role of identity utility in explaining voting behavior. The authors recruited 180 students from the pool of undergraduates from the Faculty of Social Sciences or the Faculty of Humanities at Hebrew University of Jerusalem to take part in an experiment where subjects were accordingly divided into two equal groups, knew their gross incomes and the overall average gross income, then voted anonymously over a redistributive scheme consisting of a linear tax and a lump sum transfer which was chosen by majority rule. The only difference between the treatment and the control groups was that subjects in the treatment group were informed about the existence and the size of two groups, their group affiliation, and knew the mean gross income of each group. The authors found that subjects in the treatment group systematically deviate from monetary payoff maximization towards the tax rate that benefits their group when the monetary cost of doing so was not too high. The experiment is hardly representative for real political decisions regarding redistribution, but the fact that individual behaviors are so susceptible to such a weak natural grouping does prove the existence of identity utility[13].

3.3. Decentralization and Segregation

Another implication of the theoretical framework is that all the factors affect the payoffs of building coalitions along ethnic lines are expected to influence the relationship between ethnic diversity and redistribution. The argument points to an important role of ethnic segregation and decentralization in mitigating the negative impact of ethnic diversity on redistribution.

To elaborate this argument, consider three hypothetical countries A, B, and C in which country A is ethnically homogeneous, whereas country B and C have the same levels of ethnic diversity. As implied by the theoretical framework, A has a higher level

[13] In fact, the authors argued that the identity utility comes from caring about the group status, not conforming to norm and ideal because there is no norm and ideal in their experimental design. This is not necessarily true because (1) caring about the group status itself might be a norm and ideal, and (2) norm and ideal might exist well before subjects took part in the experiment.

of redistribution than B and C if other things being equal. Assuming that B has ethnic groups living in different geographical units which are decentralized the power to decide redistributive policies themselves, then all sub-national units are ethnically homogeneous. As a result, all three motivations behind building coalitions along ethnic lines cease to exist in B; and B is expected to have a higher level of redistribution than C if C only has either ethnic segregation or decentralization, or none. Furthermore, the mitigating effect may be large enough to cancel the negative impact of ethnic diversity and bring B a higher level of redistribution compared to A. Apparently, decentralization alone does not help if the levels of ethnic diversity in sub-national units are the same with the national level in general, and so does ethnic segregation if the power to decide redistributive policies are not decentralized. In other words, ethnically diverse countries with ethnic segregation and decentralization are theoretically better than their counterparts, who have either one or none of the two features, in tackling ethnic antagonism in redistributive policies because these policies are, partially or completely, decentralized to ethnically homogeneous sub-national units.

The hypothesis relates to a broader literature on the role of ethno-federalism in resolving ethnic conflicts, supporting democratic politics, and strengthening state viability. Bunce (2004) defines four general features of ethno-federalism: (i) territorially defined subunits; (ii) dual sovereignty where the center and the subunits each have their own political and economic spheres of responsibility; (iii) a relationship between the center and the subunits that combines autonomy and coordination; and (iv) the subunits are composed of geographically concentrated ethnic groups. In general, the performance of ethno-federalism is mixed and seems to depend on the initial condition within which it is installed (Bunce, 2004). In a relevant empirical study, however, Charron (2009) finds that ethno-federalism outperforms unitary system as regards the quality of government across countries given a critical level of ethnic diversity.

4. Data

4.1. Redistribution

The theoretical framework suggests the proper measure of redistribution is all public programs from which all people can benefit as soon as they are legally eligible,

regardless of their ethnicity. The variable, therefore, should be aggregated at general government level. It goes without saying that every public policy has its redistributive aspect to some extent, explicitly or by implication (Tullock, 1997). The fact makes redistribution not straightforward to be defined in practice. Nevertheless, conventional economic analysis often focuses on public spending that explicitly favors the poor[14].

Following the convention, all the cross-country studies reviewed above employ the same measure of redistribution as initially used by La Porta et al. (1999): general government transfers and subsidies as percentage of GDP averaged for three years 1985, 1990, and 1995. Alesina et al. (2001) is an exception who use central government social spending instead. According to International Monetary Fund (2001, p. 10): "The general government sector consists of all government units and all nonmarket NPIs [nonprofit institutions] that are controlled and mainly financed by government units". Although this measure may have serious problems which are discussed in details below, I still employ it in the present study because the purpose is to show that the negative relationship between ethnic diversity and redistribution is not as robust as found in existing studies given the potentially problematic nature of the measure. The studied period is, however, from 2000 to 2005 instead for two reasons. First of all, the coverage and quality of the data are clearly better not only for transfers and subsidies but also for other variables as well. Second, the period is chosen to partially mitigate the endogeneity problem of ethnic diversity which is discussed further below. The main findings in the next section hold for other periods (i.e. 2000-2003, 2000-2007, 2000-2010) and are available upon request.

A deeper investigation into the dataset of this measure, which is from Economic Freedom of the World Project (Gwartney, Hall, & Lawson, 2012), discovers serious caveats. Because there is no detailed information on the components of transfers and subsidies in all the annual reports of Economic Freedom of the World Project, I have to resort to their primary data sources. According to the International Monetary Fund (2001), government transfers on the expense side consist of social security benefits, social assistance benefits, and employer social benefits among others; and subsidies include subsidies to public corporations and private enterprises. Whereas there is no doubt that ethnic groups may also compete for subsidies granted to public corporations and private

[14] See Alesina and Glaeser (2004) for a typical example.

enterprises, it is hard to justify the subsidies as public programs from which all people regardless of their ethnicity can benefit.

Consider first the definition of subsidy. According to International Monetary Fund (2001, p. 70), "subsidies are current unrequited payments that government units make to enterprises on the basis of the levels of their production activities or the quantities or values of the goods or services they produce, sell, export, or import". For example, the subsidies can be on "payroll or workforce, which are payable on the total wage or salary bill, the size of the total workforce, or the employment of particular types of persons; subsidies to reduce pollution; and payments of interest on behalf of corporations" (p. 70). This definition suggests that if the public corporations and private enterprises are mainly occupied by one ethnic group, then these subsidies are nothing but ideal targeted goods[15]. As a consequence, including them in the measure of redistribution is theoretically (and also practically if their fractions are large) problematic. Transfers and subsidies as percentage of GDP may be not a good indicator of the quality of government as noted by La Porta et al. (1999), it is definitely not a proper measure of redistribution to study the impact of ethnic diversity.

Therefore, in order to investigate the hypothesis in a better manner, I employ a more exact measure of redistribution which is public social expenditure as percentage of GDP averaged from 2000 to 2005. Public social expenditure consists of benefits from old age, survivors, incapacity related, health, family, active labor market programs, unemployment, housing, and other social policy areas. Data of this measure are taken from Social Expenditure Statistics of the Organization for Economic Co-operation and Development (OECD) which is of high quality, but covers only 34 countries. The main findings in the next section hold for other periods (i.e. 2000-2003, 2000-2007, 2000-2010) and are available upon request.

4.2. Ethnic Diversity: Measurement and Endogeneity

In the simplest version, the ethnic diversity index measures the probability that two randomly selected persons from a given country do not belong to the same ethnic group:

[15] The same argument can be applied, at a lesser extent, to employer social benefits whose definition can be found at International Monetary Fund (2001, p. 72).

$$Ethnic\ Diversity = 1 - \sum_{k=1}^{K} p_k^2 \ ,$$

where p_k is the population share of groups k. An important, but often overlooked, implication of all the theories investigated above is that all the ethnic groups must be relevant and eligible to compete in political arena. Undoubtedly, not all ethnic groups are politically relevant and the exact measure of ethnic diversity must take into account only the relevant ones (Posner, 2004a). The example of the Chewa and Tumbuka peoples in Zambia and Malawi mentioned above is an illustration of the idea that the presence of ethnic groups does not necessarily mean the existence of ethnic coalitions. The argument is also supported by Campos and Kuzeyev (2007) who investigate 26 former communist countries in the period from 1989 to 2002 and find that the countries remarkably became more homogeneous over the period with respect to ethnicity (e.g. Moldavian, Romanian, and Russian), but not language and religion. Rather than using diversity indices based on language and/or race, Posner (2004a) suggests using a diversity index based on politically relevant ethnic groups (PREG) and constructs the index for 42 African countries.

Although it is not explicitly considered in the theoretical models examined above, taking into account the distinctiveness between groups, approximated by linguistic differences, has been found to significantly improve the diversity index as regards statistical performance [Desmet et al. (2012; 2005, 2009)]. This creates another difficulty in constructing the right diversity index because differences between ethnic groups may come from language, income, education, and so on (Bossert et al., 2011). As a consequence, the construction of an appropriate diversity index requires aggregation across all the dimensions of differences. In fact, it is what Bossert et al. (2011) call the grouped-version generalized fractionalization index:

$$Ethnic\ Diversity = 1 - \sum_{k=1}^{K} \sum_{l=1}^{K} p_k\, p_l\, s_{kl} \ ,$$

where s_{kl} is the similarity matrix of group k and l.

It goes without saying that constructing a diversity index that can exactly reflect the true politically relevant ethnic groups as well as the general differences between them in each country is a daunting task. As a result, while waiting for such an ideal index, one still has to rely on existing ones. All the indices mentioned above are, of course, not

perfect, but they are useful as long as their imperfection is acknowledged. In details, all indices should only be interpreted as proxies for the true patterns of ethnic diversity whether their categorization of ethnic groups is based on language, race, or religion. And a proxy is not necessarily an explanation itself. In Desmet et al.'s (2012) rhetoric, it is not that "solidarity travels without trouble across groups that are separated by shallow [ethnolinguistic] gullies, but not across those separated by deep [ethnolinguistic] canyons", but categorizing ethnic groups using deep canyons proxies better for the true solidarity patterns than using shallow gullies.

In the spirit of Posner (2004a), one may still argue that even using the above interpretation, the procedure of choosing an index that has the best empirical performance in order to show the negative relationship between ethnic diversity and redistribution is scientifically problematic. Nevertheless, the aim of the present study is to show that the link between ethnic diversity and redistribution is not as robust as found in existing studies, given their potentially problematic research approach. Therefore, all the proposed hypotheses are tested by using the ELF index that takes into account the distinctiveness between groups, approximated by the proportion of shared branches in linguistic tree diagram, constructed by Desmet et al. (2012) at different levels of linguistic aggregation. This is the most powerful index with respect to statistical performance at the moment.

Another empirical problem of ethnic diversity is endogeneity. First, researchers have recognized that there may be reverse causality between ethnic diversity and redistribution. For example, different redistributive policies may influence migration between countries, the formation of ethnic coalitions within countries, or the fertility rates of ethnic groups which in turn may affect ethnic diversity. Nevertheless, the shares of ethnic groups are argued to be sufficiently stable so that changes only have a minor impact on diversity index (Alesina et al., 2003). The argument is supported by the fact that in 42 African countries whose PREG index are available for each decade from 1960 to 1990, only one country has PREG index changes after three decades and four countries change after two decades (Posner, 2004a). In case of language, the study conducted by Campos and Kuzeyev (2007) mentioned above find that there are no significant changes in linguistic diversity over the period from 1989 to 2002 in 26 former communist countries. In addition, the ELF index is constructed at different years for different

countries ranging around the period from around 1980 to 2000. Therefore, the reverse causality can be largely mitigated since there is no reason to expect that redistribution in 2000s affects ethnic diversity in, for example, 1990s. Of course, one may still argue that people may consider future prospect of redistribution when making decision on migration, and their expectations somehow transfer into actual redistribution (e.g. through voting).

Second, other potential sources of endogeneity come from unobserved country-specific characteristics which may affect both ethnic diversity and redistribution. For example, Ahlerup and Olsson (2012) and Michalopoulos (2012) identify several geographical, historical, and political variables that can explain substantially the variation in ethnolinguistic diversity across countries. Geographical and historical variables include variation in land quality, variation in elevation, latitude, and duration of human settlements since prehistoric times. To the extent to which these variables influence redistribution through income (Olsson & Hibbs, 2005), the inclusion of GDP per capita in the regression may minimize the problems posed by endogeneity. Political variables such as national building may also affect redistributive policies. Nevertheless, using value of linguistic diversity index in 1960s as instrumental variable for the value in 1990s, Desmet et al. (2005) find that endogeneity is unlikely a serious concern. In summary, the endogeneity problem of ethnic diversity seems negligible which may explain why existing studies, except Desmet et al. (2005), have never tackled them. As a consequence, it is adequate for the present study to also treat ethnic diversity as an exogenous variable.

4.3. Income Inequality

Following conventional empirical investigation, the traditional Gini index is employed to capture income inequality. In particular, the Gini index is calculated for gross income – i.e. income before taxes and transfers – which is the proper definition of income to study redistribution. Undoubtedly, gross income inequality is potentially endogenous because redistributive policies may affect individual gross income, and including it may affect the estimates of other variables. In order to avoid the problem, the Gini index is calculated by taking the average value in the period of 1990-1999. Data of this measure are taken from Solt (2009) which is, to the extent of my knowledge, the most suitable dataset for the purpose of the present study as regards comparability and coverage.

4.4. Anti-Discrimination

It is intuitively hard to find a variable to capture the strength that people identify with anti-discrimination, but I suggest using the educational performance for two reasons. First, identities are not just only a matter of discovery, but also a matter of choice – i.e. people do have choices, consciously or not, over their identities even when discoveries occur (Sen, 1999, 2006). Thus, it is reasonable to argue that education empowers people the ability to reason about their identities (and the corresponding norms and ideals) rather than simply accepting them as something pre-determined by destiny (e.g. ethnicity). By implication, Sen (1999, p. 26) argues: "An Afgan girl today, kept out of school and away from knowledge of the outside world, may indeed not be able to reason freely. But that does not establish an *inability* to reason, only a lack of opportunity to do so."

Second, education enhances the strength that people identify with anti-discrimination because conveying the basic human value that "all men are created equal" regardless of their ethnicity is indisputably one of the primary goals of the educational system. Although religious fractionalization index has been shown to be inferior to its competitors based on statistical performance, the above argument is partially supported by the empirical evidences on the impact of education on secularization[16]. If education can make people identify less to religious beliefs, it can do so, maybe with much ease, with those norms and ideals derived from linguistic, racial, or tribal communities.

The empirical studies on the preferences for redistribution based on survey data have pointed to a negative relationship between the educational attainment and support for redistribution which may indicate that higher educated people often have higher expected future income and social mobility (Alesina & Giuliano, 2009). It is, however, hard to justify that the average years of schooling may capture income and social mobility at the national level. For example, Alesina et al. (2001) show that people in European countries and the U.S are different in their opinions about income and social mobility, given the similar average years of schooling of these countries. Another possibility is that education may also pick up political ideologies and values that potentially affect preferences for redistribution such as individualism, libertarianism, or

[16] See, for example, Becker, Nagler, and Woessmann (2012); Glaeser and Sacerdote (2008); and Hungerman (2011).

egalitarianism. It is, however, unlikely that educational systems are essentially designed to affect any of these factors. In addition, the fact that socialist legal origin is also controlled for, which is discussed further below, renders this possibility more unlikely.

Educational performance is measured by the average years of schooling. Similar to income inequality, it is potentially endogenous since redistributive policies may influence individual educational performance, and including it may affect the estimates of other variables. In order to avoid reverse causality, the variable is measured in 1990; all the main findings also hold for value from 2000 and are available upon request. Data are taken from Cohen and Soto (2007) which is, to the extent of my knowledge, the best cross-country dataset in educational performance with respect to quality and coverage.

4.5. Ethnic Segregation and Decentralization: Measurement and Endogeneity

I employ a dummy variable of ethno-federalism to capture the combination of ethnic segregation and decentralization. This is a rough measure because ethno-federalism also includes many other features besides decentralization of redistributive policies. The measure, however, is the most appropriate one in the context of the present study, to the extent of my knowledge. Based on the ethno-federalism literature, Charron (2009) identifies 13 ethno-federations as follows: Belgium, Bosnia and Herzegovia, Canada, Ethiopia, India, Malaysia, Nigeria, Pakistan, Russia, Saint Kitts and Nevis, South Africa, Spain, and Switzerland. Except for Nigeria and Saint Kitts and Nevis, data on transfers and subsidies are available to all countries.

Nevertheless, the most important feature of decentralization suggested by the theoretical framework is the power of sub-national governments to decide, partially or completely, redistributive policies. This feature is checked with the database of political institutions constructed by Beck, Clarke, Groff, Keefer, and Walsh (2001). Except Pakistan, Russia, and South Africa whose data are not available, other ethno-federal countries are confirmed by Beck et al. (2001) to have state/province governments possess authority over taxing, spending, or legislating. The following analyses, therefore, are conducted with and without Pakistan, Russia, and South Africa.

Although ethno-federalism itself is not our variable of interest, readers should note that there may be some country-specific unobserved characteristics that put ethno-

federalism in place and also affect redistribution. For example, countries that are left-wing biased may advocate ethno-federation because of their concern with redistribution. If one believes that the endogeneity problem of ethno-federalism is somehow transmitted to its interaction term with ethnic diversity, which is our variable of interest, the consistency of the estimated coefficient of this interaction term can be suspected.

In an attempt to defy this suspicion, I have tried a range of instrumental variables suggested by the literature on fiscal decentralization and ethnic segregation which includes country area as argued by Panizza (1999), hypothetical ethnolinguistic segregation index constructed by Alesina and Zhuravskaya (2011), and geographical variables as suggested by Michalopoulos (2012). All of them, however, turn out to be weak instruments according to Stock and Yogo's (2005) critical values; the results are available upon request. Since weak instruments are not necessarily better than no instruments at all (Kennedy, 2008), I have to rely on the assumption that the potential endogeneity of the interaction term between ethno-federalism and ethnic diversity is negligible in order to treat it as exogenous in the following statistical analyses.

4.6. Control variables

The most parsimonious list of control variables employed in the empirical investigation includes: (i) the fraction of population over 65, which is used to capture the mobilization of the elderly to vote for social spending (Lindert, 2004b); (ii) socialist legal origin, which is used to catch the strength that people identify with socialism (Alesina & Fuchs-Schündeln, 2007); (iii) the natural logarithm of GDP per capita, which is used to control for the influence of economic development on preferences of voters regarding private and public consumption as conjectured by the so-called Wagner's law (Mueller, 2003), and on institutional quality regarding the efficiency of the tax system (Alesina et al., 2001); (iv) the natural logarithm of openness measured by the share of exports plus imports in GDP, which is used to account for the insurance element in redistributive programs as found in the empirical work of Rodrik (1998), and also the greater availability of tax bases (Goode, 1984); (v) plurality electoral rule, which is used to capture the influence of political institutions as found in Persson and Tabellini (2003). Countries that have their electoral rules changed in the studied period of redistribution are excluded, and all other

variables except socialist legal origin are averages in the period from 1990 to 1999 to avoid potential reverse causality.

In contrast to many existing studies, the present study does not control for population and latitude. Although big countries may have small governments because of economy of scale in producing public goods (Alesina & Wacziarg, 1998), this is unlikely in case of redistributive programs, so argued Alesina et al. (2001). Countries in temperate zones have more productive agriculture which has enabled them to develop their economies and abilities to redistribute (Olsson & Hibbs, 2005). Nevertheless, there is no theoretical ground to believe that latitude affects redistribution directly; since GDP per capita is already controlled for, including latitude is unnecessary.

Similarly, all legal origins (except socialist one which is discussed above) and religious affiliations are also deselected since they are purposed to test those hypotheses regarding the quality of government, not redistribution. In fact, La Porta et al. (1999) do not even have definite theoretical predictions for the impacts of these variables on the size of government, let alone the size of government itself is a problematic measure of the quality of government as the authors admitted. Furthermore, religious affiliations should be considered as a measure of ethnic diversity which uses religion to categorize ethnic groups. From this perspective, religious fractionalization index has been shown to be inferior to other fractionalization indices with respect to statistical performance (Alesina et al., 2003).

Finally, I am aware of the omission of income and social mobility which have been proved to affect preferences for redistribution in micro-level empirical studies (Alesina & Giuliano, 2009). Nevertheless, the omission is unlikely to create any significant impact for two reasons. First, it is the perception of income and social mobility that matters for redistributive preferences, and they are highly correlated with the beliefs in fairness (Alesina et al., 2001) – simply speaking, efforts are duly rewarded and the rich is deserved to what they have. But Isaksson and Lindskog (2009) show that beliefs in fairness do little to explain differences in preferences for redistribution across countries. Second, there is no reasonable argument to justify that perception of income and social mobility is correlated with ethnic diversity and ethno-federalism. Hence, in the worst case, the efficiency of the estimates is affected, but not their consistency.

5. Empirical Analysis

5.1. Empirical Strategy

The general equation to be estimated is:

$$Redistribution_i = \alpha_0 + \alpha_1 EthnicDiversity_i + \alpha_2 IncomeInequality_i + \alpha_3 Antidiscrimination_i + \alpha_4 EthnoFederalism_i + \alpha_5 EthnicDiversity*EthnoFederalism_i + \lambda X_i + \varepsilon_i,$$

where X is a vector of control variables which are commonly used in existing cross-country studies. Appendix A provides detailed information about all variables, and appendix B presents their summary statistics and pairwise correlations.

The investigation estimates two sets of regression models. The first set excludes ethno-federalism and its interaction term with ethnic diversity and tests the traditional hypothesis about the negative relationship between ethnic diversity and redistribution (α_1). The second set includes ethno-federalism and its interaction term with ethnic diversity which allows us to examine the role of ethno-federalism in mitigating the negative impact of ethnic diversity on redistribution (positive sign of α_5). In other words, being an ethno-federation is expected to mitigate, or even cancel out, the negative impact of ethnic diversity on redistribution given a specific level of diversity. Note that the magnitude of the impact depends on the level of ethnic diversity. It is also worth noting that the coefficient of ethno-federalism in the above equation α_4, is nothing but the impact of being an ethnically-homogeneous federation.

5.2. Main Results

In the present section, I concentrate only on presenting some representative results; all details of other results are available upon request. Table 1 presents the results of regressing transfers and subsidies as percentage of GDP on the ELF index calculated at the first level of linguistic aggregation which is denoted by ELF(1) and a set of other control variables. Column 1 of the table replicates almost the same specification as followed by Desmet et al. (2012). Not surprisingly, the coefficient of ELF index is negative and significant at 5% level, a result similar to the one reported by Desmet et al. (2012), though its absolute size is smaller (4.141 versus 4.472). Moreover, the coefficient of ELF index ceases to be significant at 10% level when the linguistic aggregation

reaches to the fifth level, compared to the sixth level as reported by Desmet et al. (2012). These differences may be due to differences in specification and studied period. But in general, the well-known negative relationship between ethnic diversity and redistribution continues to hold.

Table 1. Transfers and Subsidies (2000-2005) and ELF.

Variables	Transfers and Subsidies as Percentage of GDP			
	(1)	(2)	(3)	(4)
ELF(1)	–4.141**	–3.475*	–1.797	–1.586
	(0.020)	(0.093)	(0.386)	(0.458)
Gini Index (1990-1999)		–0.053		–0.064
		(0.293)		(0.227)
Average Years of Schooling (1990)			0.103	0.094
			(0.559)	(0.590)
Fraction of Population over 65	0.927***	0.970***	1.179***	1.164***
(1990-1999)	(0.000)	(0.000)	(0.000)	(0.000)
Socialist Legal Origin	2.979**	2.388**	–0.396	–0.866
	(0.011)	(0.047)	(0.794)	(0.593)
Ln GDP Per Capita (1990-1999)	1.248***	1.050***	0.415	0.39
	(0.000)	(0.005)	(0.443)	(0.477)
Ln Openness (1990-1999)	0.356	0.280	0.310	0.294
	(0.576)	(0.680)	(0.653)	(0.678)
Plurality Electoral Rule (2000-2005)	–1.503**	–1.684**	–1.494**	–1.670**
	(0.033)	(0.021)	(0.048)	(0.031)
Observations	113	108	79	78
Adjusted R^2	0.779	0.775	0.824	0.824

Notes: Estimated with OLS, p-values are in parentheses, calculated with robust standard errors. Constant terms are suppressed to save space. ELF(1): Ethnolinguistic Fractionalization Index, calculated at the first level of linguistic aggregation.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Column 2 of table 1 adds Gini index to the list of regressors. The coefficient of ELF index is still negative but only significant at 10% level and its absolute size decreases substantially from 4.141 to 3.475. Nevertheless, it stops being significant at

10% level after the third level of linguistic aggregation. Controlling for income inequality does change the negative impact of ethnic diversity. Column 3 of table 1 replaces Gini index by average years of schooling. The coefficient of ELF index is still negative but highly insignificant with a sheer drop in its absolute size from 3.956 to 1.451. Furthermore, no levels of linguistic aggregation of the index can survive the significant test at 10% level. The coefficient of average years of schooling has the expected sign, although not significant. Compared to income inequality, educational performance hits the negative impact of ethnic diversity much stronger. Finally, column 4 of table 1 adds both Gini index and average years of schooling to the list of regressors. The coefficient of ELF index has the expected sign but it is not statistically significant.

Contrary to Desmet et al. (2012; 2009)'s findings, adding average years of schooling also changes the effect of having socialist legal origin on transfers and subsidies from positive to negative although it is insignificant. In other words, holding education (and other variables) constant, there is no evidence that having socialist legal origin brings about higher level of redistribution on average. The coefficient of GDP per capita has the expected sign but it is insignificant when average years of schooling is added. The coefficient of openness also has the expected sign but it is insignificant, a result which is different from Rodrik (1998). Among all specifications and levels of linguistic aggregation, only the coefficients of fraction of population over 65 and plurality electoral rule are robustly significant with the expected signs which are in line with those findings reported by Lindert (2004b) and Persson and Tabellini (2003).

In order to access the robustness of the results, I re-estimate all regression models using social expenditure as percentage of GDP as the dependent variable. The sample now only includes OECD countries. The coefficient of ELF index is not significant at conventional levels in all regression models at all levels of linguistic aggregation. Ethnic diversity does not explain the differences in redistribution across OCED countries. Furthermore, the coefficient of average years of schooling is highly significant in regression models 3 and 4 at all levels of linguistic aggregation. The size of this coefficient is around 1 indicating that one extra average years of schooling is associated with 1% increase in the fraction of social expenditure in GDP on average. Again, only the coefficients of fraction of population over 65 and plurality electoral rule are robustly

significant and have the expected signs in all regression models at all levels of linguistic aggregation. The coefficients of GDP per capita and socialist legal origin are negative and only significant at conventional levels when average years of schooling is added. Finally, the coefficients of Gini index and openness are also insignificant in this sample.

Table 2. Social Expenditure (2000-2005) and ELF.

Variables	Social Expenditure as Percentage of GDP			
	(1)	(2)	(3)	(4)
ELF(1)	–7.103	–7.196	1.705	1.866
	(0.378)	(0.379)	(0.862)	(0.856)
Gini Index (1990-1999)		0.090		0.043
		(0.462)		(0.746)
Average Years of Schooling (1990)			1.071***	1.056***
			(0.004)	(0.008)
Fraction of Population over 65	1.480***	1.393***	1.962***	1.921***
(1990-1999)	(0.000)	(0.000)	(0.000)	(0.000)
Socialist Legal Origin	–0.897	0.382	–7.547**	–7.053*
	(0.588)	(0.853)	(0.038)	(0.060)
Ln GDP Per Capita (1990-1999)	–0.734	–0.132	–5.781***	–5.450**
	(0.533)	(0.917)	(0.000)	(0.010)
Ln Openness (1990-1999)	–0.226	–0.080	–0.954	–0.876
	(0.828)	(0.941)	(0.291)	(0.375)
Plurality Electoral Rule (2000-2005)	–3.223**	–3.125**	–4.045*	–3.955*
	(0.017)	(0.024)	(0.060)	(0.083)
Observations	33	33	26	26
Adjusted R^2	0.727	0.720	0.798	0.787

Notes: Estimated with OLS, p-values are in parentheses, calculated with robust standard errors. Constant terms are suppressed to save space. ELF(1): Ethnolinguistic Fractionalization Index, calculated at the first level of linguistic aggregation.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

I now turn to the second set of regression models to examine the role of ethno-federalism in mitigating the negative impact of ethnic diversity on redistribution. Table 3 reports the regression results for both measures of redistribution while adding ethno-

federalism and its interaction term with ELF index to the list of regressors. For convenience, the ELF index calculated at the fifth level of linguistic aggregation, which is denoted by ELF(5), is chosen to present the results.

Table 3. Redistribution (2000-2005) and Ethno-Federalism.

Variables	Transfers and Subsidies as Percentage of GDP		Social Expenditure as Percentage of GDP	
	(1)	(2)	(3)	(4)
ELF(5)	–0.413	–0.972	1.751	0.092
	(0.771)	(0.522)	(0.607)	(0.985)
Ethno-Federalism	–0.262	–3.605**	–0.341	–1.742
	(0.825)	(0.021)	(0.862)	(0.557)
ELF(5)*Ethno-Federalism		6.617***		4.389
		(0.003)		(0.496)
Gini Index (1990-1999)	–0.072	–0.06	0.039	0.03
	(0.143)	(0.243)	(0.772)	(0.836)
Average Years of Schooling (1990)	0.095	0.062	1.092**	1.022**
	(0.590)	(0.731)	(0.017)	(0.050)
Fraction of Population over 65	1.191***	1.216***	1.948***	1.974***
(1990-1999)	(0.000)	(0.000)	(0.000)	(0.000)
Socialist Legal Origin	–1.289	–1.334	–7.156**	–7.119*
	(0.411)	(0.392)	(0.047)	(0.059)
Ln GDP Per Capita (1990-1999)	0.327	0.355	–5.818**	–5.774**
	(0.554)	(0.518)	(0.024)	(0.030)
Ln Openness (1990-1999)	0.236	0.258	–1.184	–1.367
	(0.752)	(0.724)	(0.420)	(0.344)
Plurality Electoral Rule (2000-2005)	–1.692**	–1.652**	–4.199*	–4.152*
	(0.032)	(0.037)	(0.083)	(0.099)
Observations	78	78	26	26
Adjusted R^2	0.821	0.823	0.775	0.763

Notes: Estimated with OLS, p-values are in parentheses, calculated with robust standard errors. Constant terms are suppressed to save space. ELF(5): Ethnolinguistic Fractionalization Index, calculated at the fifth level of linguistic aggregation.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

First, the coefficient of ethno-federalism is negative but insignificant in regression models with no interaction term (models 1 and 2) at all levels of linguistic aggregation. Nevertheless, adding the interaction term makes the coefficient of ethno-federalism significant at 5% level in the case of transfers and subsidies (model 2) at all levels of linguistic aggregation, except the first one. Second, the interaction term also has the expected positive sign and significant at 10% level in the case of transfers and subsidies at all levels of linguistic aggregation (model 2). Both coefficients have similar signs but insignificant in the case of social expenditure. In the case of transfers and subsidies, the absolute sizes of the coefficients of ethno-federalism and its interaction term with ELF index vary across different levels of linguistic aggregation, with the value of the interaction term always larger than the one of ethno-federalism. These results suggest that being an ethno-federation hurts redistribution in total when ethnic diversity is under a critical level, but helps otherwise. Although ethno-federalism itself is not the variable of interest in the present study, its negative coefficient indicates that being an ethnically-homogeneous federation harms redistribution which may be in line with the literature on fiscal federalism[17]. Note that the sign and significance pattern of all other variables are almost the same with the results reported in tables 1 and 2. All the main findings are the same if Pakistan, Russia, and South Africa are excluded.

Table 4. Marginal Effect of Ethno-Federalism on Transfers and Subsidies.

ELF(5)	0	0.1	0.3	0.5	0.7	0.9	1
dy/dx	-3.61**	-2.94**	-1.62	-0.30	1.03	2.35*	3.01**
	(0.018)	(0.031)	(0.152)	(0.774)	(0.352)	(0.075)	(0.040)

Notes: p-values are in parentheses, calculated by Delta method. ELF(5): Ethnolinguistic Fractionalization Index, calculated at the fifth level of linguistic aggregation.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

As an illustration, I choose the ELF index at the fifth level of linguistic aggregation to present the marginal effect of being an ethno-federation on transfers and subsidies. The critical level of ethnic diversity is 0.545 – i.e. when ELF index is above 0.545, the marginal effect of being an ethno-federation is positive. Table 4 and appendix C report the marginal effect for different levels of ELF index. The marginal effect ranges

[17] See Oates (1999) for a review of this literature.

from -3.61 to +3.01 percentage point as ELF index moves from minimum to maximum. It is significant at 10% level at either low or high levels of ELF index. As an example, when the level of ethnic diversity is at maximum, being an ethno-federation increases transfer and subsidies as percentage of GDP three percentage point on average.

5.3. Robustness

In order to check for robustness of the findings presented in the previous section, I conduct a series of exercises. First of all, Desmet et al. (2012; 2005, 2009) include in their analyses a dummy variable for small islands, i.e. island countries whose population are below 0.5 million, in order to control for outliers. This is a minor concern in the present study because no small islands, in terms of the above definition, have data on average years of schooling. In all regression models which do not include average years of schooling, the results are basically the same if a small island dummy is included.

Second, all the main findings hold when regional fixed effects are also taken into account. For illustration, table 5 reports the regression results for transfers and subsidies when regional dummies are controlled for. As found above, no levels of linguistic aggregation of ELF index can survive the significant test at 10% level when average years of schooling is added, and ethno-federalism is significantly beneficial for transfers and subsidies as percentage of GDP at a critical level of ethnic diversity. In addition, the coefficients of fraction of population over 65 and plurality electoral rule are robustly significant at conventional levels throughout all specifications and levels of linguistic aggregation of ELF index.

As mentioned before, not all the relevant theories explicitly imply if ethnic diversity or polarization matters. Desmet et al. (2012; 2009) find that both types of indices are quite similar as regards empirical performance once the distinctiveness between groups is taken into account. Therefore, I replicate all the above analyses with the ethnic polarization index (POL) calculated at different levels of linguistic aggregation and find the main results unchanged: no levels of linguistic aggregation of POL index can survive the significant test at 10% level when average years of schooling is added; and ethno-federalism is significantly beneficial for transfers and subsidies at a critical level of ethnic polarization, but only at the first and second levels of linguistic aggregation. The results of other variables are almost the same as before.

Table 5. Transfers and Subsidies (2000-2005) and ELF: Regional Fixed Effects.

Variables	Tranfers and Subsidies as Percentage of GDP				
	(1)	(2)	(3)	(4)	(5)
ELF(5)	-2.514**	-2.271*	-0.911	-0.799	-1.116
	(0.049)	(0.099)	(0.518)	(0.567)	(0.492)
Gini Index (1990-1999)		-0.05		-0.033	-0.024
		(0.332)		(0.512)	(0.646)
Average Years of Schooling			0.165	0.154	0.128
(1990)			(0.364)	(0.401)	(0.494)
Ethno-Federalism					-3.954**
					(0.017)
ELF(5)*Ethno-Federalism					6.504**
					(0.018)
Control Variables	YES	YES	YES	YES	YES
Regional Dummies	YES	YES	YES	YES	YES
Observations	113	108	79	78	78
Adjusted R^2	0.786	0.778	0.828	0.825	0.824

Notes: Estimated with OLS, p-values are in parentheses, calculated with robust standard errors. Constant terms and control variables are suppressed to save space. ELF(5): Ethnolinguistic Fractionalization Index, calculated at the fifth level of linguistic aggregation. Control variables include fraction of population over 65, socialist legal origin, natural logarithm of GDP per capita, natural logarithm of openness, and plurality electoral rule. Regional dummies consist of Sub-Saharan Africa, Latin America and Caribbean, and East Asia and Pacific.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Finally, I restrict the analysis to the democratic sample in order to examine the theoretical implication mentioned above that only countries with voting mechanism should be considered. In order to examine the argument, I employ democracy index (ranging from 0 to 10) taken from POLITY IV Project to classify countries. Although the index is apparently a rough measure of the effectiveness of voting mechanism, it is the most appropriate available measure to the extent of my knowledge. In particular, all the above analyses are replicated with the sample of countries whose democracy index is above 2. Because all OECD countries are highly democratic, the exercise only focuses on transfers and subsidies. As an illustration, table 5 reports the regression results for the ELF index at the third level of linguistic aggregation.

Table 6. Transfers and Subsidies (2000-2005) and ELF: Democratic Sample.

Variables	Tranfers and Subsidies as Percentage of GDP				
	(1)	(2)	(3)	(4)	(5)
ELF(3)	-3.238*	-3.186	-0.995	-1.104	-1.1
	(0.081)	(0.101)	(0.628)	(0.596)	(0.615)
Gini Index (1990-1999)		-0.047		-0.028	-0.026
		(0.385)		(0.584)	(0.615)
Average Years of Schooling (1990)			0.041	0.018	-0.014
			(0.847)	(0.933)	(0.951)
Ethno-Federalism					-2.936**
					(0.032)
ELF(3)*Ethno-Federalism					5.676*
					(0.092)
Control Variables	YES	YES	YES	YES	YES
Regional Dummies	YES	YES	YES	YES	YES
Observations	95	93	68	67	67
Adjusted R^2	0.797	0.794	0.84	0.836	0.833

Notes: Estimated with OLS, p-values are in parentheses, calculated with robust standard errors. Constant terms and control variables are suppressed to save space. ELF(3): Ethnolinguistic Fractionalization Index, calculated at the third level of linguistic aggregation. Only countries whose democracy index above 2 are included. Control variables include fraction of population over 65, socialist legal origin, natural logarithm of GDP per capita, natural logarithm of openness, and plurality electoral rule. Regional dummies consist of Sub-Saharan Africa, Latin America and Caribbean, and East Asia and Pacific.
* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

In general, all the main findings hold: there is no negative relationship between ELF index and transfers and subsidies as percentage of GDP, and ethno-federalism is significantly beneficial for the latter at a critical level of ethnic diversity. The results are also robust to other levels of democracy index, but there are three important details. First, the statistical performance of ELF index is generally less superior in democratic sample regarding significance pattern. Second, the results of ethno-federalism and its interaction term with ELF index are decreasingly less robust as the benchmark of the democracy index increases. Finally, the coefficients of fraction of population over 65 and plurality electoral rule are robustly significant as usually found above.

6. Conclusions

Empirical studies on the impact of ethnic diversity faces two main challenges regarding the methodological as well as practical aspects of choosing the right diversity index and the exact measure of redistribution. Given these potentially debatable issues, I have shown in the present paper that there is no negative relationship between ethnic diversity and redistribution as prevalently found in existing studies when investigating the question in a proper framework. I have also discovered a role of ethno-federalism in promoting redistribution given a critical level of ethnic diversity which lends support to the influence of the combination of ethnic segregation and decentralization on redistribution in highly ethnically-diverse countries.

It goes without saying that causal interpretation of cross-country regressions requires that realities can be conceptualized as draws from a common data-generating mechanism. To all intents and purposes, I am skeptical of treating heterogeneity across countries equivalent to across individuals. As a consequence, intensive country-specific studies must be done in order to make further claim on causality. The findings, I believe, are helpful in highlighting important data patterns from which policy discussions can be built. In other words, if policy makers want to understand the differences in redistribution between their countries and others, the foremost issues towards which they should direct research efforts are demographic structure, political institutions, and the combination of ethnic segregation and decentralization; but not ethnic diversity.

Finally, the findings also pose critical questions to other empirical studies regarding the impact of ethnic diversity (e.g. public goods provision) that have paid inadequate attention to its theoretical complexity. Perhaps, the ultimate message of the present study for future empirical research is a traditional one: empirical efforts regarding data collection and statistical scrutiny are of utmost significance, but they must be piloted by a robust theoretical framework in order to answer at best the question they are designed to cope with at the first place.

Appendix A: Data Description.

1. Main Results

- Transfers and Subsidies: General government, percentage of GDP, average of the period 2000-2005. *Source*: Gwartney, Hall, and Lawson (2012).
- Social Expenditure: Public sector, percentage of GDP, average of the period 2000-2005. *Source*: OECD Social Expenditure Statistics.
- Ethnolinguistic Fractionalization Index: An ethnic diversity index based on language, account for the distinctiveness between groups. *Source*: Desmet et al. (2012).
- Gini Index: Gross income, average of the period 1990-1999. *Source*: Solt (2009), SWIID Version 3.1.
- Average Years of Schooling: Population aged 15 and above, data for 1990. *Source*: Cohen and Soto (2007).
- Ethno-Federalism: Dummy variable, ethno-federalist countries are coded 1. *Source*: Charron (2009).
- Fraction of Population over 65: Average of the period 1990-1999. World Development Indicators, World Bank. Data for Taiwan is taken from National Statistics, Republic of China.
- Socialist Legal Origin: Dummy variable, socialist legal origin countries are coded 1. *Source*: La Porta et al. (1999).
- GDP Per Capita: Natural logarithm, constant 2000 USD, average of the period 1990-1999. *Source*: World Development Indicators, World Bank. Data for Taiwan is taken from National Statistics, Republic of China.
- Openness: share of exports and imports in GDP, natural logarithm, 2005 constant price, average of the period 1990-1999. *Source*: Heston et al. (2011).
- Plurality Electoral Rule: Dummy variable, countries with plurality electoral rule are coded 1, data for the period 2000-2005. *Source*: Beck et al. (2001). Updated 2010.

2. Robustness

- Regional Dummies: Countries from Sub-Saharan Africa, Latin America and Caribbean, or East Asia and Pacific are coded 1. *Source*: World Bank.
- Polarization Index: A measure of ethnic polarization based on language that takes into account the distinctiveness between groups. *Source*: Desmet et al. (2012).
- Democracy Index: Average of the period 2000-2005. *Source*: POLITY IV Project.

Appendix B: Summary Statistics and Pairwise Correlation of Main Variables.

1. Summary Statistics

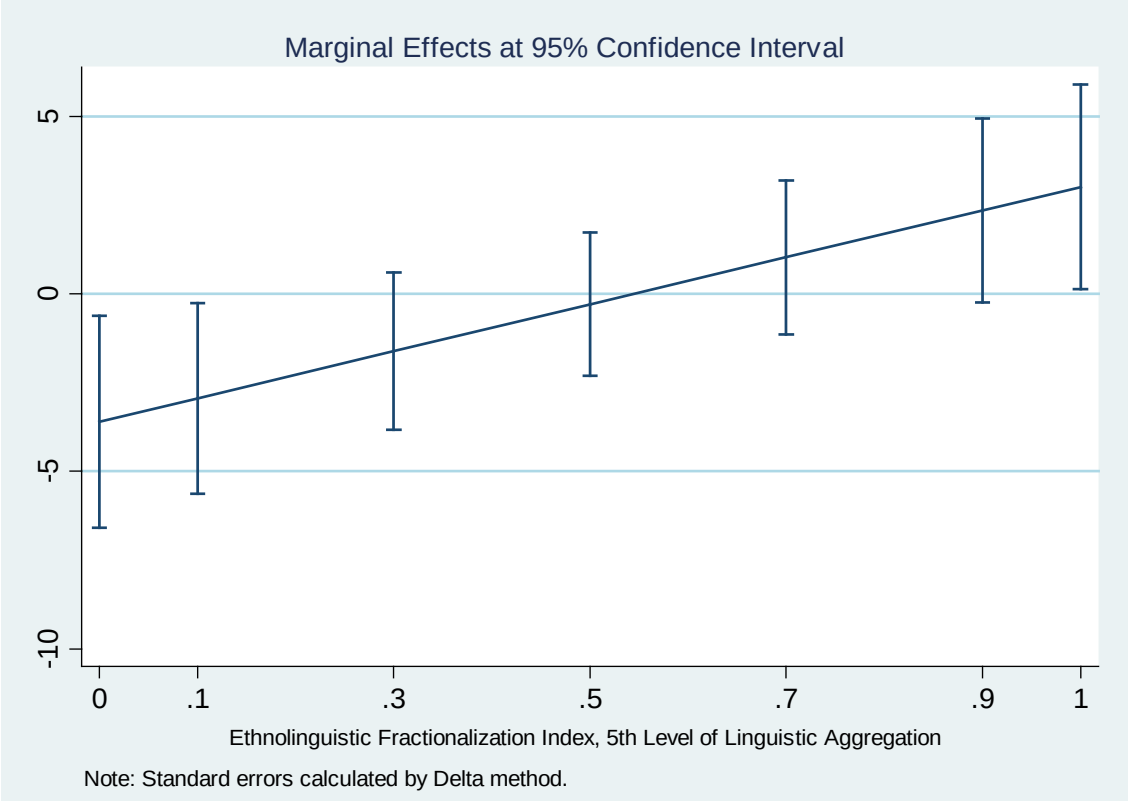
Variables	Observa-tion	Mean	Standard Deviation	Min	Max
A. Transfers and Subsidies as Percentage of GDP (2000-2005)	129	8.84	7.47	0.18	28.88
B. Social Expenditure as Percentage of GDP (2000-2005)	34	19.55	5.87	5.54	29.47
C. ELF index at the Fifth Level of Linguistic Aggregation	128	0.33	0.26	0	0.90
D. Gini index for Gross Income (1990-1999)	119	44.54	7.46	30.50	67.11
E. Average Years of Schooling (1990)	84	5.99	3.38	0.22	12.44
F. Ethno-Federalism	127	0.09	0.28	0	1
G. Fraction of Population over 65 (1990-1999)	129	7.27	4.60	1.04	17.52
H. Socialist Legal Origin	128	0.19	0.39	0	1
I. Ln GDP Per Capita (1990-1999)	129	7.76	1.60	4.76	10.52
J. Ln Openness (1990-1999)	127	4.16	0.56	2.80	5.75
K. Plurality Electoral (2000-2005)	115	0.63	0.49	0	1

2. Pairwise Correlations

	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
A	1.00										
B	0.86	1.00									
C	0.03	0.05	1.00								
D	0.09	0.16	-0.30	1.00							
E	0.25	0.33	-0.04	-0.19	1.00						
F	0.00	0.10	0.52	-0.29	0.16	1.00					
G	0.76	0.87	0.15	0.04	0.29	0.18	1.00				
H	-0.02	-0.09	0.18	-0.16	-0.46	-0.12	0.06	1.00			
I	0.50	0.55	0.13	-0.17	0.77	0.21	0.60	-0.55	1.00		
J	0.52	0.31	0.39	-0.02	-0.12	0.24	0.28	0.25	-0.02	1.00	
K	-0.42	-0.31	-0.12	-0.08	0.28	0.15	-0.18	-0.04	-0.05	-0.58	1.00

Appendix C:

Marginal Effect of Ethno-Federalism on Transfers and Subsidies (% of GDP).



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