

Article

How Effective Is Fiscal Decentralization for Inequality Reduction in Developing Countries?

Kumba Digidowiseiso ^{1,*}, Syed M. Murshed ² and Sylvia I. Bergh ²¹ Faculty of Economics and Business, University of National, Jakarta 12520, Indonesia² International Institute of Social Studies, Erasmus University Rotterdam, 2518 AX The Hague, The Netherlands; murshed@iss.nl (S.M.M.); bergh@iss.nl (S.I.B.)

* Correspondence: kumba.digdo@civitas.unas.ac.id

Abstract: The relationship between fiscal decentralization and vertical inequality has long received attention by fiscal federalism theorists. However, horizontal inequality has been largely overlooked. This study will present a novel empirical examination of the relationship between fiscal decentralization, vertical inequality, and horizontal inequality. Specifically, it will focus on how institutional quality and military expenditure affect the fiscal decentralization–inequality nexus across 33 developing countries in the period 1990–2014. Findings indicate that varieties of fiscal authority have a significant effect on distribution of income and ethnic inequality. This depends on the level of institutions and defense spending achieved by these developing countries.

Keywords: fiscal decentralization; inequality; institutional quality; military spending



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1. Introduction

Decentralization has been a significant topic for all policy makers around the world, particularly in developing countries, as some believe it can be the means to improve redistribution, which ultimately reduces inequality. However, Prud'homme [1] shows that decentralized developing countries may face some capacity constraints which hinder achievement of this objective. As a result, fiscal decentralization may fundamentally be suitable only for developed countries.

The relationship between fiscal decentralization and inequality is complex, and many have tried theoretically and empirically to disentangle it. However, recent evidence is inconclusive. According to the theoretical literature, many sub-national governments should be involved in redistribution policies, since decentralized redistribution increases interjurisdictional competition among local governments [2]. This creates 'voting by the feet' incentives à la Tiebout [3]. Nevertheless, one will argue that such fiscal mobility yields a zero-sum situation that breeds new economic costs for all competing regions [4]. Hence, from a dissenting point of view, if both redistributive policies and the preferences of local people regarding public goods and services are to be uniform in all jurisdictions, then central government should play a dominant role in the redistribution [5].

Similarly, we cannot determine whether fiscal decentralization can affect inequality, as the empirical results are still ambiguous. By using developing and developed countries, Sepulveda and Martinez-Vazquez [6] found that the size of government plays a substantial role in explaining the relationship between fiscal decentralization and distribution of income. In another study, Goerl and Seiferling [7] showed that decentralization of redistributive spending appears to have no significant impact on income inequality. Meanwhile, Lessmann [8] found that fiscal decentralization can significantly decrease income inequality.

In this study, we argue that the mixed results from the fiscal decentralization–inequality nexus is caused by a lack of understanding in identifying such connections based on indirect mechanisms. The channel can, to some extent, be explained through institutional quality and military spending.

Regarding institutional quality, one may argue that an increase in inequality is affected by quality of institutions. For example, Rodriguez-Pose and Ezcurra [9] state that decentralization can increase inequality in poor countries due to weak institutions and a high level of territorial disparities. Another standpoint comes from Lessmann [8], who believes that the efficiency-enhancing effect of regional convergence occurs most likely in countries with a good institutional environment. However, the role of institutions is rather weak and implicit and has not been empirically tested. To fill the gap in the literature, we rely on Riker's [10] argument that the outcomes of decentralization depend on political accountability. We also acknowledge the potential of elite capture [11] and administrative capacity [1] as indirect channels of the fiscal decentralization–inequality nexus.

As for military expenditure influencing the fiscal decentralization–inequality nexus, many empirical studies regard defense spending as the means of decentralization. A higher level of military expenditure is associated with a lower level of fiscal decentralization [12,13]. Moreover, in the event of conflict, sub-national governments demand a greater portion of the public sector, because they have revenue constraints [14]. Many empirical analyses treat military spending as a direct effect of inequality without considering the degree of fiscal decentralization [15,16]. In this context, we want to help to fill the gap in the current literature. Sepulveda and Martinez-Vazquez's [6] study can be an entry point to explain that the connection between fiscal decentralization and inequality depends on public sector size. Since the proportion of defense spending is part of general government expenditure, we believe that it is associated with common problems that, to some extent, affect inequality. Hence, local officials should have fewer incentives to make military expenditures.

The varying conclusions regarding the connection between fiscal decentralization and inequality are also the result of using different fiscal decentralization indicators. We will utilize the concept of Elazar [17] on regional authority. He argues that the devolution of fiscal powers is not related solely to the preference-matching mechanism by which the degrees of decision-making to tax and borrow, as well as revenue and assignments, are implemented independently by sub-national governments (self-rule). However, the devolution of fiscal powers should also take into account the capacity of sub-national governments to co-determine central government's decision-making. In this context, both local and central governments can work and decide together on redistribution issues (shared-rule). Thus, various institutional settings of fiscal decentralization are expected to produce different outcomes on inequality, particularly when we add military expenditure and different channels of institutional quality.

To strengthen the literature, many empirical studies measure inequality only in vertical terms, which Tadjoeeddin et al. [18] refer to as inequality in a population. The most common measurement for this type of inequality is the Gini coefficient. However, this cannot capture horizontal inequality, which refers to inequality between different ethno-social groups or regions. In this article, we use ethnic group political inequality to gauge horizontal inequality, since there is no available economic measure to perform proper analysis in a panel dataset.

Based on motivation and the various gaps mentioned above, this paper tries to investigate the relationship between fiscal decentralization and vertical and horizontal inequality in 33 developing countries (see Appendix A) over the period 1990–2014. In this article, we also want to examine whether fiscal decentralization is more effective in reducing inequality in developing countries with a better level of institutional quality and a lower level of military expenditure.

We carried out a two-step system, general method of moments (GMM), and found that different institutional settings of fiscal decentralization in developing countries could significantly contribute to distribution of income and to ethnic inequality. In the former, if sub-national governments in developing countries perform a self-rule mechanism, this will increase vertical inequality. However, they can actually improve their distribution of income if they reach an optimal degree of military expenditure. On the other hand, when sub-national governments of developing countries administer a shared-rule mechanism,

this will improve vertical inequality. Such a connection can, to some extent, be explained by the channels of military expenditure and law and order.

In the latter, sub-national governments can either execute a self-rule or a shared-rule. Such a condition can be achieved, for self-rule, with a better level of democracy, or, for shared-rule, a stronger rule of law. In addition, to carry out taxing and borrowing independently, developing countries require a certain degree of optimal military spending to effectively reduce ethnic inequality.

The next section provides a literature review on the relationship between fiscal decentralization and inequality and on the roles of military expenditure and institutional quality. We then present a new dataset and methodology that are closely related to the aspects of inequality in developing countries. Before presenting the conclusions, we will obtain the econometric results based on several characteristics such as fiscal, institutional quality, military expenditure, and demography.

2. Review of Literature

In recent years, many scholars have focused their attention on vertical inequality. For example, for the period 1971–2000, Sepulveda and Martinez-Vazquez [6] observed 56 countries to analyze the fiscal decentralization–inequality nexus. They found that government size plays a significant role in the fiscal decentralization–inequality nexus. Accordingly, when the size of government is relatively small in the economy, a higher level of decentralization appears to worsen income distribution. However, fiscal decentralization improves the distribution of income when it accounts for 20 percent or more of the GDP.

In a more specific study, over a period of observation similar to that of Sepulveda and Martinez-Vazquez, using 23 OECD countries Sacchi and Salotti [19] showed that tax expenditure does not have a significant effect on inequality. However, a positive association exists between tax revenue and income inequality. As opposed to Sacchi and Salotti's object of analysis, Bojanic [20] found that decentralization has a minimal impact on inequality. However, there was a positive correlation between expenditure decentralization and inequality when the estimations excluded the two largest countries, the U.S. and Canada, from the equation.

In another study, over the period 1980–2010, Goerl and Seiferling [7] found no significant impact of decentralization of redistributive spending on income inequality. Additionally, there was a hump-shaped relationship between total expenditure decentralization and income inequality. In contrast, Lessmann [8] found that fiscal decentralization reduced regional inequality in 54 countries.

To conclude, of all the literature reviewed, only the study by Sepulveda and Martinez-Vazquez [6] adequately describes the role of institutional quality, for which they use the index of democracy. However, using democracy as a single proxy of institutional quality can be misleading. In addition, none of the literature emphasizes horizontal inequality, which Tadjoeeddin et al. [18] regard just as important as vertical inequality. Finally, the direct and mediate effects of military spending on the fiscal decentralization–inequality nexus are neglected in all the literature.

Given the amount of evidence from the literature review above, there are several theoretical arguments to explain why fiscal decentralization impacts inequality. These arguments depart from the subjects of income redistribution and population mobility. According to the first generation theory of fiscal federalism, central government should play a dominant role in redistribution, because both redistributive policy and the preferences of local people regarding public goods and services are uniform in all jurisdictions [5]. However, decentralized redistribution increases competition among local governments. This creates 'voting by the feet' incentives, whereby poor households move to jurisdictions that provide more generous redistribution schemes, while the rich households shift to jurisdictions with minimal tax and transfer schemes [3].

Such claims are challenged by the second generation of fiscal federalism. Qian and Weingast [21] argue that 'voting by the feet' à la Tiebout [3], which emphasizes the extent

to which local governments grant welfare provisions to their communities, can be more effective in reducing inequality than redistribution schemes set by the central government. In this context, local governments, particularly in poorer regions, make use of having less generous welfare provisions by adopting a tax-cut policy for firms in order to attract more investment [22]. This method creates more jobs within the jurisdiction. In the end, these mechanisms not only produce a high intensity of redistribution in the local communities, but also reduce inequality.

Another channel on the fiscal decentralization–inequality nexus can come from the public sector size. Brennan and Buchanan [23] state that under the Leviathan hypothesis, governments and their bureaucrats are revenue-maximizers, always increasing their size through excessive taxation. The spirit of interjurisdictional competition among local governments to some extent restrains their capabilities to redistribute taxes efficiently and ultimately generates inequality. However, these bureaucrats are a source of diseconomies of scale in terms of revenue and expenditure. In the former, such a situation takes place when more human and financial resources are devoted to excessive tax collection. In the latter, the income generated from the taxpayers is spent in an inefficient and ineffective manner.

Even if we assume that policy makers are benevolent and collectively work to maximize welfare, ‘voting by the feet’ à la Tiebout incurs a cost of relocation that citizens themselves must bear. In this context, communities become more rational in their choices to move to other jurisdictions. Aside from the few competitors in the potential area, if a small difference exists between the net utility in the current jurisdiction and that in the potential jurisdiction, residents will choose to stay where they are. Hence, interjurisdictional tax competition may still put negative pressure on government size and collection of revenue, leading to underprovision of public goods and services. Overall, such pressures breed inequality.

Public sector size gives another dimension to depict the effect of military spending on inequality. In the literature of conflict, there are two contrasting arguments. On the one hand, decentralization can reduce ethnic conflict in which central government gives political, social, and economic control to the politically relevant ethnic groups in a region [24,25]. On the other hand, decentralization can escalate ethnic conflict through strengthening ethnic identities [26], creating a constitution that discriminates against excluded ethnic group [27], allocating ‘special’ resources to a region which might fuel ethnic conflict [28]. In line with the rich literature on conflict, many scholars find that higher levels of military expenditure weaken fiscal decentralization [12,13]. A continuing threat of social turbulence creates a tendency to allow sub-national governments less discretion to spend [29]. Additionally, Peacock and Wiseman [14] argue that when social disturbances create a negative environment, all citizens and sub-national governments demand that the spending of central government must be large to deal with the grievances. Therefore, in the event of conflict, revenue mobilization from local sources is limited. Additionally, sub-national governments lack the power to increase their social spending (i.e., redistribution), since the proportion of military spending increases during conflict.

The missing link in the current literature is that the size of the public sector that includes military spending suffers from the problem of the commons. In principle, many government programs may induce benefits centered on a specific sector or region. Such programs are financed mainly through a common pool of resources. The commons problem becomes more obvious in developing countries with a greater degree of ethnic conflict. In Indonesia, for example, the scope of conflict management is divided financially and concurrently between the central and sub-national governments.

We argue that decentralization can shape inequality through the problem of the commons, in this case, military expenditure. Assume that a ‘responsive’ central government in a developing country has two defense programs, specifically designed in terms of national and local. The national security program is centralized because policy makers want to ensure that all citizens receive the benefit of this program under conditions of peace and stability. Since the scale of the program is national, central government will finance

this project. They also decide to decentralize the other defense program (for instance, local conflict), because they believe that the goals and benefits of this program are for the needs of local citizens. Additionally, consider that the program is fully financed by local budgets, as they have the capacity to support the program by mobilization of revenue. Moreover, for each local government, local conflict will become one of their 'local' public goods and services, to be diversified according to the preferences of their local citizens [5].

In an ideal condition, with no social turbulence, sub-national governments prefer to have a smaller public sector or lower level of military expenditure. Decentralization will also reduce the problem of commons at the local level, since there is no program associated with the budget of the central government. Coupled with the revenue-constraint hypothesis à la Brennan and Buchanan [23], this will reduce inequality. However, as mentioned above, when there is social unrest, the population and local government prefer a larger size of government, or in this case, a higher level of defense spending. Decentralization will potentially increase the commons problem. In addition to this self-financed program, there may be a similar defense program with local benefits, specifically designed to mitigate conflict but financed by the central government. This is due to central government's characteristic of being 'responsive' to all citizens. However, local officials now have more incentive to enlarge their mobilization of revenue and to diversify their preferences, because they have the authority to alter the costs of providing their 'local' public goods and services to other sectors, even outside their jurisdiction. Such conditions increase inequality.

Moving to the mediating effect of institutions, our conceptual framework on the substantial role played by institutional quality in clarifying the effect of the fiscal decentralization–inequality nexus is based on the seminal work by Riker [10]. Clearly, political accountability, through the strength of political parties, can exert political leverage on the outcomes of decentralization. Basically, strong political parties can provide a robust political and financial platform for competent politicians in local governments, facilitating their possibilities for reelection in the next period, and for promotion to the national government. Having qualified politicians at their disposal, the parties, in return, want to extend their control over policies in order to maintain and even increase the number of their electoral votes in the future. Some scholars argue that democracy can also be a source of political accountability. In this context, Enikolopov and Zhuravskaya [30] state that the goals of decentralization on certain outcomes, such as provision of public goods and services as well as redistribution, are subject to whether local public officials are elected rather than appointed by the central government. This again ensures that they are more accountable to their constituents.

Many believe that decentralization can be detrimental to redistribution if implemented in developing and transitioning economies [31,32]. All the risk associated with fiscal decentralization is directed toward a decrease in the quality of government decisions and an increase in the influence of elites. Bardhan and Mookherjee [11] state that local officials tend to be captured by their elites, even if they are elected democratically through voting. This results in a significant increase in redirection of benefits to unintended groups and in corruption.

The objective of redistribution in developing countries becomes even harder to achieve due to already existing problems related to the capacity and competency of local officers [1]. Keefer and Knack [33] explain that a poor quality of bureaucracy can contribute to a greater level of inequality through a lower degree of enforcement of property rights. In principle, a higher level of bureaucratic quality requires stronger enforcement of impartiality rules, whereby the use of authority is not based on partisan considerations and interests [34]. Bureaucratic quality also requires autonomy, whereby bureaucrats can independently set goals and deliver desired outcomes. Such autonomy should ensure legitimacy of government, in such a way that citizens and political leaders support the programs designed and implemented by bureaucrats.

Nonetheless, potential investors and asset holders need protection from being captured by either the government or other groups [35]. These features of impartial decision-making and bureaucratic autonomy can lead to the enforcement of property rights, which provide

clarity about the boundaries separating one person's property from that of another. If property rights influence inequality, the analytical framework is then determined by the type of government and its protection of the property of certain groups. For instance, Piketty [36] shows that leviathan governments can maximize their own utility by protecting the middle classes, since they will have a high return on investment through tax-generated revenue. This will, in turn, increase inequality. However, if revenue-maximizing governments use tax revenues for the purpose of redistribution, inequality will decline.

In summary, the connection between fiscal decentralization and inequality depends on the ability of central government to contain the commons problem when designing its defense program. For this reason, local officials should also have fewer incentives to spend military resources. In addition, the quality of institutions plays a dominant role in explaining whether fiscal decentralization affects inequality. All in all, we expect that fiscal decentralization is more effective in reducing inequality in developing countries with a higher level of institutional quality and a lower degree of military expenditure.

3. Data and Methods

Since we want to investigate the relationship between fiscal decentralization and income inequality in developing countries, our analysis is focused on national inequality. Unlike regional inequality studies, which suffer from scarcity and poor quality of regional data in developing and emerging countries [8], this study includes national data on developing countries, available on a wider scale, to facilitate a proper panel analysis. Thus, the driving forces of national inequality can be generalized in an efficient manner.

The dependent variable of inequality is measured in terms of vertical and horizontal inequality (see Table 1). The concept of inequality has also been beset with measurement problems, and several alternatives have been used in the literature. The most common measure of inequality is the Gini coefficient, which can be defined in terms of income or consumption, and either for individuals or households. In addition, Tadjoeeddin et al. [18] believe that it is a common measurement of vertical inequality, which they refer to as inequality in a population. However, such a variable cannot capture horizontal inequality, which corresponds to inequality between different ethno-social groups or regions. Thus, in the case of vertical inequality, we use the *All the Ginis* (ATG) dataset from Milanovic [37]. Such data will be supplemented by the egalitarian component index from the varieties of democracy (V-Dem) dataset, which includes equal protection, access, and distribution of economic resources across social groups [38].

Meanwhile, horizontal inequality can be best measured in terms of economic aspects (e.g., income). However, such data are not available to conduct a panel data analysis. Thus, we utilize ethnic group political inequality from the Ethnic Power Relations (EPR) dataset [39]. This inequality is defined as the share of the population that belongs to the excluded ethnic group relative to the share of the total population belonging to politically relevant ethnic groups.

Overall, we implement the dynamic panel data analysis in 33 developing countries over the period 1990–2014. The model is specified as follows:

$$\text{INEQ}_{it} = \alpha_0 + \gamma_0 \text{INEQ}_{it-1} + X_{it} \gamma'_1 + Z_{it} \gamma'_2 + u_i + \theta_t + \varepsilon_{it}, \quad (1)$$

where the subscript i denotes the country, and t denotes the year. The dependent variable of INEQ_{it} is composed over the average of the relevant five periods (1990–1994, 1995–1999; 2000–2004; 2005–2009; 2010–2014). INEQ_{it-1} is the lagged variable of inequality. X_{it} is the main variables of interest, and Z_{it} is a set of control variables. Meanwhile, u_i is an unobserved time-invariant, θ_t is unobserved time-variant, and ε_{it} is the corresponding disturbance term.

In Equation (1), the adoption of five-year consecutive periods can neutralize the effects of cyclical fluctuations and reduce the problem of missing values in the annual inequality data [6]. In addition, Sepulveda and Martinez-Vazquez [6] state that such a method can refine the quality of the inequality variable, which is subject to quantification errors.

Table 1. Variable and source.

| Variable Name | Description | Variable Source |
|---------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| lgdppc | Natural logarithm of real GDP per capita | World Economic Outlook, IMF |
| popgr | Population growth rate | World Development Indicator, World Bank |
| open | Openness in trade | World Development Indicator, World Bank |
| gov | Government expenditure as percentage of GDP | World Economic Outlook, IMF |
| milex | Military expenditure as percentage of GDP | Stockholm International Peace Research Institute (SIPRI) |
| dem | Level of democracy: 0 represents autocracy and 10 represents democracy | Basic Quality of Government (QOG) dataset based on Polity IV project |
| elecDEM | Electoral democracy assigned a score between 0 and 1. Highest score represents highest level | Varieties of democracy (V-Dem) dataset |
| partDEM | Participatory democracy assigned a score between 0 and 1. Highest score represents highest level | Varieties of democracy (V-Dem) dataset |
| corr | Corruption has six-point scale. Highest score represents greatest risk of corruption | International Country Risk Guide (ICRG) |
| lo | Law and order assigned a score between 0 and 6. Highest score represents highest level | International Country Risk Guide (ICRG) |
| bq | Bureaucratic quality has four-point scale. Highest score represents highest level | International Country Risk Guide (ICRG) |
| horg | Share of excluded ethnic group to politically relevant ethnic groups (log) | Ethnic Power Relations project |
| gini | 'Standardized' Gini coefficients | <i>All the Ginis</i> (ATG) dataset |
| egal | Egalitarian component index | Varieties of democracy (V-Dem) dataset |
| fisauto | Sums of tax and borrowing autonomy | Regional autonomy index (RAI) dataset |
| fiscont | Sums of tax and borrowing control | Regional autonomy index (RAI) dataset |

In the models, we also incorporate the income group and period fixed effects to control the issue of time-invariant (u_i) and time-variant (θ_t) unobserved factors, respectively. Such a method is expected to reduce cross-sectional dependence due to spatial effects and unobserved common factors [40]. Hence, in the fixed effects (FE) model, we incorporate both income group and period fixed effect. In the random effects (RE) model, we take only income group fixed effect into the estimation. Specifically, the inclusion of u_i will at least tackle some unobserved preferences of societies in a certain income group and may thus simultaneously determine the degree of redistribution and fiscal decentralization.

However, as fiscal decentralization, institutions, and military spending are endogenous variables [6,8,15], the estimations of both fixed and random effects may produce biased and inconsistent results. Thus, instrumental variables (IV) should be the most appropriate approach to mitigate the problem of reverse causality. The implementation of such techniques has been challenged due to the scarcity of time-variant exogenous instruments. Faced with the difficulty of the instrument, we use the lagged value of endogenous explanatory variables and their interactive terms to conduct a dynamic panel analysis.

Regarding fiscal decentralization indicators, we will incorporate the regional autonomy index (RAI) dataset [41]. Following this concept, in the RAI dataset, the authority of sub-national governments to conduct fiscal policies can be measured by their ability to tax and borrow independently (self-rule). In contrast, there is a possibility that central and sub-national governments together decide the level of taxing and borrowing (shared-rule).

Aside from fiscal decentralization, our next variable of interest is related to the country's polity. In this context, we want to capture the direct and indirect effects of institutional quality on inequality. Empirical studies have pointed out the important effect of institutional quality on inequality, but none of them have included these concerns in the analysis. This is partly due to the problem of measurement regarding institutional quality. To solve this issue, Murshed et al. [42] argue that it can be viewed at the level of process and outcome.

Process is related to the degree of democracy or autocracy, which can be a proxy to quantify a country's systemic characteristics. Outcome can be quantified by quality of governance.

From another perspective, Rothstein and Teorell [34] state that the quality of institutions can be best described in terms of input and output. The former is related to access to public authority (i.e., democracy), while the latter corresponds to the way in which authority is exercised (i.e., government quality or governance). In this study, the process or input side of institutional quality is taken from the Polity IV project, which combines autocracy and democracy scores, and from the varieties of democracy (V-Dem) dataset, which dissects democracy in terms of electoral and participatory. In addition, we will deploy the international country risk guide (ICRG) dataset to investigate the output or outcome aspect of institutional quality, which includes risk of corruption, bureaucratic quality, and law and order.

Another main variable of interest is defense spending. As the structure of government expenditure contains a proportion of military spending, we include military expenditure as a percentage of GDP in the separate regression. This variable is taken from the Stockholm International Peace Research Institute (SIPRI) dataset. Several studies have examined the effect of military spending on inequality [16,43]. Meanwhile, military expenditure lessens the level of decentralization [12,13]. Hence, these studies can estimate the direct and mediate effects of military expenditure.

The control variables included in vector Z_{it} of Equation (1) have also been selected based on the literature review on fiscal decentralization and inequality [6,7,19]. Here, we include per capita GDP, population growth rate, and trade openness. The GDP per capita data are taken from the IMF database, based on the current World Economic Outlook. Meanwhile, population growth rate and trade openness are taken from the World Development Indicator (see Table 1).

Overall, the observations of variables are relatively unbalanced (see Table 2). Regarding the dependent variable, clearly, both *gini* and *egal* remain at a relatively high level, while the horizontal inequality measurement lies at a relatively moderate level. However, local governments in developing countries have relatively small degrees of fiscal autonomy (1.6) and control (0.25). From the perspective of institutional quality, all variables of democracy, *dem* (5.5), *elecDEM* (0.43), and *pardem* (0.25), indicate that developing countries, on average, do not implement full democracy and have a relatively low risk of corruption (2.3). All samples of developing countries face problems within law and order (3.1), as well as bureaucratic quality (1.5). In addition, the average of military spending in developing countries is quite moderate, at 2.3 percent of GDP.

Table 2. Descriptive Statistics.

| Variable Name | Observation | Mean | Standard Dev. | Min | Max |
|-------------------------|-------------|-------|---------------|-------|--------|
| Gini | 438 | 0.42 | 0.09 | 0.24 | 0.74 |
| Egalitarian | 602 | 0.54 | 0.17 | 0.15 | 0.90 |
| Horizontal Gini (log) | 442 | −1.96 | 1.30 | −8.50 | −0.09 |
| Fiscal Autonomy | 174 | 1.58 | 2.31 | 0 | 10.21 |
| Fiscal Control | 174 | 0.25 | 0.66 | 0 | 3 |
| Democracy | 663 | 5.51 | 2.90 | 0 | 10 |
| Electoral Democracy | 619 | 0.43 | 0.21 | 0.07 | 0.91 |
| Participatory Democracy | 619 | 0.25 | 0.15 | 0.01 | 0.67 |
| Corruption | 445 | 2.33 | 0.84 | 0 | 5 |
| Law and Order | 445 | 3.09 | 1.05 | 0.50 | 5.98 |
| Bureaucratic Quality | 445 | 1.57 | 0.81 | 0 | 4 |
| Per capita Growth (log) | 647 | 7.13 | 1.12 | 4.68 | 9.99 |
| Defense Spending | 526 | 2.31 | 2.22 | 0.08 | 26.1 |
| Population growth | 666 | 1.70 | 1.22 | −3.77 | 6.25 |
| Openness | 623 | 80.61 | 41.09 | 0.67 | 440.74 |

4. Results

In Table 3, we try to investigate the relationship between fiscal decentralization, institutional quality, military expenditure, and vertical inequality. Our dependent variable is based on the *All the Ginis* (ATG) dataset. To dissect the fiscal decentralization–vertical inequality nexus, we initially conduct the basic panel of random effects (RE) and fixed effects (FE) estimations with the standard of error-corrected method.

Table 3. Full Regressions on Gini, Fiscal Decentralization, Institutional Quality, and Military Expenditure.

| Exp. Variables | Dep. Variable: <i>All the Ginis</i> | | | | | |
|------------------------|------------------------------------------------------------------------------|-------------------|-------------------|----------------------------------------------|-------------------|------------------|
| | A. Variable of Interest: Fiscal Autonomy, Institution, and Military Spending | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fisauto | 6×10^{-4} (0.05) | −0.006 (0.01) | −0.009 (0.01) | −0.004 (0.02) | −0.02 (0.05) | −0.01 (0.02) |
| Dem (polity) | 0.02 * (0.009) | | | | | |
| Elecdem | | 0.05 (0.11) | | | | |
| Pardem | | | 0.07 (0.13) | | | |
| Cor | | | | −0.004 (0.01) | | |
| Lo | | | | | −0.03 (0.02) | |
| Bq | | | | | | −0.004 (0.03) |
| Milex | −0.004 (0.02) | −0.006 (0.009) | −0.006 (0.008) | −0.002 (0.02) | 0.04 (0.03) | −0.003 (0.02) |
| Fisauto × Dem | -8×10^{-4} (0.006) | | | | | |
| Fisauto × Elecdem | | 0.002 (0.01) | | | | |
| Fisauto × Pardem | | | 0.009 (0.03) | | | |
| Fisauto × Cor | | | | 6×10^{-4} (6×10^{-4}) | | |
| Fisauto × Lo | | | | | 0.01 (0.02) | |
| Fisauto × Bq | | | | | | 0.003 (0.01) |
| Fisauto × Milex | 0.006 (0.009) | 0.005 (0.004) | 0.005 (0.004) | 7×10^{-4} (0.006) | −0.009 (0.008) | 0.003 (0.005) |
| R ² | - | - | - | - | - | - |
| Lag | 3 | 3 | 2 | 4 | 3 | 3 |
| Instrument | 21 | 21 | 27 | 15 | 21 | 21 |
| AR <i>p</i> -value | 0.25 | 0.16 | 0.50 | 0.93 | 0.89 | 0.73 |
| Sargan <i>p</i> -value | 0.28 | 0.36 | 0.13 | 0.17 | 0.48 | 0.21 |
| Observation | 94 | 93 | 93 | 38 | 88 | 88 |
| Groups | 31 | 30 | 30 | 18 | 26 | 26 |

Table 3. Cont.

| Exp. variables | Dep. Variable: All the Ginis | | | | | |
|------------------------|-----------------------------------------------------------------------------|------------------|-------------------|-----------------|--------------------|------------------|
| | B. Variable of Interest: Fiscal Control, Institution, and Military Spending | | | | | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fiscon | 0.03 (0.03) | 0.09 (0.55) | −0.009 (0.01) | 0.07 (0.13) | −0.15 ** (0.06) | 0.14 (0.19) |
| Dem (polity) | 0.01 (0.008) | | | | | |
| Elecdem | | 0.13 (0.29) | | | | |
| Pardem | | | 0.07 (0.13) | | | |
| Cor | | | | 0.007 (0.02) | | |
| Lo | | | | | −0.04 ** (0.02) | |
| Bq | | | | | | −0.004 (0.02) |
| Milex | 0.006 (0.01) | 0.003 (0.02) | −0.006 (0.008) | 0.004 (0.02) | 0.04 ** (0.02) | 0.007 (0.01) |
| Fiscon × Dem | −0.003 (0.003) | | | | | |
| Fiscon × Elecdem | | −0.13 (0.62) | | | | |
| Fiscon × Pardem | | | 0.009 (0.03) | | | |
| Fiscon × Cor | | | | −0.04 (0.07) | | |
| Fiscon × Lo | | | | | 0.08 ** (0.04) | |
| Fiscon × Bq | | | | | | −0.04 (0.06) |
| Fiscon × Milex | -1×10^{-4} (0.004) | −0.006 (0.11) | 0.005 (0.004) | 0.02 (0.04) | −0.08 * (0.04) | −0.01 (0.03) |
| Lag | 3 | 3 | 3 | 4 | 3 | 4 |
| Instrument | 20 | 20 | 20 | 14 | 20 | 14 |
| AR <i>p</i> -value | 0.37 | 0.36 | 0.25 | 0.28 | 0.31 | 0.29 |
| Sargan <i>p</i> -value | 0.23 | 0.21 | 0.20 | 0.24 | 0.19 | 0.23 |
| Observation | 94 | 93 | 93 | 88 | 88 | 88 |
| Groups | 31 | 30 | 30 | 26 | 26 | 26 |

Notes: Number of parentheses are robust standard error. Asterisks as follows: *** = significant at 1 percent level; ** = significant at 5 percent level; * = significant at 10 percent level. Other explanatory variables as follows: (1) natural logarithm of GDP per capita; (2) population growth rate; (3) openness in trade. In case of GMM, first lag of dependent variable is an explanatory variable. Full results available upon request.

As previously discussed in the methodology, the static panel data analysis may generate biased and inconsistent results if we cannot control the reverse causality in the model. Hence, we implement a two-step system, general method of moments (GMM) [40]. Such methods can deal with various issues on the fiscal decentralization–inequality nexus such as endogeneity, the limited observations and groups, as well as the uncorrected standard of error. In this context, we utilize the lagged value of these indicators and their interaction variables as instruments. Overall, we count on the results from GMM settings instead of RE and FE estimations, since the former pass the autocorrelation and validity tests.

In Table 4, we utilize the egalitarian component index of V-DEM dataset as a proxy indicator for inequality. The current estimations yield even better findings in terms of their contribution of input-based metrics of institutional quality. The critical difference between the results in Table 3 and those in Table 4 lies in the role of a self-rule mechanism, which plays a major part in Table 4.

Table 4. Full Regressions on *Egal*, Fiscal Decentralization, Institutional Quality, and Military Expenditure.

| Exp. Variables | Dep. Variable: Egalitarian Component Index | | | | | |
|------------------------|------------------------------------------------------------------------------|----------------------|-------------------|-----------------------------------------------|-------------------------------|-------------------|
| | A. Variable of Interest: Fiscal Autonomy, Institution, and Military Spending | | | | | |
| | (13) | (14) | (15) | (16) | (17) | (18) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fisauto | 0.02 (0.04) | 0.02 * (0.009) | 0.01 (0.01) | 0.009 (0.02) | 0.006 (0.009) | 0.01 (0.02) |
| Dem (polity) | 0.002 (0.007) | | | | | |
| Elecdem | | 0.06 (0.09) | | | | |
| Pardem | | | 0.11 (0.11) | | | |
| Cor | | | | −0.006 (0.009) | | |
| Lo | | | | | 6×10^{-4} (0.006) | |
| Bq | | | | | | −0.01 (0.02) |
| Milex | 0.04 *** (0.02) | 0.03 ** (0.02) | 0.03 (0.02) | 0.03 (0.02) | 0.005 (0.009) | 0.02 (0.02) |
| Fisauto × Dem | 2×10^{-4} (0.006) | | | | | |
| Fisauto × Elecdem | | −0.005 (0.02) | | | | |
| Fisauto × Pardem | | | −0.009 (0.02) | | | |
| Fisauto × Cor | | | | -7×10^{-4} (9×10^{-4}) | | |
| Fisauto × Lo | | | | | −0.001 (0.002) | |
| Fisauto × Bq | | | | | | 0.002 (0.005) |
| Fisauto × Milex | −0.01 ** (0.005) | −0.009 ** (0.004) | −0.007 (0.006) | −0.006 (0.005) | −0.002 (0.003) | −0.008 (0.005) |
| R ² | - | - | - | - | - | - |
| Lag | 2 | 2 | 2 | 3 | 2 | 2 |
| Instrument | 27 | 27 | 27 | 21 | 27 | 27 |
| AR <i>p</i> -value | 0.14 | 0.12 | 0.14 | 0.43 | 0.11 | 0.12 |
| Sargan <i>p</i> -value | 0.86 | 0.68 | 0.68 | 0.39 | 0.97 | 0.99 |
| Observation | 110 | 110 | 110 | 39 | 103 | 103 |
| Groups | 33 | 33 | 33 | 19 | 29 | 29 |

Table 4. Cont.

| Exp. variables | Dep. Variable: Egalitarian Component Index | | | | | |
|------------------------|-----------------------------------------------------------------------------|-----------------|------------------|------------------|--------------------------------|------------------|
| | B. Variable of Interest: Fiscal Control, Institution, and Military Spending | | | | | |
| | (19) | (20) | (21) | (22) | (23) | (24) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fiscon | −0.16 (0.31) | −0.02 (0.17) | 0.009 (0.10) | 0.04 (0.04) | 0.03 (0.04) | −0.03 (0.06) |
| Dem (polity) | −0.002 (0.005) | | | | | |
| Elecdem | | 0.02 (0.08) | | | | |
| Pardem | | | 0.08 (0.09) | | | |
| Cor | | | | −0.001 (0.01) | | |
| Lo | | | | | −0.001 (0.006) | |
| Bq | | | | | | 0.003 (0.008) |
| Milex | 0.03 (0.02) | 0.03 (0.02) | 0.03 * (0.02) | 0.005 (0.01) | -2×10^{-4} (0.009) | −0.004 (0.01) |
| Fiscon × Dem | 0.02 (0.03) | | | | | |
| Fiscon × Elecdem | | 0.08 (0.24) | | | | |
| Fiscon × Pardem | | | 0.07 (0.22) | | | |
| Fiscon × Cor | | | | −0.008 (0.01) | | |
| Fiscon × Lo | | | | | −0.005 (0.001) | |
| Fiscon × Bq | | | | | | 0.008 (0.002) |
| Fiscon × Milex | 0.005 (0.06) | −0.02 (0.03) | −0.02 (0.02) | −0.01 (0.01) | −0.007 (0.01) | 0.003 (0.002) |
| Lag | 2 | 2 | 2 | 2 | 2 | 3 |
| Instrument | 27 | 27 | 27 | 27 | 27 | 20 |
| AR <i>p</i> -value | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 | 0.14 |
| Sargan <i>p</i> -value | 0.70 | 0.56 | 0.64 | 0.99 | 0.99 | 0.84 |
| Observation | 110 | 110 | 110 | 103 | 103 | 103 |
| Groups | 33 | 33 | 33 | 29 | 29 | 29 |

Notes: Number of parentheses are robust standard error. Asterisk as follows: *** = significant at 1 percent level; ** = significant at 5 percent level; * = significant at 10 percent level. Other explanatory variables as follows: (1) Natural logarithm of GDP per capita; (2) Population growth rate; (3) Openness in Trade. In case of GMM, first lag of dependent variable is explanatory variable. Full results available upon request.

Moving to Table 5, we deploy the same method and estimation as with the previous tables. However, we put more emphasis on the aspect of horizontal inequality. The results are mixed, subject to different institutional settings of fiscal decentralization.

Table 5. Full Regressions on *Horg*, Fiscal Decentralization, Institutional Quality, and Military Expenditure.

| Exp. Variables | Dep. Variable: Share of Excluded Ethnic Group to Politically Relevant Ethnic Groups (Log) | | | | | |
|------------------------|-------------------------------------------------------------------------------------------|------------------|------------------|-----------------|-----------------|-----------------|
| | A. Variable of Interest: Fiscal Autonomy, Institution, and Military Spending | | | | | |
| | (25) | (26) | (27) | (28) | (29) | (30) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fisauto | −0.92 ** (0.42) | −0.98 (0.78) | −0.90 (0.69) | −0.48 (0.34) | 0.38 (0.86) | −1.63 (1.67) |
| Dem (polity) | −0.20 * (0.11) | | | | | |
| Elecdem | | −2.11 (3.39) | | | | |
| Pardem | | | −3.83 (4.96) | | | |
| Cor | | | | 0.08 (0.25) | | |
| Lo | | | | | 0.02 (0.94) | |
| Bq | | | | | | 1.05 (0.72) |
| Milex | −0.18 (0.20) | 0.45 (0.43) | −0.59 (0.46) | −0.20 (0.32) | 0.04 (0.68) | −0.88 (0.62) |
| Fisauto × Dem | 0.10 ** (0.04) | | | | | |
| Fisauto × Elecdem | | 0.57 (1.78) | | | | |
| Fisauto × Pardem | | | 0.38 (2.24) | | | |
| Fisauto × Cor | | | | 0.006 (0.01) | | |
| Fisauto × Lo | | | | | −0.30 (0.46) | |
| Fisauto × Bq | | | | | | 0.18 (0.50) |
| Fisauto × Milex | 0.13 * (0.08) | 0.24 * (0.13) | 0.27 * (0.14) | 0.17 (0.12) | 0.21 (0.29) | 0.49 (0.35) |
| Lag | 2 | 4 | 4 | 4 | 3 | 4 |
| Instrument | 27 | 15 | 15 | 15 | 21 | 15 |
| AR <i>p</i> -value | 0.36 | 0.20 | 0.18 | 0.13 | 0.16 | 0.37 |
| Sargan <i>p</i> -value | 0.42 | 0.81 | 0.86 | 0.45 | 0.70 | 0.96 |
| Observation | 98 | 98 | 98 | 38 | 93 | 93 |
| Groups | 29 | 29 | 29 | 18 | 26 | 26 |

Table 5. Cont.

| Exp. variables | Dep. Variable: Share of excluded ethnic group to politically relevant ethnic groups (log) | | | | | |
|------------------------|-------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|--------------------|-----------------|
| | B. Variable of Interest: Fiscal Control, Institution, and Military Spending | | | | | |
| | (31) | (32) | (33) | (34) | (35) | (36) |
| | System GMM | System GMM | System GMM | System GMM | System GMM | System GMM |
| Fiscon | −5.62 (4.17) | 0.17 (1.14) | −1.86 (1.68) | 0.07 (2.33) | −3.32 ** (1.47) | 0.81 (0.87) |
| Dem (polity) | −0.25 (0.19) | | | | | |
| Elecdem | | −1.04 (1.07) | | | | |
| Pardem | | | −2.53 (2.19) | | | |
| Cor | | | | 0.15 (0.37) | | |
| Lo | | | | | −0.63 (0.63) | |
| Bq | | | | | | 0.06 (0.10) |
| Milex | 0.009 (0.25) | −0.05 (0.14) | 0.05 (0.29) | −0.07 (0.18) | 0.40 (0.45) | 0.04 (0.15) |
| Fiscon × Dem | 0.41 (0.45) | | | | | |
| Fiscon × Elecdem | | −1.53 (1.48) | | | | |
| Fiscon × Pardem | | | −0.07 (2.88) | | | |
| Fiscon × Cor | | | | −0.52 (1.03) | | |
| Fiscon × Lo | | | | | 0.60 * (0.68) | |
| Fiscon × Bq | | | | | | −0.29 (0.21) |
| Fiscon × Milex | 0.90 ** (0.44) | −0.05 (0.33) | 0.37 (0.41) | 0.41 (0.31) | 0.62 (0.73) | −0.16 (0.27) |
| Lag | 4 | 3 | 4 | 3 | 4 | 2 |
| Instrument | 15 | 21 | 15 | 21 | 15 | 26 |
| AR <i>p</i> -value | 0.20 | 0.17 | 0.19 | 0.19 | 0.18 | 0.31 |
| Sargan <i>p</i> -value | 0.89 | 0.32 | 0.97 | 0.88 | 0.72 | 0.94 |
| Observation | 99 | 99 | 99 | 93 | 93 | 93 |
| Groups | 29 | 29 | 29 | 26 | 26 | 26 |

Notes: Number of parentheses are robust standard error. Asterisk as follows: *** = significant at 1 percent level; ** = significant at 5 percent level; * = significant at 10 percent level. Other explanatory variables as follows: (1) natural logarithm of GDP per capita; (2) population growth rate; (3) openness in trade. In case of GMM, first lag of dependent variable is explanatory variable. Full results available upon request.

5. Discussion

In Table 3, we begin our interpretation with the direct effect of the input-based metrics of institutional quality. From column (1), democracy (polity) appears to be significant on vertical inequality when fiscal autonomy is included in the estimations. However, the inter-

action variables between decentralization indicators and democracy (polity) appear to be statistically insignificant. Additionally, when democracy (polity), participatory democracy, electoral democracy, fiscal autonomy, and fiscal control are taken into account, as in model (1), (2), (3), (7), (8), and (9), the direct effect of military expenditure can insignificantly affect inequality. In addition, their interaction terms appear to be insignificant on inequality when these input-based metrics of institutional quality connect with decentralization indicators.

Moving to the output-based metrics of institutional quality, in model (11), our results show that law and order can significantly lower inequality when degree of fiscal control is taken into account. Unlike Chong and Calderon's [44] as well as Perera and Lee's [45] studies, all of which find that improvement in law and order is associated with increasing income inequality in developing countries, we find that a good legal system can abate this inequality. This might be the case when enhanced protection of property rights leads to an improvement in distribution of income, as in Latin American countries [46]. Similar to results from the input-based measures of quality of institutions, when fiscal control connects with rule of law, military expenditure can significantly grow inequality in developing countries. This outcome corroborates the results of studies by Abell [47], Kentor et al. [43], and Biscione and Caruso [16]. There are several explanations for the 'inequality-widening' phenomenon. For instance, Abell [47] reports a great discrepancy in salary between military and government workers, as well as between skilled and unskilled labor in these two sectors. From a different perspective, Kentor et al. [43] find that a 'new' military industry, categorized as a capital-intensive project, is suitable only for educated and skilled workers. All these factors deteriorate the distribution of income for the rest of society.

Based on the interaction between rule of law and fiscal control, as well as between military expenditure and fiscal control, we discover that shared-rule should have a more equalizing effect on income distribution in developing countries with relatively better levels of law and order and lower levels of military expenditure. The point at which fiscal control starts to lessen inequality is equal to 1.9 points and 1.9% on the ICRG scale and GDP, respectively. Based on estimations of indirect channels, the direct and overall effect of fiscal control on inequality is negative. This finding suggests that, if central and local governments have more interaction and co-decisions on redistribution issues, such a mechanism can decrease inequality. This, of course, is not surprising, since sub-national governments have different redistributive capacities related to taxes and transfers. Thus, increasing standardization of redistribution plays a significant role in reducing inequality.

Meanwhile, in Table 4, regarding the input-based metrics of institutional quality, improving democracy (polity), as well as electoral and participatory democracy, seem to be unimportant in any attempts to reduce inequality. In contrast, Scheve and Stasavage [48] observe the democracy–wealth inequality nexus in 10 countries of Latin America and the U.S. over the period 1900–2010. They argue that three factors can explain why the presence of democracy may increase inequality in some countries but have the opposite effect in others: first, when society is divided, as by ethnic and religious differences; second, when citizens consider the wealth-equalizing policies set by the government to be unfair; and last, when the democratic process has been captured by the rich. Similarly to Table 3, the interaction terms appear to be insignificant on inequality when democracy (polity) and electoral and participatory democracy connect with decentralization indicators.

Meanwhile, in models (13), (14), and (21), the direct effect of military expenditure significantly increases inequality when decentralization indicators and the input-based metrics of institutional quality are included in the estimations. However, based on the indirect effect of defense expenditure in column (14), fiscal autonomy can improve income distribution if military spending reaches an optimal percentage of GDP. The point at which fiscal autonomy starts to lessen inequality is equal to 2.2% on the GDP. All in all, unlike Table 3, the direct and total effect of fiscal autonomy on inequality is positive in which fiscal autonomy is having a growing impact on inequality. This verdict corroborates results

of other cross-country studies, as by Sepulveda and Martinez-Vazquez [6], Goerl and Seiferling [7], and Sacchi and Salotti [19].

On the output-based metrics of institutional quality, military expenditure and its connection with fiscal decentralization indicators have an insignificant effect on inequality when measurement of institutional quality is added to the estimations. From column (18) and (24), unfortunately, we cannot support Chong and Calderon's [44] or Perera and Lee's [45] findings, that the quality of bureaucracy is positively and significantly associated with inequality. Chong and Calderon [44] state that institutional reform in developing countries, involving various programs such as development of the tax collection system, intensive training for bureaucrats, as well as simplification of bureaucracy, rules, and formalities, may satisfy the preference of the community in the formal sector. On the other hand, the community in the informal sector may receive a higher level of transaction costs than with the previous procedures, due to 'adjustments' in this new formal system. Therefore, a better level of institutional reform may generate a higher level of inequality.

Moving to Table 5, from column (25), when developing countries independently conduct their own taxing and borrowing policies, the direct and total effects are negative and significant to horizontal inequality. Moreover, a higher degree of democracy (polity) in developing countries generally generates a lower level of horizontal inequality. In addition, after developing countries have reached a certain level of democracy, fiscal autonomy can produce a more equalizing effect on excluded ethnic groups. Yet, the value of polity at which it effectively reduces horizontal inequality in developing countries is equal to 9 points on the polity scale.

Regarding this phenomenon, Stewart et al. [49] shed some light on how democracy in political policies alleviates horizontal inequality. The authors suggest the involvement of several factors: first, the design of the electoral system and rules of political competition; second, the composition of the executive body and the way decisions are taken; and last, the extent and nature of decentralization. These play a crucial role in ensuring the inclusion of each group politically in terms of power and decision-making.

In the estimation of fiscal autonomy, we also find no significant evidence of an association between military expenditure and horizontal inequality. However, after developing countries reach an optimum level of military expenditure, fiscal autonomy can have a more significant effect on equalizing the politically excluded ethnic group. The point at which this transpires is equal to 4% of the GDP. Using the analogy from Biscione and Caruso [16], one might argue that if industry for defense is carried out domestically and is labor-intensive, taking the excluded ethnic group into consideration, military expenditure can politically and economically improve the status of this group.

From model (35), although the direct and indirect effects of military expenditure are insignificant, the direct and overall effect of shared-rule on horizontal inequality is negative. This result indicates that when central and sub-national governments intensify their efforts to work and decide together on ethnic inequality issues, this can reduce horizontal inequality in developing countries. Such a negative effect depends on the interaction between fiscal control, and law and order. In this context, the value of law and order at which shared-rule becomes effective in improving the politically excluded ethnic group in developing countries is equal to 5.5 points on the ICRG scale.

6. Conclusions

In this research, we provide a novel approach to the relationship between fiscal decentralization and inequality in 33 developing countries over the period 1990–2014. We also investigate how defense expenditure and a process-based and an outcome-based measure of institutional quality, play a significant role in shaping such nexus.

The main finding of the empirical examination is that different institutional settings of fiscal decentralization in developing countries can affect distribution of income and ethnic inequality. Regarding income inequality, evidence from the ATG and V-DEM dataset shows that if sub-national governments in developing countries independently implement

their taxing and borrowing policies, this will have a rising impact on vertical inequality. However, developing countries can actually improve the distribution of income if they reach an optimal degree of military expenditure. On the other hand, when central and sub-national governments cooperate and decide together on redistribution issues, this will improve vertical inequality. Such a connection can, to some extent, be explained by the channels of military expenditure and law and order.

Regarding ethnic inequality, the degree of regional authority plays a significant role in reducing horizontal inequality. In this context, sub-national governments can either carry out taxing and borrowing policies independently or cooperate with central government to decide on these policies. Such a condition can be achieved, for self-rule, by a better implementation of democracy, or, for shared-rule, a stronger rule of law. Additionally, the implementation of self-rule in developing countries needs a certain degree of optimal defense spending to reduce ethnic inequality more effectively.

Overall, this study provides an important contribution regarding the link between varieties of fiscal authority, inequality, quality of institutions, and military expenditures. In the future, we expect that local governments in developing countries will share more revenue and expenditure assignments with their central governments. This can, to some extent, affect income distribution. Future research should explore the effects of different types of decentralization (i.e., political and administrative) on inequality, as this study only covers the fiscal dimension of decentralization. In addition, our study cannot explain why most of democracy variables and their interaction with decentralization indicators do not affect inequality in developing countries. This is beyond the scope of our study, and deserves to be researched in the future.

Author Contributions: K.D. synthesized the revision of existing contributions, their connection with this research, collection of data, and the estimation of the empirical model. S.M.M. conducted the interpretation of empirical findings. S.I.B. conducted the interpretation of empirical findings. Discussion of results and main conclusions are a joint work of all co-authors. All authors have read and agreed to the published version of the manuscript.

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Appendix A. List of Developing Countries (RAI Sample Dataset)

| No | Country | Region | Income Group | No | Country | Region | Income Group |
|----|-----------|-----------------------------|---------------------|----|------------|-----------------------------|---------------------|
| 1 | Albania | Europe and Central Asia | Upper middle income | 18 | Macedonia | Europe and Central Asia | Upper middle income |
| 2 | Argentina | Latin America and Caribbean | Upper middle income | 19 | Malaysia | East Asia and Pacific | Upper middle income |
| 3 | Belize | Latin America and Caribbean | Upper middle income | 20 | Mexico | Latin America and Caribbean | Upper middle income |
| 4 | Bolivia | Latin America and Caribbean | Lower middle income | 21 | Montenegro | Europe and Central Asia | Upper middle income |
| 5 | Bosnia | Europe and Central Asia | Upper middle income | 22 | Nicaragua | Latin America and Caribbean | Lower middle income |
| 6 | Brazil | Latin America and Caribbean | Upper middle income | 23 | Panama | Latin America and Caribbean | Upper middle income |

| No | Country | Region | Income Group | No | Country | Region | Income Group |
|----|--------------------|-----------------------------|---------------------|----|-------------|-----------------------------|---------------------|
| 7 | Bulgaria | Europe and Central Asia | Upper middle income | 24 | Paraguay | Latin America and Caribbean | Upper middle income |
| 8 | Colombia | Latin America and Caribbean | Upper middle income | 25 | Peru | Latin America and Caribbean | Upper middle income |
| 9 | Costa Rica | Latin America and Caribbean | Upper middle income | 26 | Philippines | East Asia and Pacific | Lower middle income |
| 10 | Cuba | Latin America and Caribbean | Upper middle income | 27 | Romania | Europe and Central Asia | Upper middle income |
| 11 | Dominican Republic | Latin America and Caribbean | Upper middle income | 28 | Russia | Europe and Central Asia | Upper middle income |
| 12 | Ecuador | Latin America and Caribbean | Upper middle income | 29 | Serbia | Europe and Central Asia | Upper middle income |
| 13 | El Salvador | Latin America and Caribbean | Lower middle income | 30 | Suriname | Latin America and Caribbean | Upper middle income |
| 14 | Guatemala | Latin America and Caribbean | Lower middle income | 31 | Thailand | East Asia and Pacific | Upper middle income |
| 15 | Honduras | Latin America and Caribbean | Lower middle income | 32 | Turkey | Europe and Central Asia | Upper middle income |
| 16 | Indonesia | East Asia and Pacific | Lower middle income | 33 | Venezuela | Latin America and Caribbean | Upper middle income |
| 17 | Jamaica | Latin America and Caribbean | Upper middle income | | | | |

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