

A THEORY OF ETHNIC DIVERSITY AND INCOME DISTRIBUTION

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A Theory of Ethnic Diversity and Income Distribution

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Abstract

In this paper, how the two dimensions of heterogeneity of people in society, income disparity and ethnic diversity, affect the reallocation of the income is examined. Specifically a legislative bargaining model is constructed to investigate how the political parties whose platforms are distinguished by ethnicity and income group, form a coalition and enter a government to implement their preferred fiscal policy is analyzed. The result of the model suggests, that the preferred partner for coalition is the group with smaller population size (cheaper to buy) and lower income level (easier to tax). Combined with the idea of Kuznets curve, this result suggests that in poor countries ethnic coalitions tend to occur and in the middle and high income countries, class coalitions are likely to occur.

Further I extend the model such that the member in the coalition gets per-capita transfer equally to overcome the shortcomings of the conventional model. The extended model shows that if the rich is in the majority, forming an oversized coalition might be the optimal strategy, which is consistent with empirical findings in some developed countries, such as Denmark or Sweden.

Keywords: Political Economy, Diversity, Legislative Bargaining

JEL Codes: P16, D30, D72

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Abstrakt

V tomto článku je studován vliv dvou druhů heterogenit lidí ve společnosti a jejich vliv na přerozdělování příjmů. Dvě heterogenity jsou rozdělení příjmů a etnická různorodost. Legislativní vyjednávací model je zkonstruován, aby bylo možné vyšetřit, jak politické strany, jejichž základna je definovaná danými etnickými a příjmovými skupinami, tvoří koalice a vstupují do vládních formací, aby prosadily určitá fiskální pravidla, která budou podporovat jejich voličskou základnu. Výsledek modelu naznačuje, že preferovaný partner pro koalici je strana s malou populační skupinou (snadno koupitelná) a nízkou hladinou příjmů (snadno zdanitelná). Zkombinujeme-li toto s ideou Kuznětsovy křivky, tento výsledek naznačuje, že v chudých zemích snadno nalezneme etnické koalice, zatímco v bohatších společnostech najdeme spíše třídní koalice.

Dále rozšiřuji model takovým způsobem, že členové koalice dostanou transfer na hlavu, který má vyvážit nedostatky tradičního modelu. Rozšířený model ukazuje, že pokud bohatí tvoří většinu, vytvoření příliš velké koalice může být optimálním řešením, které je ve shodě s empirickými poznatky z vyvinutých zemí, jako je Dánsko nebo Švédsko.

1 Introduction

Ethnic diversity has been considered to have a certain impact on the economy of a society. Some empirical studies confirm that diversity of people, such as religion, ethnicity or linguistic differences have a negative effect on economic growth because diversity of people tends to lead to political conflict and conflict affects economic growth negatively through several channels, such as non-optimal level of taxation, provision of public goods, transfer targeted to specific groups or ultimately the destruction of resources by wars.¹ There are few theoretical papers which connect the conflict between people to the diversity of people's background. Of these few papers, some focus on the direct effect of ethnic conflict and others analyze the roots of conflict: diversity of people's background, such as religion or ethnicity. Both streams of theory assume that if there is ethnic or religious diversity of people, it directly leads to conflict. However Alesina and Glaser (2004) argue that the negative effect of diversity does not appear if the ethnic minority are rich. They argue that in Belgium, the minority Walloons used to be relatively richer than the Flemings were and that they do not conflict over redistribution of resources which would lead to lower growth otherwise, thus the negative effect of diversity did not prevail in Belgium. However their argument does not quite hold in the case of Rwanda, where the ethnic minority Tutsi are relatively rich, but they still fight for redistribution which leads to lower welfare of the society. Here lies the starting point of this paper: if the ethnic minority is rich, does it always decrease the negative effect of ethnic diversity as Alesina and Glaser argue?

¹Easterly and Levine (1997) is a classic paper which shows empirically the negative relationship between economic growth and ethnic diversity.

In this regard, Przeworski (2005) partially answers this question, showing that the relative size of a certain ethnic group does not correlate with the share of the vote of the ethnic group. He argues that people do not always vote along ethnic lines. Below is a modified example from Przeworski. Assume that everybody can stand as a candidate as in the citizen-candidate model.² There are two ethnic groups, A and B and additionally within the group some of the members are rich and some are poor, thus we can classify people into four groups, A and rich, B and rich, A and poor and B and poor. Assume that each group has a population size smaller than half, in other words, to get majority agreement, each group has to make a coalition with another. They can form a coalition either along ethnic lines or according to their income in order to win and enter the government to implement their preferred policy. However, because they divide a fixed pie within the group, they want to win with the minimum share of votes. Let's consider two cases, which are presented in the table below.

	rich	poor	total
A	25	35	60
B	30	10	40
total	55	45	100

	rich	poor	total
A	10	45	55
B	30	15	45
total	40	60	100

In both tables, ethnic minority B is relatively rich (the proportion of rich is larger than poor). In the left table above, the group of rich forms a coalition because the population size of the coalition of rich is smaller (55%) than that of the ethnic majority group A (60%) and they would implement preferred policy by the rich as in the case of Belgium. On the other hand, in the right table, the ethnic group A can win with smaller

²For detail of citizen candidate model, please see Coate and Besley (1997).

votes (55%) than the coalition of the rich group (60%), thus group A would form a coalition and would implement a policy preferred by ethnic majority A, similarly as in the case of Rwanda. In both cases, the ethnic minority B is relatively rich; however, the political result is different. The negative effect of ethnic diversity is more likely to prevail in the case of the right-table. This example suggests that it depends on how the attributes are chosen as to which political parties form a coalition. If the coalition along class is formed, then the negative effect of ethnic diversity would be less likely to appear. In this paper, a legislative bargaining model is constructed to answer the following question: when do the class coalitions occur and when do ethnic coalitions occur?

Posner (2005) argues that people usually have several attributes such as linguistic, income level and ethnicity, and choose their attributes on which they vote to maximize their utility. Similarly in my model, the political coalition is formed according to either class or ethnicity, maximizing the utility of the group which has the strongest bargaining power (agenda setter).

So far, very few researchers have analyzed what would happen when there are two dimensions of heterogeneity, income inequality and ethnic diversity. Based on Przeworski's (2005) argument of the minimum winning coalition, I construct two types of legislative bargaining models where ethnic or class coalition is formed through bargaining between political parties.

The introduction of income difference to the ethnic diversity of people leads to interesting findings: the coalition is likely to be formed with the group whose population size is small and income level is low because it is cheaper to persuade to be a partner

of coalition and once it becomes a partner, easier to tax. This result answers why we see ethnic-based coalitions in most of the countries in Africa, where each ethnic group is small in population size. Secondly, when the poor is the majority, as the income difference between the rich and the poor increases, political coalitions along class are more likely to occur. In fact this finding fits the reality in Latin America, where the income inequality is very high and coalitions based on class are more likely to be formed rather than ethnicity. On the other hand, in Africa, where the income inequality is relatively moderate, ethnic coalitions are more likely to be formed. When the rich is the majority, this relation between income difference and coalition formation gets reversed: as income difference increases, ethnic coalitions are likely to occur. If we combine this finding with the idea of Kuznets curve (1995),³ ethnic coalitions occur only in poor countries but not in the middle income and rich countries.⁴ This answers the question why we see ethnic coalition in Rwanda and not in Belgium.

However, it still fails to show why we often see in reality oversized coalitions. In other words, *ceteris paribus*, the conventional model shows that a smaller sized coalition is always preferred, following the logic of minimum winning coalition, although in reality it is not always true. Thus, I extend the model to explain why and when we see oversized coalitions are formed.

In the extended model the bargaining power within the coalition is proportional to the population size of the groups and thus the per-capita transfer is provided equally

³Kuznets (1955) shows that income inequality increases when countries are in transition from low-income to middle-income. Afterwards, when countries become more advanced, income inequality tends to decrease.

⁴To examine the statement more precisely, we need empirical research, however, this is beyond the scope of this paper.

within the coalition. Similarly to the conventional legislative bargaining model, if the poor is the majority, a coalition with a smaller population would be formed. Interestingly, however, I show that when the rich is in the majority, this is not the case: the optimal strategy for the agenda setter might be to form an oversized coalition to internalize the cost of taxation more efficiently. This finding partially explains the puzzle that theoretically only a minimum winning coalition should occur but in reality we sometimes see as opposed to theory oversized coalitions in developed countries.

In the following sections, firstly I mention the contributions and limitations of the existing theoretical and empirical research on this issue. Secondly, the conventional and its finding are presented. Thirdly the extended model which overcomes the shortcomings of the conventional model is presented and the conclusion follows.

2 Literature Review

There are several empirical studies which report a negative relationship between ethnic or religious diversity and economic growth or provision of public goods. The leading papers are by Easterly and Levine (1997) and Alesina et al. (2003). Using cross-country data which consists of 197 countries, Easterly and Levin (1997) try to explain where the low level of economic growth of Africa comes from and conclude that ethnic fractionalization lowers the incentive to invest in productive public goods, such as education or infrastructure and thus lowers economic growth. To measure the extent of ethnic diversity, they used the measurement developed by Mauro (1995), which defines the degree of fractionalization as the probability that two randomly selected

individuals from a population belonged to different ethnic groups as a proxy for ethnic diversity.

Alesina et al. (2003) use a similar measurement of diversity in the society, but they extend this measurement to measure not only ethnic diversity but also linguistic and religious diversity.⁵ They argue that religious diversity does not so much affect GDP growth, as does linguistic and ethnic diversity. Further, their result reveals that all these diversities are significantly negatively related to the provision of public goods and government transfer per GDP. They suspect that the government with a higher degree of diversity of people has a greater difficulty in reaching consensus, which can negatively affect GDP growth. This leads to the idea that diversity affects economic growth through the government's fiscal policy such as tax, publicly provided goods and transfers. This is the motivation to analyze the effect of ethnic or religious diversity on government fiscal policy.

Contradicting the result of Alesina et al. (2003) and Easterly and Levine (1997), Collier (2001) shows that ethnic diversity does not have an effect on economic growth if the society is under democracy, but it does under dictatorship. He shows this result by running a regression of per capita GDP growth on the interaction term of ethnic diversity and political rights and finds that it is highly significant. Actually their result suggests that ethnic diversity affects economic growth through political process as in this paper.

There are few theoretical studies regarding ethnic diversity. In terms of the question

⁵In this paper, ethnicity is loosely defined such that the result can be extended to analyze not only ethnic diversity but also religious or linguistic diversity.

how the diversity of people affects economic variables, such as GDP per capita or welfare of the economy, there are three major theoretical approaches. The first approach introduces externalities in the utilities of agents and examines how these externalities affect economic variables, such as economic welfare or growth.⁶ The second approach analyzes the effect of diversity which is caused by a change in a determinant of growth, such as investment rate.⁷ The third approach analyzes a game between political parties whose preferred policies are different from each other. This paper takes the third approach to focus on how the political parties interact with each other, i.e., to analyze which kind of coalition, either ethnic or class would be formed.

Fernandez and Levy (2005) investigate the political equilibrium and argue that if there is a high degree of diversity of people, there would be less redistribution to the poor, but after a certain threshold of diversity, the situation would be as if there is a low degree of diversity. However, there are some limitations in their model. First, their result of a non-monotonic relation between diversity and redistribution depends crucially on the assumption that there is an exogenous fixed cost of provision of public goods. In my model the cost of providing a public good would be endogeneized as a function of income distribution and population size of each party. Secondly, it is assumed that rich people are united together and only poor people are diversified. In my model, the rich are also diversified and if the rich unite together or not is endogeneized in the political process of coalition formation.

⁶Esteban and Ray (1999) introduce externalities, which allow the expected utility of agents to be affected by the strategy of other groups and analyze the links between the level and pattern of conflict and distribution of the people that favor different outcomes.

⁷Cole et al. (1996) show in equilibrium with a social norm parents save for their children more than optimal and deviation from this equilibrium makes someone worse off if he is the only one who deviates .

A recent work by Renzo (2006) analyzes how government policy results in inefficient allocation when there are two opposing groups which conflict about redistribution allocation, using a recursive formulation with probabilistic voting and shows that in a more ideologically homogeneous country, the incumbent has an advantage in winning in the next election, and thus they are less shortsighted and provide more efficient allocation to the society. She succeeds in showing the negative relationship between ideological diversity in the society and economic growth, but she assumes that people vote along their ethnic attributes, and in this paper, I would like to analyze one stage before, i.e., which attribute will govern people's voting behavior.

Compared to the rich results of empirical research which has been done, the theoretical research should be improved to explain the results which the empirical research suggests and I believe that this paper can fill this gap in the literature.

3 Model

3.1 Environment

Let's consider a society with two distinct ethnic groups (A and B), e.g., black and white and two income groups, *Rich* and *Poor* within each ethnic group A and B i.e., there are 4 distinct groups, A and *Rich* (AR), A and *Poor* (AP), B and *Rich* (BR), B and *Poor* (BP). Group $h \in \{AR, AP, BR, BP\}$ has a population size $n(h)$, and within each group, people are assumed to have the same level of per-capita income $Y(h)$. To analyze the coalition formation I assume that each group cannot be the majority alone: $n(h) < 0.5, \forall h$. For simplification, population size of the society and total income of

the society Y are normalized to one ($\sum_h n(h) = 1; Y = \sum_h n(h)Y(h) = 1$).⁸

Additionally, for simplicity it is assumed that there is no per-capita income difference between the groups in the same class:

$$Y(AR) = Y(BR) = Y(R); Y(AP) = Y(BP) = Y(P)$$

The preference of the member in group h is described by the following utility function:

$$u(h|i, j) = (1 - t(i, j)) \cdot Y(h) + \tau(h|i, j), \quad (1)$$

where $t(i, j)$ is the common flat tax rate on income, which is the same for everybody in the society, and $\tau(h|i, j)$ denotes a per-capita transfer to the member group h , which is group specific. The index i denotes the agenda setter group and j denotes the partner group of the agenda setter, which will be introduced later on in the next section.

In the environment described above one round of legislative bargaining model is constructed, following Diemeier and Merlo (1998). To implement the preferred policy, the group has to make a coalition with another group to win a majority in government. Let's call the coalition which enters the government and implements their preferred policy as a *winning coalition*. The winning coalition implements its preferred policy if it is formed, $T(i, j) = \{t(i, j), \tau(h|i, j)\}$, for all h . Namely $T(i, j)$ consists of a common tax rate and transfers along income class or ethnic line, or both.

The sequence of the legislative bargaining follows:

- (1) The agenda setter group i is chosen according to the recognition probabilities, $\pi(h)$.

⁸ $Y(h)$ expresses how the income level of group h differs from the average income of the society, Y .

(2) The agenda setter i chooses a partner group j and makes a policy proposal $T(i, j)$.

(3) The partner j decides if he accepts an offer or not. If he accepts, the game ends and the winning coalition is formed with i and j and $T(i, j)$ would be implemented. If not, the game proceeds to (4).

(4) If a coalition is not formed, no government is formed and the default policy q will be implemented. Under the default policy, no tax would be collected and thus no redistribution occurs:

$$q = \{t(i, j) = 0, \tau(h|i, j) = 0\}, \text{ for all } h.$$

The reservation utility of the partner group j under the default policy would be:

$$\bar{u}(h) = Y(h) \tag{2}$$

For tractability of the model, here I assume that a consensus government would not occur. By consensus government I mean a 3-group coalition which excludes the agenda setter to prevent the formation of a winning coalition.⁹

The budget constraint of the government is:

$$\sum_h n(h)\tau(h|i, j) = Y \cdot \left(t(i, j) - \frac{t(i, j)^2}{2} \right), \tag{3}$$

where $t(i, j)$ is the tax rate, which depends on which group is a policy proposer and partner, $\frac{t(i, j)^2}{2}Y$ is the associated cost of collecting and reallocating the tax, following

⁹If I include the possibility of consensus government, the choice of the partner j would be either to form a coalition with the agenda setter or to be in a consensus government. Here for simplicity, I excluded this possibility, however, for further research, admittedly, considering this alternative would make this analysis richer.

the specification of Roland and Bolton (1997), and $n(h)\tau(h|i, j)$ denotes the transfer to the group h .

Now in the parliament, each political group tries to implement their own preferred policy, i.e., the policy which maximizes the sum of the utility of the members of its own group.

The agenda setter i chooses a tax rate, group specific transfer and partner group to form a coalition with, maximizing the utilities of the members in group i :

$$\begin{aligned} \max_{j, t, \tau} u(i|i, j) & \tag{4} \\ \text{s.t. : } u(j|i, j) & \geq \bar{u}(j) \\ n(i) + n(j) & \geq 0.5 \end{aligned}$$

(2), (3) is given,

Note that the agenda setter of course can choose the default policy if it is more beneficial for him rather than forming a coalition. The first constraint above expresses that the agenda setter offers the shares of the net tax revenue such that the utility of the partner group would be higher than the utility under a default policy. The second constraint expresses that the agenda setter would choose a partner such that he can win a majority after forming a coalition.

For simplicity, I assume that $\pi(h) = 1$ for group h , which satisfies

$$n(h) + n(\tilde{h}) > 0.5 \text{ and } n(h) + n(\hat{h}) > 0.5, \tag{5}$$

where \tilde{h} denotes the group which has the same ethnicity as group h and \hat{h} denotes the group which has the same income level as h . For example, $\tilde{h} = AR$ if $h = AP$ and $\hat{h} =$

AR if $h = BR$. Note that the group which would be selected as an agenda setter has to belong to the majority group in both lines, ethnicity and class; however, it does not have to have a large population size itself. Interestingly, it can occur that the group with small population size can be an agenda setter and thus have a strong bargaining power because it can choose its partner. For example, even if population share of the group AP is just, say, 5% when A is the majority and P is the majority, then group AP would be the agenda setter. Thus it will have a strong bargaining power and be in the winning coalition all the time if one is formed.

3.2 Definition of Equilibrium

Given the population sizes and income level of each group, $n(h)$ and $Y(h)$ for all h , an equilibrium is an equilibrium coalition $\{i^*, j^*\}$, the equilibrium policy $T(i^*, j^*)$ and utilities of members in each group, $u(h|i^*, j^*)$, $\forall h$,

such that

- (a) i^* satisfies (4);
- (b) $\bar{u}(j)$ is given by (4);
- (c) j^* & $T(i^*, j^*)$ solves (3).

3.3 Characterization of Equilibrium

In this section, I will follow the conventional way of legislative bargaining that in equilibrium the agenda setter would give the minimum amount to the partner group to let it accept an offer of government formation. Obviously, the incentive compatibility constraint binds in this case and the level of utility of partner would be that under the

default policy.

We can assume that ethnic group A is the majority in the society without loss of generality:

$$n(AR) + n(AP) > 0.5$$

Further here I assume that the groups with two different attributes never form a coalition. Admittedly it is a quite strong assumption, however, later on in this paper this assumption will be relaxed in the extended model. With this assumption, the agenda setter would offer the minimum amount to the partner group such that the partner accepts. For the notation, let us call this conventional model the *minimum offer model*.

Proposition 1 *Under the minimum offer model, if $n(\hat{i})Y(\hat{i}) > n(\tilde{i})Y(\tilde{i})$, an ethnic coalition occurs.*

Proof: See Appendix

When the agenda setter offers the minimum amount to the partner, basically he chooses the partner who has a lower income so it is easier to tax and whose population size is smaller so that cheaper to persuade to be a partner of winning coalition. From this proposition, the following corollary can be derived.

Corollary 1 *Under the minimum offer model, if the poor is the majority, as the income difference between rich and poor becomes larger, class coalition is preferred. On the contrary, if the rich is the majority, as the income difference gets larger, the ethnic coalition is preferred.*

Proof: See Appendix

The first statement of corollary, when the poor is the majority, answers why we see the class coalition in Latin American countries where the inequality is high and why

we usually see the ethnic coalition in African countries where the income inequality is moderate compared to Latin America.¹⁰ Thus this corollary partly explains why we see income class conflict in Latin America rather than ethnic conflict (white vs. mestizo vs. indigenous) as Fearon (2006) argues.¹¹

On the other hand, the second part of the corollary says when the rich is the majority, this relationship between income level difference and preferred partner would be reversed, i.e., as income difference becomes larger, the ethnic partner is preferred. This finding is interesting in the sense that the relationship between income level difference and coalition formation is not monotonic. The famous Kuznets (1995) curve suggests that income inequality and richness of countries should have an inverse U relationship. If we combine the idea of Kuznets and corollary 1 in this paper, then it suggests that when the country is poor, we tend to see ethnic coalitions as in most of the countries in Africa, but as the country becomes richer and the income inequality increases, we tend to see the class coalitions as in Latin America. Afterwards, when the country becomes even richer, the income inequality should decrease, and then we should see the class coalition according to the second statement of corollary 3, which is the case of Finland or United States.

Regarding Finland, Belgium and other developed countries, many political scientists suggest that political parties do not follow ethnical cleavage anymore, and they would rather follow other lines, such as income class. McRae (1986, 1987) argues that

¹⁰Admittedly the income difference between rich and poor captures only one perspective of Gini coefficient. For a finer discussion, one can use the measurement in Human Development Report by UNDP where there is information of income ratio of rich and poor by countries.

¹¹For a detailed discussion of the "elite" politics in Latin America, see Higley and Gunther (1992).

in Belgium they had to transform their linguistic based parties into another system, "Grand Coalition" across Flemish and Walloons regions to avoid political conflict, and as a result the political coalition formation usually occurs not along linguistic lines but along income class or ideology.¹² In Finland, the distinguishment of the language distinction was subordinate, so they did not need a dramatical political transformation as in Belgium, however, Swedish People's party (SFP) was enough linguistically *neutral* enough that Finnish speaking people would not mind forming a coalition or include them in the government: SFP was always a possible coalition partner for the Finnish speaking parties.

On the other hand, Horowitz (1985) argues that in most countries of Africa and South Asia, we see that ethnically based parties are formed and they are usually too strongly originated by their own ethnicity to make a coalition across ethnicities. Of course, there are some exceptions, such as the formation of a grand coalition in Kenya in 2007 or a multiethnic coalition in Sri Lanka or Nigeria as Horowitz discusses in his book. However, usually these coalitions are unstable and momentary.

So far, I have analyzed the case where income indifference is introduced to ethnic diversity, using a conventional legislative bargaining model. It certainly gives richer analysis compared to the model with only one dimension of heterogeneity, however, admittedly it suggests that *ceteris paribus* the coalitions with smaller population size are preferred. However, in reality it is not always true: we often see an oversized coalition. To overcome these shortcomings, I extend the conventional legislative bargaining model, in a way that the per-capita transfer is equally provided within the winning

¹²For the details of "Grand Coalition" in Belgium in 1970's, see Strom et al. (1994).

coalition.

3.4 Characterization of Equilibrium - Extended Model

A minimum offer to the partner features a legislative bargaining model: the agenda setter gives the minimum amount so that the partner will marginally accept his offer. However sometimes it is more realistic that once a coalition is formed you can target and provide transfer to the coalition as a whole, i.e., some ethnic group or income group but cannot differentiate the transfer within the coalition, the same ethnicity or income group. For example, the government decides that they will implement a preferable policy for the rich, such as a less progressive tax, but within the rich the government cannot distinguish which kind of rich people would enjoy this policy, black or white. Or the government decides to implement a policy preferable to the Christian church but within the same religion, it is hard to implement the policy which targets only the rich or poor Christian.

Thus I assume the government cannot distinguish the groups within the ethnic group or income group and thus the per-capita transfer based on ethnicity or income group is provided equally to the member of the ethnic group or income group:

$$\tau(h|i, j) = \sum_H \tilde{\tau}(H|i, j) \cdot I(h \in H), \quad (6)$$

where H denotes the ethnic group or income group, i.e., $H \in \{A, B, R, P\}$ and:

$$A \equiv \{AR, AP\}$$

$$B \equiv \{BR, BP\}$$

$$R \equiv \{AR, BR\}$$

$$P \equiv \{AP, BP\}.$$

The transfer should be given to either ethnic group A and B or the class group, *Rich* and *Poor*.¹³ In other words, the bargaining power within the coalition now becomes proportional to their population size, which is also more realistic in the case of majority voting.

Lemma 1 *Given the constraint (6), in the equilibrium the agenda setter would never choose the group with two different attributes.*

Proof: See the Appendix

To maximize the utility of its own members, the agenda setter would first choose the partner group and give the transfer along the attribute which is common between the agenda setter and partner group. If the agenda setter chooses the group with two different attributes as a partner, then the tax rate becomes higher to provide the transfer to more people and thus the net tax income would be lower. Regarding the overall transfer, the net tax revenue is higher in this case and thus total transfer within the coalition is higher. However, since now the transfer is provided to the ethnic or

¹³For example, the member of group AP has a chance of getting the transfer because he belongs to ethnicity A or income group P :

$$\tau(AP|i, j) = \tilde{\tau}(A|i, j) + \tilde{\tau}(P|i, j).$$

income group which the agenda setter does not belong to, per capita transfer to the agenda setter is lower. Thus to maximize the utility of its own group, he would never choose the group with two different attributes as a partner. In other words the winning coalition is all the time either an ethnic or class coalition, which was the assumption in the former model, but now it is the result in the extended model and in this sense, the extended model is superior to the previous one.

The utility function of the member of the agenda setting group given that its partner is j would be

$$u(i|i, j) = (1 - t(i, j))Y(i) + \frac{(t(i, j) - \frac{t(i, j)^2}{2}) \cdot Y}{n(i) + n(j)}.$$

From Lemma 1, the following lemma can be immediately derived.

Lemma 2 *There would be no transfer outside of the coalition:*

$$\tau(h) = 0, h \neq i, j.$$

The logic is quite similar to Lemma 1. Whenever the agenda setter wants to provide the transfer to the ethnic or income group which it does not belong to, the tax rate is higher to feed more people and per-capita transfer to the member of the agenda setter is lower compared to the case when the agenda setter provides the transfer only to the ethnic or income group to which it belongs. Thus the agenda setter prefers providing a transfer to the group which shares the same ethnicity or income level.

Given that the agenda setter would never chooses a partner with two different attributes, the equilibrium tax rate would be

$$\begin{aligned} t(i^*, j^*) &= \frac{Y - Y(i^*)\{n(i^*) + n(j^*)\}}{Y} \\ &= \frac{\sum_h Y(h)n(h) - \{Y(i^*) - Y(j^*)\}n(j^*)}{Y}, \quad h \neq i^*, j^*. \end{aligned} \quad (7)$$

The equilibrium tax rate is a function of income level and population size of each ethnic and income group. Thus per capita transfer is also a function of these variables and how the winning coalition is formed would also depend on these variables.

Now let's examine under which circumstances what kind of coalition would be formed. Let us define the utility difference of the member in the agenda setter group under ethnic coalition and class coalition:

$$\begin{aligned}\Delta &= u(i|\tilde{i}, \tilde{i}) - u(i|\hat{i}, \hat{i}) \\ &= -(t(i, \tilde{i}) - t(i, \hat{i}))Y(i) + \frac{(t(i, \tilde{i}) - \frac{t^2(i, \tilde{i})}{2})}{n(i) + n(\tilde{i})} - \frac{(t(i, \hat{i}) - \frac{t^2(i, \hat{i})}{2})}{n(i) + n(\hat{i})},\end{aligned}\quad (8)$$

where $t(i, \tilde{i})$ denotes the tax rate under the ethnic coalition and $t(i, \hat{i})$ class coalition. You can easily see that the ethnic coalition is preferred and the agenda setter chooses the group which has his ethnicity if and only if $\Delta > 0$. After manipulating (8), we can derive the following result.

Proposition 2 *Under constraint (6), ethnic coalition occurs if and only if*

$$(n(\hat{i}) - n(\tilde{i}))(1 - (n(i) + n(\tilde{i}))(n(i) + n(\hat{i}))Y(i)^2) > 0. \quad (9)$$

The following corollary can be derived to see closely the implication of proposition 2.

Corollary 2 *If the poor is the majority, the ethnic coalition occurs if and only if the population size of the class partner is larger than that of the ethnic partner:*

$$n(\hat{i}) > n(\tilde{i}).$$

Proof: See Appendix

Corollary 2 above suggests that the partner with a smaller population size is preferred. Ethno - Linguistic index (ELF index), constructed by Alesina et al. (2003)

measures the probability of two randomly selected individuals coming from different ethnic or linguistic groups. It suggests that most countries in Africa have a higher value of this index, compared to other parts of the world. In other words, if there is a large number of different ethnic groups, this index would be higher as in the case of Africa. A large number of ethnic groups means that the population size of each ethnic group is small. Thus basically this corollary suggests that in the countries with higher ELF index, an ethnic coalition is more likely to be formed, which is consistent with most countries in Africa. For example, in Kenya, one of the countries which has the highest ELF index, the largest ethnic group shares only 22% of total population and the other 6 ethnic groups shares only a little more than 5%. In fact, Miguel and Gugerty (2004) report how the ethnic conflict and diversity lead to lower public goods provision in Kenya such as school attainment or water access.¹⁴

On the contrary if the rich is the majority, the following striking result is derived.

Corollary 3 *If the rich is the majority and the income difference between the rich and the poor is large enough, i.e.,*

$$\frac{1}{(n(i) + n(\hat{i}))(n(i) + n(\tilde{i}))} < Y(i)^2,$$

the partner with a larger population size is chosen.

Proof: See Appendix

This corollary suggests if the rich is the majority, then it can happen that the agenda setter prefers the partner with the larger population. In other words, an oversized winning coalition occurs when the rich is the majority and when the income level

¹⁴Their results suggest that when the ethnically based coalition enters government, it leads to a policy oriented to specific ethnic groups and thus it leads to lower provision of constructive public goods.

difference between rich and poor is large.

To see the condition of ethnic coalition closer, I decompose (8), the utility difference of the agenda setter:

$$\Delta = \left\{ \frac{t(n(i) + n(\tilde{i}))(1 - (n(i) + n(\tilde{i}))Y(i))}{n(i) + n(\tilde{i})} - \frac{t(n(i) + n(\hat{i}))(1 - (n(i) + n(\hat{i}))Y(i))}{n(i) + n(\hat{i})} \right\} - \left\{ \frac{t^2(n(i) + n(\tilde{i}))}{2(n(i) + n(\tilde{i}))} - \frac{t^2(n(i) + n(\hat{i}))}{2(n(i) + n(\hat{i}))} \right\}$$

Let us examine what would happen if the ethnic partner has a larger population size. Note that an increase in the population size of the ethnic partner and thus coalition has three effects on this utility difference (Δ): (1) net income effect (2) per capita transfer effect (3) deadweight cost effect. Regarding the net income effect after tax, which is captured by the first term in the equation above, if the ethnic partner has a larger population size, the equilibrium tax rate would be lower under the ethnic coalition because they can extract from less people. Secondly, according to what the second term suggests in the equation, per capita transfer would be lower, because the tax rate is lower, which is quite intuitive. Surprisingly, on the other hand, the third term suggests the deadweight cost would be more efficiently internalized under the ethnic coalition. Basically when the ethnic partner is larger in population size than the class partner, it positively affects the utility of a member of the agenda setter group through the effect (1) and (3), and negatively through the effect (2). We can expect that if these positive effects dominate the negative effects, the agenda setter prefers the partner with the larger population size. The logic to explain this oversized coalition is similar to that of "economy of scale" in international trade or mergers and acquisitions in the field of business, i.e., the larger sized group benefits more from lower costs per

member, given the cost is concave with the size of the group because it can internalize deadweight cost more efficiently.

In the literature of political coalition formation, it has been often argued why we see oversized coalitions that even though theory suggests that a coalition should be formed with a minimum winning coalition. Actually, Sjölin (1993), Volden and Carrubba (2004) and many others show that in reality it often happens that the coalition formation in the developed countries such as Denmark and Sweden are not minimum winning coalitions, i.e., the agenda setter had a chance to choose a partner group with smaller population size but it chooses a partner with a larger population size. Interestingly, this phenomena occurs not only at the country level but also at the local government level. For example, Sorent et al. (2008) show that in the election of local government in Denmark, oversized coalitions can be also seen, which they could not explain within the logic of existing theoretical studies.

On the other hand, there are few theoretical papers trying to explain the mechanism of oversized government.¹⁵ For example, similarly to this paper, Baron and Diermeier (2001) also construct a legislative bargaining model to analyze why oversized or minority government can be formed. However, the main difference between this paper and theirs is that in their model oversized government is caused by an extreme status quo policy. On the contrary, in this paper, given the same status quo policy, the coalition with the larger population size can be preferred when the rich is the majority, because the rich prefer lower taxes and less deadweight cost for redistribution. This tendency

¹⁵Volden and Carrubba (2004) have a nice review of existent theories which try to explain why oversized coalitions can be formed and they test empirically these theories.

is more apparent as the income level difference between rich and poor becomes larger. Thus they sometimes prefer the group with the larger population size as a partner to internalize the deadweight cost of the distribution. As argued in Volden and Carruba (2004) there are others who try to investigate the mechanism of oversized coalition. However, none of the existing studies' argument for oversized coalition is similar to this paper and thus this paper contributes new insights to the field.

4 Conclusion

In this paper, I analyze the effect of income distribution and ethnic diversity on political coalition formation and government fiscal policy, constructing two types of legislative bargaining model.

The minimum offer model which follows conventional legislative bargaining, the agenda setter chooses the partner group which has the lower income level and thus is easier to tax and which has a smaller population size such that it is cheaper to buy (cheaper to persuade to be a partner of the winning coalition). Further, as the income level difference between the rich and poor increases, I find that when the poor is the majority, a class coalition is more likely to occur, which fits to observations in Latin American countries. However this relationship between income difference and preference for coalition would be reversed if the rich is the majority. If the result is combined with the idea of Kuznets's U curve, actually we should see an ethnic coalition only when the country is very poor, and afterwards, as the country becomes richer we tend to see a class coalition.

The extended model answers, on the other hand, the puzzle of oversized coalitions: why we see oversized coalition in reality contrary to what theory suggests. Taking into consideration the income distribution as well as population size of the groups, when the country is relatively rich, then we can possibly see oversized government, because the deadweight cost of per capita transfer would be more efficiently internalized. Secondly, when the population size of the ethnic group is small, which is true in most of the countries in Africa, the results of this paper suggests that we tend to see ethnic coalitions. Here ethnicity is loosely defined as something which unites people apart from income level. Thus, this model can be extended to analyze the effect of religious or linguistic, or even geographical difference of people.

Admittedly, reality is a mixture of both models, conventional and extended model: the agenda setter would not give exactly minimum, but neither provide exactly equal amount of the transfer within the coalitions. Further research can extend the model to see what would happen when the bargaining power of the partner group is somewhere in the middle.

Further, I exclude the possibility of consensus government; the "loose" coalition formed just to prevent the agenda setter from forming winning coalition. For further extension, one can include this possibility to make the result richer. Additionally, the existing literature has not empirically tested the effect of ethnic diversity interacting with income distribution, which would also be new question for research

Appendix

Proof of Proposition 1. In this case, the utility function of the agenda setter would be

$$u(i) = (1 - t(i, j))Y(i) + \frac{\beta(t(i, j) - \frac{t(i, j)^2}{2}) \cdot Y}{n(i)},$$

where β is the proportion of the net tax revenue which the agenda setter gets from the incentive compatibility constraint of the partner group which binds in this case,

$$\begin{aligned} u(j) &= \bar{u}(j) & (P2) \\ \Leftrightarrow (1 - t(i, j))Y(j) + \frac{(1 - \beta)(t(i, j) - \frac{t(i, j)^2}{2}) \cdot Y}{n(j)} &= Y(j) \end{aligned}$$

After substituting P2 into P1, and taking the first order condition gives us the equilibrium tax rate:

$$t(i, j) = \frac{Y - n(i)Y(i) - n(j)Y(j)}{Y}. \quad (P3)$$

On the other hand, the utility difference of the agenda setter when the partner has the same ethnic attribute and when the partner belongs to the same income group is defined by

$$\begin{aligned} \Delta &= u(i|i, \tilde{i}) - u(i|i, \hat{i}) \\ &= -(t(i, \tilde{i}) - t(i, \hat{i}))Y(i) + \frac{(t(i, \tilde{i}) - \frac{t^2(i, \tilde{i})}{2})}{n(i) + n(\tilde{i})} - \frac{(t(i, \hat{i}) - \frac{t^2(i, \hat{i})}{2})}{n(i) + n(\hat{i})}, \end{aligned}$$

where $t(i, \tilde{i})$ denotes the tax rate when the agenda setter chooses an ethnic partner and $t(i, \hat{i})$ denotes the tax rate when the partner belongs to the same income group as the agenda setter. Substituting P3 into the utility difference above and manipulating gives us

$$\Delta > 0 \text{ iff } n(\hat{i})Y(\hat{i}) > n(\tilde{i})Y(\tilde{i}).$$

■

Proof of Corollary 1. The condition of Proposition 1, when the ethnic partner is preferred can be changed into

$$\frac{n(\hat{i})}{n(\tilde{i})} > \frac{Y(\tilde{i})}{Y(\hat{i})}.$$

Now when the poor is the majority, this condition becomes

$$\frac{n(AP)}{n(BR)} > \frac{Y(R)}{Y(P)}.$$

It is quite obvious that as the income difference becomes larger, this condition is unlikely to be satisfied.

When the rich is the majority, the condition becomes

$$\frac{n(BR)}{n(AP)} > \frac{Y(P)}{Y(R)},$$

and it is quite obvious that as the income difference becomes larger, the ethnic coalition would be more preferred. ■

Proof of Lemma 1. We will consider the case when the *Poor* is the majority and thus the agenda setter is *AP*. In this case, the utility of the agenda setter when he chooses *BR* as a partner $u(AP|AP, BR)$ is:

$$u(AP|AP, BR) = (1 - t(AP, BR)) \cdot Y(AP) + \tau(AP|AP, BR).$$

Note that *AP* has two ways of providing transfer to allow *BR* to accept the offer and satisfy the members of its own group, (1) transfer to ethnic group *A* and income group *Rich* (2) transfer to ethnic group *B* and income group *Poor*. Lets consider the case when he chooses (1). Then

$$\begin{aligned} \tau(AP|AP, BR) &= \frac{\alpha(t(AP, BR) - \frac{t^2(AP, BR)}{2})Y}{n(AP) + n(AR)} \\ t(AP, BR) &= 1 - \frac{n(A)Y(AP)}{\alpha}, \end{aligned}$$

where α is the share of the tax revenue which would be provided to ethnic group *A* and the rest of the net tax revenue would be provided to the income group *Rich*. On the other hand, the utility of *AP* if it chooses group *AR* as its partner is

$$u(AP|AP, AR) = (1 - t(AP, AR)) \cdot Y(AP) + \tau(AP|AP, AR).$$

Solving the utility maximization of *AP* given that *AR* is a partner would give us

$$\begin{aligned} t(AP, AR) &= \frac{Y - n(A)Y(AP)}{Y} \\ \tau(AP|AP, AR) &= \frac{(t(AP, AR) - \frac{t^2(AP, AR)}{2})Y}{n(AP) + n(AR)}. \end{aligned}$$

Since $\alpha < 1$, we can easily see that

$$\begin{aligned} t(AP, BR) &> t(AP, AR) \\ \tau(AP|AP, AR) &> \tau(AP|AP, BR). \end{aligned}$$

This means that the net income is always higher and per capita transfer to the member of group AP is always higher when the partner group is AR and thus the utility of the member of group AP is also always higher in the case when AR is a partner than in the case when BR is a partner, which contradicts the reasoning that the agenda setter chooses a partner to maximize his utility. ■

Proof of Corollary 2. It is quite obvious that the second term of condition (7) is always smaller than 1, (the population size of the ethnic or income group is smaller than 1 and income level of the Poor is smaller than 1, since $\sum_h n(h) = 1; Y = \sum_h n(h)Y(h) = 1$) ■

Proof of Corollary 3. When the rich is in the majority, the second term of the condition is not always smaller than 1 as opposed to the case when the poor is the majority, since $Y(i) > 1$. We can easily see that the coalition with the larger population size is preferred whenever the second term becomes negative:

$$1 - (n(i) + n(\tilde{i}))(n(i) + n(\tilde{i}))Y(i)^2 < 0$$

$$\Leftrightarrow \frac{1}{(n(i) + n(\tilde{i}))(n(i) + n(\tilde{i}))} < Y(i)^2.$$

■

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