Department of Public Policy
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Remittances Vs Public Finance Capacity.
Impact Assessment in Reducing Income Inequality in Latin America:
A Quasi-Experimental Analysis

By

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Author's Declaration

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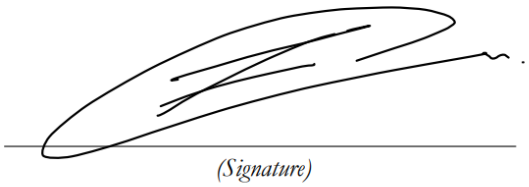

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Abstract

Income inequality is a major challenge in Latin America, and remittances are often seen as a potential solution. However, the impact of remittances on income inequality is complex and contested. This thesis examines the impact of remittances on income inequality in Latin America at a macroeconomic level. It utilizes a 15-country, 20-year panel dataset sourced from the World Inequality Database and the World Income Inequality Database. To address endogeneity concerns, this study employs lagged remittances at 1 and 3-year intervals as instrumental variables. Both empirical approaches, namely 2SLS and GMM, indicate that remittances exhibit a weak and statistically insignificant effect on reducing income inequality in the absence of systematic fiscal redistribution. In contrast, public finance capacity demonstrates a statistically significant and more pronounced impact on reducing income inequality. These findings suggest that public finance capacity plays a pivotal role in reducing the Gini index in Latin America surpassing the impact of remittances. Therefore, policymakers should prioritize enhancing public finance capacity to alleviate income inequality.

Key words: Development, Remittances, Public Sector, Public Finance.

Acknowledgements

This thesis is the result of a non-mandatory investigation of my master's degree. This work is based on my 2 years of formation in Vienna and a couple of months in Berlin. After witnessing how effective redistributive fiscal policy works in these countries myself, I considered it necessary to venture into this research exercise.

In this context, I would like to thank my professors and trainers, including my colleagues and mentors from the Department of Economics at the UCA, whose teachings have always been with me. Throughout the Master a special mention to Arianna Ornaghi from Hertie School, Misi, Anand, Martin, Michael and Evelyn from CEU. I thank you all for your commitment in teaching and your advice, you have inspired me to carry on with my ambitions as a researcher.

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Last but certainly not least, I thank my family and dedicate all my effort and dedication today and forever. I thank my father and mother, Douglas and Arely, who have set an example of hard work and helped me pay for my education with great effort. I thank my grandfather Francisco and grandmothers, Graciela and Marta, for migrating to the U.S. with the foresight to help their family succeed. I appreciate their prayers and advice, which motivate me to continue to push myself and dream.

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Chapter 1. Introduction

"♪ I would like to create a labor union with the neighbor downstairs.
He doesn't have a job, don't trust him!
Why doesn't he have a job? Because he doesn't catch one
Why doesn't he catch one? Because he's on record
Why is he on record? Because he steals a lot
Why does he steal so much? Because he doesn't have a job
That's exactly what I asked you! 'Why doesn't he have a job?'♪ "
Joaquin Sabina – Vicious Circles (1980) song lyrics.
Translated form original version in Spanish [Circulos Viciosos].

During 2021 LAC received more than 100k billion dollars in remittances, which constitutes an annual growth of 26.0%, the highest registered in the past 20 years(Harris & Maldonado, 2023). To put this in perspective, if remittances sent by migrants are summed up in the region, they would represent the 7th largest economy. Yet, despite these large cash transfers, why are Latin America and the Caribbean (LAC) regions not achieving high economic development.

Which are the income distribution implications behind this phenomenon? Can remittances reduce Income Inequality? Is cash enough to overcome Income Inequality? Development studies literature and theory reveal a variety of outcomes that depend on the dimensions and categories involved in the exercise. In addition, in terms of quantitative impact assessment tools and methodologies when dealing with studies of economic development. Indeed, quantitative impact assessment tools also have to deal with the complexity of not satisfying the Exogeneity Assumption and isolating the endogeneity bias. Moreover, the effects that remittances may have on income distribution and their governance implications in the region is a new area of theoretical and empirical importance for regions with large inequality gaps in income distribution such as Latin America and Africa, the regions with a higher level of income inequality(Chami et al., 2018; Ebeke & Le Goff, 2011; World Bank, 2022).

Although this is a complex and new topic, various studies have been conducted in Latin America as well as in Africa and East Asia. Several studies attempt to verify a fundamental economic intuition such as the greater the flow of remittances the greater the economic growth. However, there is no conclusive evidence of such an affirmation. Studies show positive and negative impacts depending on the limitation of the study and also a significant part of them show a neutral or null impact. Likewise, the findings are not only limited to economic variables but also to various areas of development such as the importance of institutions.

In general, there is evidence that better institutions imply economic growth and development(Knack & Keefer, 1995). Nevertheless, this notion extracted in the context of remittances is worth investigating for its potential impact as a macroeconomic stabilizer. The remittance trap argues that the stabilizing role of remittances in a context of weak governance can lead governments to become free riders and fail to fulfill their obligations to provide minimum social guarantees. Yet, because households are protected from macroeconomic shocks, they may not be aware of the absence of minimum guarantees and are limited in their political participation, thus creating a remittance trap(Chami et al., 2018).

This Remittances, Income Inequality and Governance Puzzle are new and open for research. Therefore, from a welfare economics perspective, this problem is approached in the context of Latin America's market economy as a public policy concern. Likewise, in the spirit of offering a holistic investigation of economic development, the following two research questions are formulated: What is the impact of remittances received in Latin American countries on reducing income inequality? Can Remittances be more effective to decrease income inequality than Nations' Public Finance Redistribution capacity?

To answer these questions, a quantitative empirical and experimental empirical strategy is used for the last 25 years in LAC region countries. The structure of this thesis is as follows: Chapter 2 looks at the patterns that this puzzle has followed in research and what the results of previous research have been to define the research gap and the scope of the research. Chapter 3 provides a theoretical framework for the ideas behind the role of the state throughout history to analyze the Latin American region. This is to further understand the development traps and how to attack them in reducing income inequality. In Chapter 4, the empirical component and its quasi-experimental design are presented. In this Chapter, the background framework required for the data analyses, from the formulation of the hypotheses to the formulation of the database used, will be presented. Chapter 5 immerses in the 2SLS and GMM models. The results of the 2 hypotheses related to the research questions are tested in this chapter, including validity and robustness tests results.

Finally, chapter 6 discusses regression findings from the previous chapter, relating them to their public policy implications. Likewise, it acknowledges the limitations of the scope of the results obtained. The main contributions, conclusions and evidence-based recommendations of this study are summarized in Chapter 7.

Chapter 2. Literature Review

Rapid growth is a priority of Developing countries and it has historically been seen as a synonym for development. Lately, a considerable volume of literature examines the impact of remittances on various aspects of development and income inequality, however, they are still contested. This initial section will concentrate on reviewing the existing literature pertaining to the economic growth and development consequences of remittances. In particular I will emphasize the complex nature of this subject to further elaborate on the theoretical foundations of my thesis. Subsequently, I will discuss prior research conducted to comprehend the relationship between remittances and inequality, incorporating empirical evidence and identifying patterns by zooming into the research question, method, and specific region focused on in the previous literature. The purpose of this is to underscore that there is no proof indicating that remittances reduce income inequality in developing nations. Lastly, I will establish a connection between the existing research gap and studies exploring the relationship between income inequality and remittances from a governance perspective. This connection will help delineate the research scope of my study.

2.1. Patterns Remittances Research in Economic Growth and Development

Among Economists, there is a general interest in the micro- and macroeconomic impacts of remittances as large international monetary flows. Common sense would say that larger monetary flows inevitably lead to economic growth since they constitute private money that, broadly speaking, can be either used to boost consumption or investment (Barajas et al., 2009; Sobiech, 2019). Nonetheless, existing academic studies have uncertain conclusions regarding the overall pattern when it comes to economic growth. In this quantitative study, I will focus on summarizing the most relevant findings focusing on developing countries[1].

Over the past X years, remittances have become a salient topic, especially for developing countries, where they have become even as large as Foreign Direct Investment (Barajas et al., 2009). This focus has been driven by the desire to get a snapshot of current research on whether remittances[2] can contribute to economic growth. In the Cazachevici et al. (2020) study, the exercise of a Bayesian averaging model was conducted for the side and middle-income countries. This study evaluates 538 estimators reported across 95 studies to assess the long-run impact of remittances

[1] I will focus to bring the analysis to Latin America and Africa for their income inequality similarities.

on growth. Their results suggest that leaving aside a potential publication bias toward reporting a positive effect, approximately 40% report positive effects, 40% report no effect, and 20% report a negative effect (Cazachevici et al., 2020). In general, the effects of Remittances on Economic growth results are mixed, even though higher cash flows should intuitively imply economic growth; the summary of studies carried out about the most relevant studies from recent years provide a variety of results.

Furthermore, Cazachevici et al. (2020) report that studies that do not address endogeneity systematically report larger magnitude effects of remittances on economic growth (Fayissa & Nsiah, 2010). This is a relevant starting point for the quantitative approach of this thesis research. Endogeneity control should be a priority to avoid biased estimators. Therefore, the method from which this relationship is analyzed will be fundamental for this analysis.

Experimental methods have very recently been assigned as the most adequate to solve the endogeneity of the development models. Accordingly, numerous papers support the instrumental variable method as the most appropriate method for processing panel data (Adams, 2011). Consistent with this, I analyze the results obtained from studies that provide answers to the question, what are the impact of remittances on economic growth, development, and income inequality matters that follow a quasi-experimental approach? Mostly I refer in this study to those that apply the Two Stages Least Square (2SLS) design or the Arellano-Bond estimator or Generalized Method of Moments (GMM).

Research on remittances and economic development reveals a consistent lack of conclusiveness in its findings. Ustubici & Irdam (2012), among other papers of the time, introduced a fundamental shift in measuring development beyond economic growth. The study examined the impact of remittances on the Human Development Index (HDI) in 24 countries (8 per each of income levels according to the World Bank), between 1990 and 2005. The regression analysis results reveal a positive effect of remittances on development. However, the key conceptual contribution of studies around the 2010s is their underlying conceptual contribution to the holistic concept of Development, including control variables related to public management. Regarding the results, public spending not only has a significant impact, but also has a greater impact than remittances. To be more specific, the following section will return to this point of the importance of the public sector in development and will go on to analyze the impact of remittances on income distribution.

2.2. Previous Research on Remittances and Income Inequality

In discussing income inequality, regional references to Latin America and Africa are essential. In this regard, I will follow the above exercise by analyzing the experiences of these continents in implementing empirical methodologies of Instrumental Variables. The reason behind this is that Latin America and Africa are not only home to the largest Gini coefficients, but also represent a large number of countries that are recipients of remittances, such as Mexico and Kenya.

According to the World Bank (2022), in 2021 Mexico ranked second among countries with the highest flow of remittances. In this regard, Kóczán and Loyola conducted a nationwide study in Mexico using a household survey. Their approach was to match remittance recipients with their non-remittance recipient counterfactuals. By looking at the difference in power to cope with external shocks such as the 1994 crisis, the researchers claimed in their study that remittances do have an income inequality-reducing effect (Kóczán & Loyola, 2018). However, Bang et al. (2016) also conducted a country-level study in Kenya using household survey data. The findings of this study using 2SLS yielded (contrary to Mexico) a strengthening effect of remittances on income inequality. Although, it should be noted that countries relate to different contexts, the focus of my research will be on more literature from panel data studies to enhance this Latin American study and in the interest of time.

Returning to the results of research using data panel analysis, the results, as in the previous section, are inconsistent between non-regional and regional studies. On the one hand, non-regional studies such as Ebeke & Le Goff (2011) titled "Why migrants' remittances reduce income inequality in some countries and not in others?" establishes how the results depend on migrants' qualification levels both in their home country and in their host country. On the other hand, referencing regional studies, an IV study in Africa that used lagged remittances as an instrument assessed a positive reinforcing impact of remittances on Gini (Anyanwu, 2011). In addition, a paper using the same method and instrument interested in measuring the impact of poverty found a significant reduction effect on income distribution between 0.06 and 0.12% (Acosta et al., 2008). Similar to a paper studying the Balkans where the results are positive, but not robust (Bajra, 2021).

In general, the studies cited so far focus exclusively on macroeconomic and income distribution indicators, losing sight of the role of government. The following section briefly addresses this issue. Moreover, after analyzing the literature about the impact of remittances on income inequality, this proves to be contested and reveals a number of gaps that can be addressed and further improved in future studies.

2.3. Patterns on Remittances, Income Inequality and Governance

This section addresses the lack of studies that approach these components of development that are distinctive to LAC: Remittances, Income Inequality and Governance. Although the theoretical framework elaborates on this linkage, it is important to mention that the number of studies is lower than in the previous two sections. Thus, here I compile the most relevant papers that are part of a economic stabilizer dispute between remittances and governance. In this regard, the competing economic stabilizer role of remittances yields two broad categories, namely, those who claim that remittances improve institutions and thus stabilize the economy, and those who claim that remittances deteriorate the institutions and thus affect the economy. The results of this new area of research are again varied and inconclusive.

In the first category of remittances as stabilizers, I want to address a study published by the International Monetary Fund for LAC between 1995 and 2014. The study showed that remittances have a macroeconomic stabilizing effect and reduce inequality, but with statistically non-significant estimators (Beaton et al., 2017). Relatedly, a study of sub-Saharan Africa published the same year found contrary improvements in democratic outcomes (Williams, 2017).

Additionally, the second category of remittances as destabilizing is led by the study by Abdih and others published in 2012 entitled "Remittances and institutions: Are remittances a curse?". This paper conducts a data panel study in 111 countries using IV strategies. As one of the pioneers in such assessments, this study found that the effect of remittances on issues such as corruption, rule of law, among others, were negative and overall worsened government accountability (Abdih et al., 2012). These findings are further reinforced in 2019 where remittances have a strengthened effect on corruption indices for a panel of 15 years and 195 countries (Ricciardulli, 2019). to what both studies suggest is a peril whereby remittances might be sponsoring a pass of free riders to unsound Democracies (Abdih et al., 2012; Escribà-Folch et al., 2015; Ricciardulli, 2019). A claim might be linked to the most recent views of some IMF economists about the existence of a Remittances Trap.

2.4. Thesis Scope

The above shows that the research gap regarding the weather remittances effectively reduce income inequality in Latin American region. The literature is inconclusive and does not allow to answer the two research questions of this study: What is the impact of remittances received in Latin American countries on reducing income inequality? Can Remittances be more effective to decrease income inequality than a Nations' Public Finance Redistribution capacity? Therefore, there is room to perform an impact assessment using IV approach and adding to the model the Welfare Economics component.

My contribution to solving this Remittances, Income Inequality and Governance puzzle would be applying public sector economics theory from a quasi-experimental approach. I will use panel data for time purposes and will guide my research on the 2017 IMF study that uses IV approach for LAC until 2015 and does not account for the government role in the redistribution of the income.

Finally, while in this study I will refer to the potential effect interacting among the three categories under study, my findings do not seek to prove such theories regarding a remittance trap. Indeed, some ideas might contribute to the near future. However, it is not the focus of my research per se.

Chapter 3. Theoretical Framework

In this chapter, I offer the theoretical framework regarding the role of the Public Sector and Welfare Economics in reducing income inequality. Subsequently, I address the question: what is the role of the government? Here I will flash the conditions of the neoliberal context to outline the role that the lack of Public Goods and Welfare provisions in Latin America has on Income Inequality. Later, I proceed to link ideas the Latin American economies to conceptualize traps theories. Finally, I connect the main barriers to breaking the Traps: Lack of comprehensive development policies and lack of Public Finance redistribution capacity, to formulate the two hypotheses of this study.

3.1. Public Sector Interventions ideas according to Economists

Every student of economics is familiar with Adam Smith's Invisible Hand and *laissez faire laissez passer* reference, both are ideas often used to support an absent-minded Government in the Economy. Nonetheless, Smith as the founder of Economics as a science, as many other influential economists, despite being known by the invisible hand, as a moral economist did address the role of the government in public life. He referenced that in order to oppose to injustice there were three vital duties of the Government: national defense, justice administration and public institutions for the public good (Smith, 2005). This thesis section briefly explores the ideas of the most influential economists of contemporary times including Economics Nobel Prize Laureates. The purpose here will be to focus on the ideas related to the Government's role in reducing income inequality. Likewise, to analyze this section, it is vital to have in mind the Market and the Government, and to then define the importance of Public Sector Economics.

Fiscal versus Monetary Policy

The first group of economists who considered fiscal policy as an important instrument for development began with John Maynard Keynes, the mastermind behind the systemization of Macroeconomics as an area of economic analysis. During a more developed capitalism stage than Smith was able to see in 1930, the Great Depression led Keynes to offer his ideas to revitalize the U.S. economy (Crafts & Fearon, 2010). Indeed, in his most influential work, Keynes stresses that during periods of economic decline and unemployment, Governments should embrace expansionary fiscal policies, such as increasing public spending and cutting taxes to stimulate the aggregate demand and therefore boost employment (Keynes, 1936).

Despite this advice, following World War II, a new country-nations economic order left rebuilding of these economies and their prosperity to fall under the responsibility of institutions such as the International Bank for Reconstruction and Development (World Bank, 2023) and the International Monetary Fund (IMF) in the context of The Breton Woods system. Both relevant institutions offered financing and advice to country governments, not only in Europe but also in The Americas (Ghosh, 2021; Naím, 2000). Moreover, starting in the 1960s, Nobel Memorial Prize in Economic Sciences laureates began to formally influence economic policies (Boettke et al., 2012).

One of the first economists to make a statement about Inequality was Simon Kuznets, who won the prize in 1971. As a economist who studied economic growth, his early research was guided by asking whether the distribution of income increases or decreases during economic growth (Kuznets, 1955). His empirical work supported the inverted-U inequality curve that showed for US, England, and Germany how inequality would rise in the beginning of the production process and eventually decline. This finding, however, has been questioned more recently as Kuznets Curve does not systematically extend to modern conditions (Acemoglu & Robinson, 2002; Ferreira & Ravallion, 2011). Nonetheless, beyond his ideas regarding income inequality, Kuznets (1973) had a clear perspective on the importance of theology and institution and ideological adjustments to enact economic growth. This work influenced both Keynesian and Monetarist Economists, two extremes of the economic policy spectrum.

Milton Friedman, 1976 Nobel laureate, argued that the government's exclusive responsibility in the economy was related to the management of circulating money through the market. Furthermore, Friedman (1982) considered that the government had to avoid at all costs its interference in fiscal policy since it distorted market forces and destroyed competition and incentives in a society dedicated to freedom, where, ideally, all economic activity should primarily rely on the market forces (Friedman, 1982). Regarding income distribution, he dedicates "Chapter 10" of his *Capitalism and Freedom* book to argue how harmful and ineffective taxation measures are for competition. Fiercely defending free market economy's ability to adjust and offer opportunities to individuals; this was a speech that became very popular at the University of Chicago and became the ruling paradigm for economic policy extended in Chile and the CELAC (Hoover Institution, 2011).

Development and Welfare Economics: Holistic approach

In contrast to Friedman's ideas of market freedom, the economist Amartya Sen, winner in 1998 of the Nobel Prize, developed a new paradigm of "Development as freedom". In this book, a more holistic approach is taken beyond growth as individual emancipation. He highlights instrumental freedoms, including political, economic, social, and protective security, as vital components in achieving genuine development (Sen, 1999, 2009). This holistic approach has had a profound impact on the field of development economics and provide a basis of a recharacterization of Welfare Economics and development notions in terms of 'opportunity-freedom' rather than utility (Vizard, 2005). With this vision in mind and in opposition to Friedman freedom views a group of contemporary Development Economists that are studying Income Inequality such as Joseph Stiglitz, Anthony Atkinson, Banerjee and Duflo contradict that reductionist view.

The holistic approach from Development and Welfare Economics promoters for an active role of the government, collectively it advocates for a systematic and comprehensive response to Income Inequality (Banerjee & Duflo, 2020), it is about stepping into solving problems of market failures via redistribution policies (Stiglitz, 2021) meaning that that poverty or income inequality is not about lack of Money (IMF, 2016). As Atkinson (2015) states, is much more complex than the conventional macroeconomic analysis, in essence, economic inequality is multidimensional.

Overall, the key idea derived from the economists cited above does not lie in the governance versus market debate, but rather in the crucial notion of market governance itself. Moreover, the insight leads us to the holistic approach that contemporary economists assign primary importance to the role of the public sector in mitigating income inequality. In this light, the following section reviews what has been the dominant paradigm of economics and its consequences for development in Latin America.

3.2. Navigating Market Economies in Latin America and Welfare Concerns

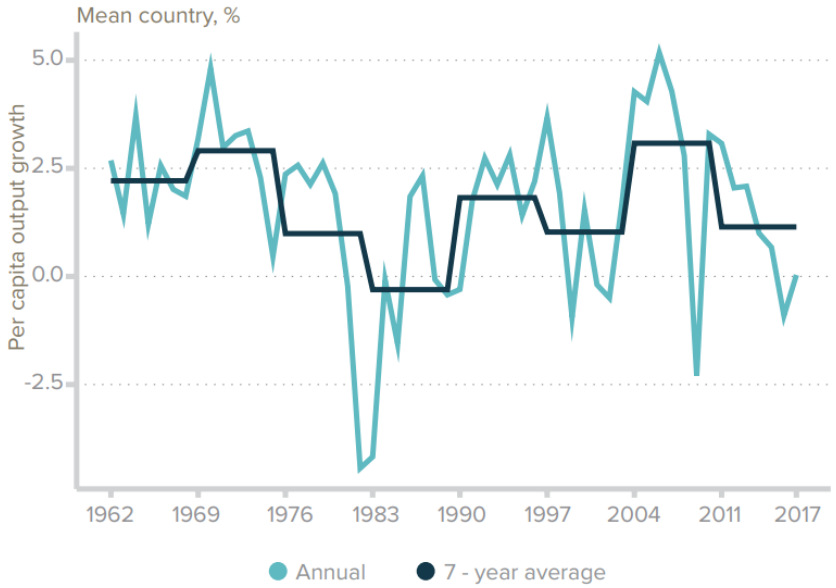
Inequality and low growth have already been mentioned as usually associated with Latin American economies. Was this always the case? I remit myself here to a look at what have been the predominant economic models after the Great Depression. Contrary to Development and Welfare Economics approaches, this section sets the context on Latin America ruling models ended up based on a Market Economy represent the main preferences of the political regimes of the time.

Latin American Structuralism dictated by the United Nations Economic Commission for Latin America (ECLA) in the decade of the 1950s was a turning point in economic activity. The objective was centered on economic growth via the model of foreign trade and import substitution(Di Filippo, 2009). This economic model was formulated by Raul Prebich, the first assigned executive secretary of the ECLA. Naturally, the idea was to reduce spending on essential tradable goods and to redirect spending towards capital goods imports, which was technology that was not domestically available. However, this strategy was not sustainable for developing countries a decade after empirically measuring the impact and cost of import restrictions in the mid-1960s(Irwin, 2020). Simultaneously, with the civil-political crises of the 1970s, the vacant model was rather occupied by the ideas of free market economies mentioned in the previous section of the Chicago University economists.

Fast forward to the 1980s, with the collapse of Bretton Woods in a Pre-Globalization Context. The Washington Consensus arrives at the end of the decade as an attempt to generate economic prosperity. The macroeconomic discipline measures proposed, in theory, would allow countries to tame inflation, control foreign debt, de-regulate the economy and choose to privatize state-owned enterprises (Naím, 2000). Research has in the recent years has been conducted in this matter and the assessment of these measures, in specific of the Structural Adjustment Programs, make a balance that the cost that these measures had in terms of economic inequality (Forster et al., 2019; Hutchison & Noy, 2003).

At present, one of the latest UNDP (2021) regional reports on economic growth and development in Latin America, titled "Trapped", analyses the region's economic performance and reveals that high economic inequality and low growth rates constitute key obstacles to economic development. Figure 1 shows the real annual per capita growth rates in gross domestic product (GDP) between 1962 and 2017. Figure x not only allows observing through the decades how in 7 average years the rates in the countries studied have not risen above 3% (UNDP, 2021). In addition, another relevant point to note is the annual volatility that such rates experience, paying special attention to the slump in the 1980s and the impact of the economic crisis of 2009.

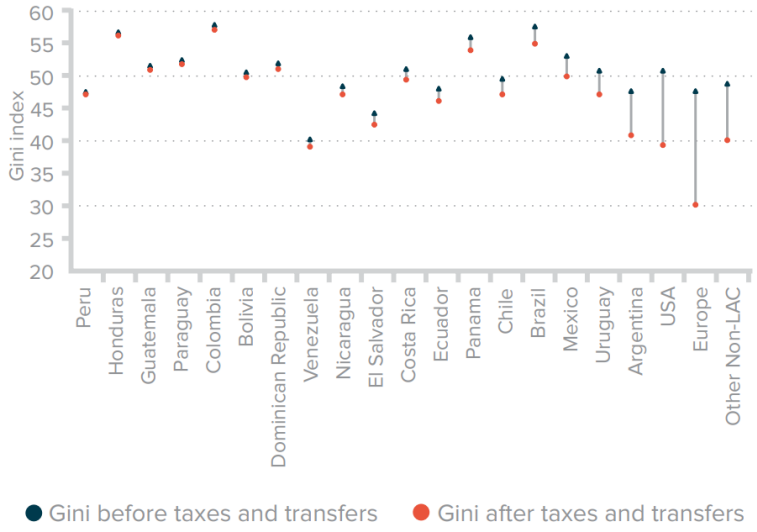
Figure 1: LAC historical per capita output growth rate (1962–2017)



Source: Obtained from (UNDP, 2021)

The same report also discusses the extent to which the low growth experienced by the region is inclusive. Figure 2 presents the Gini indices corresponding to certain Latin American countries in contrast to developed economies as compared to the United States and Europe. In this regard, it becomes evident that in the United States and Europe, fiscal redistribution plays a key role in achieving an adequate income distribution (UNDP, 2021). For example, in Europe, before redistribution, the Gini index ranges around 50, close to what is obtained in Peru; however, after taxation and transfers, the index decreases by more than 10 points.

Figure 2: Gini indices before and after taxes and transfers (circa 2014)



Source: Obtained from (UNDP, 2021)

In this section, I have flashed the factors that have led Latin America to establish itself as a market economy by importing models that promised to accelerate the region's economic growth. Indeed, the situation is relevant in the sense that growth and development are not only low but also vulnerable to external shocks, also trapping the economies of the region. Given this scenario, the following section offers the theoretical framework for a more detailed analysis of the complexity of reality.

3.3. Development Traps notions

In this Section, I provide a summary of conceptual approaches for a nuanced understanding of growth and poverty traps beyond their intuitive definitions of vicious circles. For this study, **Traps** here are interpreted as self-reinforcing mechanisms that perpetuate low growth or poverty within countries. A rigorous examination of the theories of traps in the LAC region would be of great interest, however, it is beyond the scope of this study and I limit myself to outlining the development policy implications that these theories support and demonstrate.

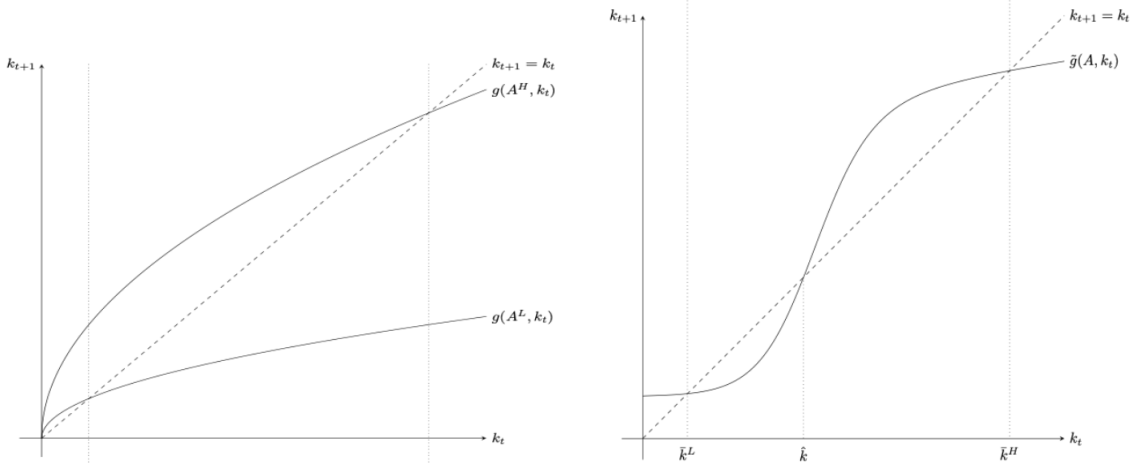
On the **Low Growth Trap**, it is associated with the work of growth economists such as Kaldor and Myrdal, whose reflections go beyond supply and demand and suggest a perspective of growth influenced by the political context and institutions (Fujita, 2004), leading to more realistic reflections on growth. Likewise, regarding the difficulties pointed out in Figure 2 on low growth, recent institutional reports express their concern by identifying numerous traps in Latin America's economic performance: Productivity Trap, Institutional Trap, Sustainability Trap, and so on (OECD, 2019; UNDP, 2021). Since the emphasis of this study is on income inequality, although the traps mentioned belong to the development concerns, I will not address them here.

Furthermore, in this study, we focus on the concept of the **Poverty Trap** due to its close connection with inequality in income distribution. In this regard, a recent study has provided empirical evidence of its presence and of the necessity to rethink the design of public policies intended for poverty reduction (Balboni et al., 2020). Moreover, the foundations about why people stay poor are summarized in the following text:

> "The equal opportunity argument is associated with growth models going back to Solow (1956), who stressed that countries with the same intrinsic would eventually converge to the same outcomes. This implies that any difference in long-run outcomes must be due to differing individual characteristics" (Bandiera et al., 2020).

In order to analyze the former statement, I simultaneously use Figure 3, where panel (a) illustrates the Solow production function, where specialization in initial skills through investment in technology allows the second period to accumulate more capital. However, development economists contest the idea that the poor are poor because of their willingness and rather start from the baseline difference in skills and opportunities, hence, the proper production function has an S-shape as depicted in panel (b). Thus, there is a long dynamic equilibrium gap k which is a level that cannot be escaped unless there is a big push (Banerjee & Duflo, 2012)via institutional intervention. Otherwise, the eventual transfers that are made will only act as shock absorbers for households rather than effectively lifting them out of poverty.

Figure 3: Poverty Traps and Graphical representations of the Production Function



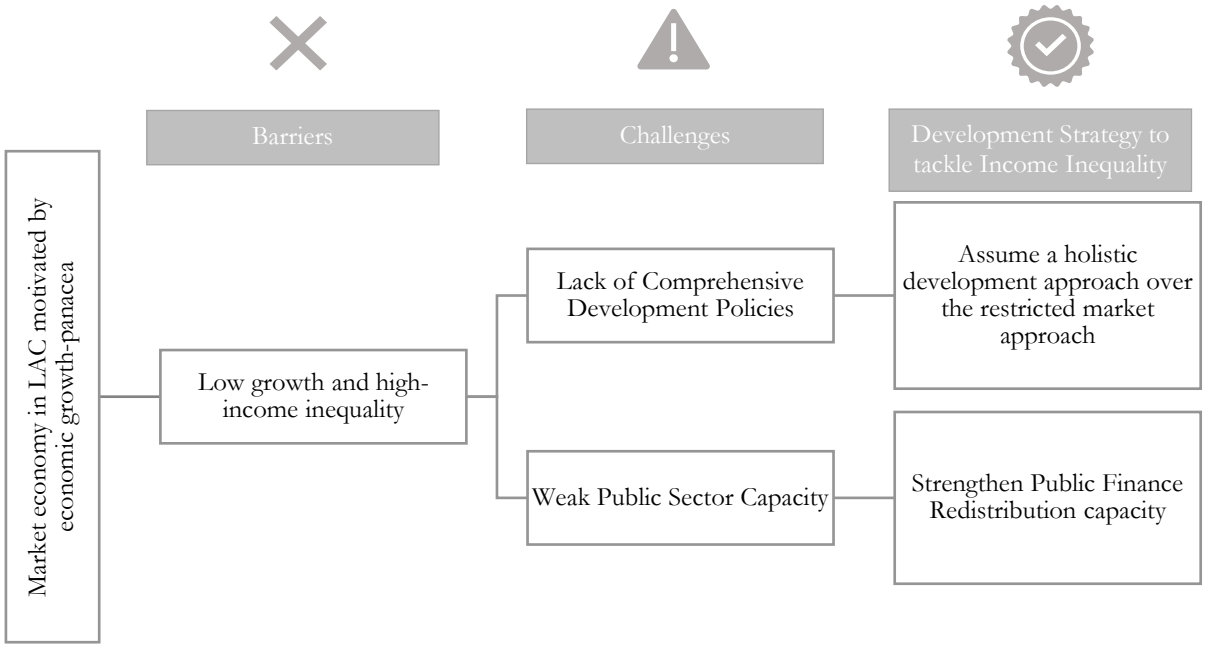
(a) Concave Production Function *(b) S-shaped Production Function*

Source: Obtained from (Balboni et al., 2020)

Likewise, the implications of poverty trap empirical findings suggest that to lift people out of poverty in certain contexts in developing countries, training and a big investment can accomplish the objective of poverty alleviation(Balboni et al., 2020; Banerjee & Duflo, 2012). Nevertheless, for this regional LAC study, the key insights that can be highlighted are two items: first, the differential in access to resources and opportunities determines people's income and development level in the market. And secondly, the indispensable role of the state is to make use of public policies to break with growth and poverty traps (Kraay et al., 2014) placing income distribution and pre-distribution public finance policies in in the center of the development debate.

Recapitulating this theoretical framework, from Public Sector role to Traps and Income Inequality Barriers, the low growth and poverty trap present in the Latin American economy are contemporary barriers with systematic roots that require comprehensive and long-term transformations. Furthermore, its two cross-cutting challenges linked to income distribution are reported in Figure 4, and which therefore motivate the two hypotheses of this study.

Figure 4: LAC Income Inequality Barriers and Challenges from a Welfare Economics Perspective



Source: Author's own Chapter 3 reflections

In conclusion, this chapter has analyzed the barriers and challenges that development economists have been advocating for decades. However, when confronted with the implications of development measures above that come from the welfare economics and the advocacy of a robust public sector for effective income re-distribution, this study proposes two hypotheses to be evaluated in the following chapters. Concerning the effectiveness of comprehensive policies that ponder the multiple aspects of development, I propose to evaluate a macroeconomic placebo that constitutes the injection of family remittances into the developing economy of Latin America, regardless of income redistribution, most of which reaches the poorest households. Therefore, aligned with the RQ I test ***Ho1: Rm do not reduce economic inequality*** and related to the effectiveness of a robust government we test ***Ho2: Remittances sent by migrants to LAC countries are less likely than government expenditure to reduce income inequality.***

Chapter 4. Empirical Design

Chapter 2 entails that there are mixed results when evaluating the effect of remittances in reducing income inequality. Likewise, Chapter 3 contextualized the complexity factor of development and the importance of Public Sector interventions in Latin American countries. Therefore, in this chapter I retake the hypotheses of this study and argue the Instrumental Variable (IV) approach as a tool to overcome potential endogeneity biases due development traps. Subsequently, I operationalize each of the variables of this study following the frameworks exposed in previous chapters and provide details on the data sources. Finally, I complement my analysis with robustness checks that will be performed in the following sections. Consider that the limitations of this research design are assessed in section 6.3.

4.1. Quasi-experimental Design

The second chapter of this research showcased a summary of quantitative economic studies assessing the influence of remittances on income inequality from both microeconomics and macroeconomics perspective. The reasons behind choosing to focus on the macro in this study have 2 key points. The first empirical reason is for data availability and scope of the research, a factor that carries upsides and downsides. On one hand, microeconomic data has the advantage of great number of observations and specificity on a granular level, nonetheless, this kind of measurements regularly obtained from household surveys carrier great amount of work to standardize for doing cross-sectional country evaluations. On the other hand, taking macroeconomic consolidated indicators carries various assumptions for economic modeling since often the indicators function as proxy variables for what is attempted to be measured. However, these indicators are regularly reported by the countries and often updated to global databases that allow to obtain log times series to perform data panel analysis. On the same note, the second reason is theoretical, as mentioned since the introduction and sustained throughout the previous sections from a Political Economy perspective it is important to perform cross-sectional and long-term impact assessments.

Likewise, since the above reasons satisfy the nature of my study -a public policy study using economics empirics- I apply a data panel analysis quantitative research design. Therefore, in the subsequent subsections I develop the research hypothesis setting and argue the reasons behind the Instrumental Variable (IV) model as empirical strategy.

4.1.1. Hypotheses and data pre-design

This study attempts to answer to the research question: What is the impact of remittances received in Latin American countries on reducing economic inequality? Therefore, I would like to briefly remind that the proposed two hypothesis that this study will test from a public policy perspective (see section 3.4) are **Ho1** that establishes that Remittances do not reduce economic inequality and **Ho2** that established that remittances are less likely to reduce income inequality than government expenditure. Consequently, in this subsection I elaborate on the setting of the data design.

First, the unit of measurement is country-year level for Latin American Countries between 2000 and 2019 (pre-pandemic)[3]. In consonance with the advantages mentioned above regarding panel data studies is a good fit for the hypothesis of this study centered in Latin America between 2000 and 2019. In principle my intention was to do a Latin America and Caribbean region study and include 34 countries. Nonetheless, most of the data required to do the analysis is not reported to the two main data sources of this study[4]. Also, the period is constrained by Income Inequality measured by Gini Index started to be consistently reported from 2000s, something that also coincides when Remittances flows started to expand. I retake this and provide the specifics in section 4.3.

4.1.2. Assumptions and Method selection

Aligned with the theory exposed in section 2.3 related to the Endogeneity problem of Income Inequality, this study assumes the Instrumental Variable (IV) approach from the Statistical Inference strategies as the best strategy to test the hypothesis for 2 key reasons:

Key reason 1: This method successfully overcomes biased results due to omitted variables that traditional regression techniques (i.e., OLS) may produce.

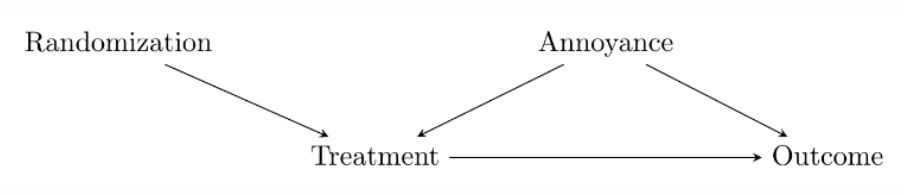
Making an overview of the big topics that this thesis studies: Economic Development, Income Inequality, Public Finance and Social Welfare; what has been established since the beginning is that all are multidimensional. Therefore, running OLS regression to test the hypothesis that involves income inequality would potentially yield to biased results for omitted variables by failing to "closing back doors" (Huntington-Klein, 2021). The concept and essence of this statement is developed in the second reason.

[3] Data availability restrictions
[4] The list of Countries is in Table 5

Key reason 2: This method successfully isolates the endogenous bias by using an Instrument Variable

This is possible because what this strategy does is to use inferential statistics to imitate the Randomization effect(Huntington-Klein, 2021) that allows to avoid the potential double sided causality relationship that remittances and income inequality may exhibit. This is possible thanks to "the closing back doors effect" that graphically looks like Figure 5. This figure represents the general RCT setting, where the Annoyance is controlled by randomizing the Treatment to see the real impact of the Outcome and that way closing any paths that go through other unobserved variables (annoyance).

Figure 5: IV DAG graph



Source: Huntington-Klein (2021)

For the IV case however, we are not controlling for a variable, what is done is to target the main annoyance identified, which in this case is the endogeneity. What is done is to remove the unexplained parts and only obtain paths (impact) that come from the predictor and Instrumental Variable needs to be used to isolate the impact without back doors(Huntington-Klein, 2021). For this procedure to be successful, there are two statistical assumptions that the proposed model should comply with: (1) Instrument Relevance and (2) Exclusivity assumption, in subsection 5.1.3Instrumental Variables approach: 2SLS and GMM I will elaborate and statically test these assumptions.

4.2. Model Operationalization

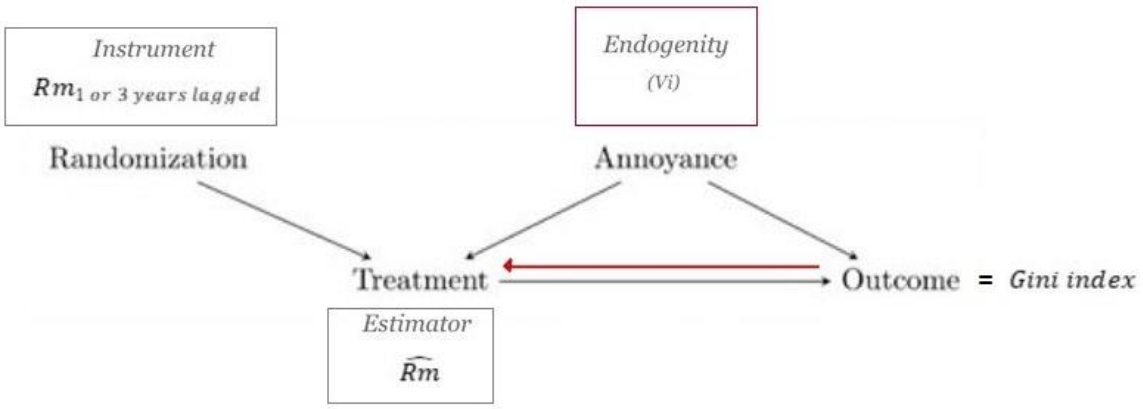
With the aim of applying the statistical statements of the last subsection to this study, I present a glimpse into the model in Table 1. Likewise, here I retake the findings addressed in Chapter 2, were Lagged Remittances are a solid Instrument to use in measuring its impact on income inequality.

Table 1: Variables Operationalization and Sources

Model Variables		Indicators	Data Source
Main Independent Variable	→ Remittances	· **rm:** Remittances as % of the GDP	WBG Open Data
Instrumental Variable(s)	→ Lagged Remittances	· **rml1 and rml3**: Lagged Remittances as % of the GDP by 1 and 3 years	WBG Open Data
Dependent Variable(s)	→ Income Inequality	· **gini**: GINI Index · **theil:** Theil Index · **palma**: Palma Index	World Income Inequality (WIID) Database
Control Variables	→ Public Finance Redistribution capacity	· **gov_e:** Government expenditure as a % of the GDP · **debt_s:** Total debt service (% of exports of goods, services and primary income) · **ca_balace**: Current account balance indicator	WBG Open Data
Moderating Variable	→ Income group	· **incomegroup:** WBG income classification	WBG Open Data

Furthermore, Table 1 would be useful to replicate the DAG graphic shown in Figure 1 analysis to this model and follow the 2 IV assumptions in the following Figure 6. The DAG to the IV model allows to close back doors paths once the two IV assumptions are satisfied.

Figure 6: Remittances effect on Income Inequality Model IV DAG graph



Source: Author's adaptation based on Huntington-Klein (2021)

After Allowing to express the operationalization of the IV model:

$$Rm = \gamma_0 + \gamma_1 Rm_{1\ or\ 3\ years\ lagged} + \gamma_2 Control\ varibles + \upsilon \quad (4.1)$$

$$Gini\ index = \beta_0 + \beta_1 \widehat{Rm} + \beta_2 Control\ variables + \varepsilon \quad (4.2)$$

The following subsection will mention details regarding the database that was collected, cleaned and used to perform the IV analysis.

4.3. Database

The database of this study is composed by country-year level data from 15 Latin American Countries (1995-2019), constituting a balanced panel of 300 observations with 14 variables merged using RStudio 2023.06.0 version. The main data sources are listed in Table 1. On one hand the Open Data portal allowed to extract complete macroeconomic data correspondent to the variables for the period of interest. On the other hand, the other source of data is the WIID developed by the United Nations University World Institute for Development Economics Research. Regarding the income inequality indicators extracted there is important to underline that income inequality measurements are via "Income, net/gross" at a "Per capita" level. This selection presents a sparce data issue with specific countries: Chile, Guatemala, Nicaragua and Mexico. Nonetheless, I decided to impute data via Multivariate Imputation by Chained Equations algorithm to complete the panel using the MICE RStudio package and selecting a Random Forest strategy.

Chapter 5. Data Analysis

This statistical section has two stages, In the first subsection I give an overview of the information that different regression models offer. Here the main finding is that even though observational data suggest that remittances reduce income inequality, the quasi-experimental models do not support the main hypothesis of this study. Likewise, in the second subsection, I run the regressions for the second hypothesis and run different validity tests to the regressions models operated. Afterwards, the implications of the statistical outputs of this section are discussed in the light of this theoretical framework in Chapter 6.

5.1. Income Inequality Impact assessment

The previous chapter described how this thesis will test the overall effects of Remittances in Income Inequality. To proceed with such statistical analysis an overview of relevant observational findings, later with OLS regressions and later dig deep into the chosen method to test the main hypothesis results.

5.1.1. Observational Results

This subsection aims to draw comprehensive cross-sectional and time series insights from the data panel that has been constructed. This would be the foundation for enabling a more rigorous statistical analysis in subsequent subsections.

Table 2. Data panel Descriptive Statistics

Descriptive Statistics
ddata
N: 300

	ca_balance	debt_s	gini	gov_e	rm	rm_l1	rm_l3
Mean	-2.24	21.27	49.12	13.33	4.78	4.92	5.07
Std.Dev	3.70	13.96	4.71	2.94	5.94	6.13	6.39
Min	-15.34	4.26	38.01	7.00	0.00	0.00	0.00
Q1	-4.45	11.42	45.75	10.97	0.95	0.95	0.86
Median	-2.33	16.23	49.25	13.28	1.94	1.99	1.99
Q3	-0.46	27.53	52.56	15.69	7.19	7.25	7.25
Max	12.13	86.18	61.47	20.38	21.80	23.79	25.38
MAD	2.89	8.79	4.97	3.44	2.43	2.46	2.56
IQR	3.98	16.07	6.78	4.71	6.21	6.27	6.37
CV	-1.66	0.66	0.10	0.22	1.24	1.25	1.26
Skewness	0.47	1.64	-0.17	0.27	1.52	1.51	1.50
SE.Skewness	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Kurtosis	2.30	2.83	-0.48	-0.60	1.11	1.08	1.06
N.Valid	300.00	300.00	300.00	300.00	300.00	300.00	300.00
Pct.Valid	100.00	100.00	100.00	100.00	100.00	100.00	100.00

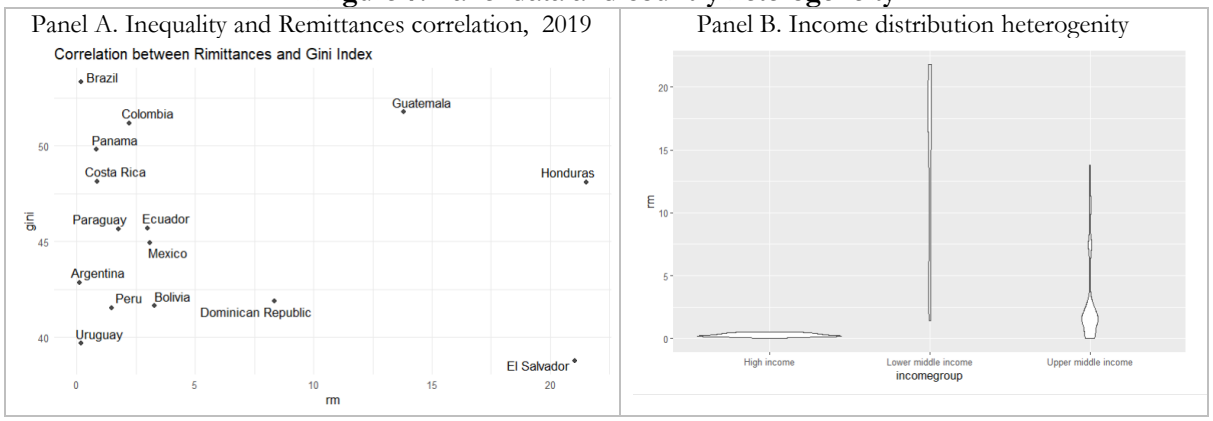
Source: Author's Calculations

First, Table 2 provides an important summary of descriptive statistics from our panel. The primary objective of this table is to obtain a broad understanding of the data's dispersion levels. Knowing

that a high standard deviation indicates significant variability in the data, it is relevant to note that the main independent variable, as well as the instruments and the dependent variable, exhibit a Std.Dev above 4, indicating substantial variability. This finding is expected since Latin American countries and their economies are known for their heterogeneity. Furthermore, Skewness and Kurtosis support this observation. Considering that skewness measures the distribution's asymmetry, it is worth noting that rm and the Instruments are right-skewed. Likewise, to assess the normality of the data using Kurtosis, "gini" and "rm_l3" and the control variables exhibit positive kurtosis, indicating considerable levels of variability. This finding is further illustrated in a series of histograms in Appendix A.

Furthermore, Figure 7 provides a graphical analysis of the data's heterogeneity. For instance, Panel A illustrates the relationship between remittances and the Gini index for 2019. Aligned with Section 3.2 of this study, the scatterplot helps us understand that countries in Central America and the Dominican Republic experience important remittance flows, indicating the prominence of remittances as a percentage of GDP. Building upon this analysis, Panel B presents the violin distribution categorized by income groups. It cues that countries with lower incomes tend to have a higher proportion of remittances in relation to their GDP. Accordingly, this analysis highlights the need to incorporate country-level fixed effects in subsequent regression analyses and to employ an income group clustering approach to better interpret the data without losing its inherent characteristics through statistical transformations such as logarithmic transformations.

Figure 7: Panel data and country heterogeneity

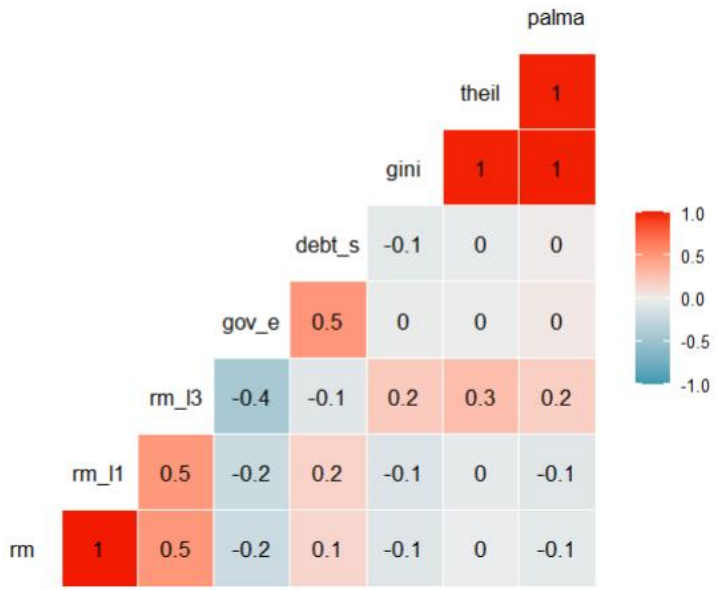


Source: Author's Calculations

Continuing our analysis based on the observational data, relevant Pearson correlation coefficients are presented in Figure 7. Firstly, revisiting Ho1, which suggests that remittances (rm) do not mitigate economic inequality "gini". In this case, the correlation coefficients indicate a slight effect

with a correlation of -0.1 between remittances and the Gini index. Secondly, focusing on Ho2, which posits that remittances are less effective than government expenditure in reducing income inequality, the correlation coefficients do not provide conclusive evidence regarding which variable is more likely to reduce income inequality. However, is interesting to note that the strongest positive correlations are between the rm_l1 instrument and the inequality indicators (gini, theil and palma).

Figure 8: Variables Pearson Correlation matrix



Source: Author's Calculations

In summary the observational findings of this subsection raise the importance of targeting homogeneity in the regressions and broadly show trends regarding the hypotheses that are not definite. In the subsequent section, a more rigorous hypotheses analysis is developed.

5.1.2. OLS results

Elaborating on subsection 4.1.3, "Method Selection," Ordinary Least Squares (OLS) is not an appropriate strategy for testing the hypotheses of this study due to endogeneity issues. As stated by Huntington-Klein (2021), the presence of endogeneity can result in biased estimates that fail to accurately reflect the true population value. This bias, known as omitted variable bias, occurs when an important variable is excluded from the regression equation, leading to a correlation with the error term and inaccurate average estimation.

In Appendix B, four OLS models are presented, with the Gini index as the dependent variable. However, none of these models provide strong evidence to support H1o, which suggests that "rm"

reduces the Gini index. Moreover, the models do not indicate significant relationships between the other independent variables -"gov_e," "debt_s," and "ca_balance"- and the Gini index. Additionally, the three models have low R-squared and adjusted R-squared values, which suggest a weak overall fit.

Table 3: OLS regressions output - Fixed Effects: country

(y=gini)	FE Current Rm (Model 1)	FE Rm 1y (Model 2)	FE Rm 3y (Model 3)
rm	-0.276**		
	(0.120)		
gov_e	-1.029***	-1.027***	-1.013***
	(0.135)	(0.135)	(0.136)
debt_s	0.045***	0.047***	0.042**
	(0.017)	(0.017)	(0.017)
ca_balance	0.147**	0.152**	0.103
	(0.066)	(0.067)	(0.066)
rm_l1		-0.285**	
		(0.130)	
rm_l3			0.088
			(0.098)
Num.Obs.	300	300	300
R2	0.211	0.210	0.199
R2 Adj.	0.161	0.159	0.148
AIC	1531.7	1532.2	1536.4
BIC	1550.2	1550.7	1554.9
RMSE	3.06	3.06	3.08
* p < 0.1, ** p < 0.05, *** p < 0.01			

Source: Author's Calculations

Table X reports the OLS applying FE at a country level. Based on the results of the Panel Linear Modeling using FE models, the variable "rm" has a statistically significant negative relationship with the Gini index in the FE Current Rm model, suggesting that current remittances contribute to a reduction in income inequality. Likewise, both "gov_e" and "debt_s" variables are consistently found to be statistically significant in all models, indicating that higher government expenditure and public debt as a percentage of GDP are associated with a decrease and an increase in income inequality, respectively. Likewise, it is also notable that R-squared and adjusted R-squared values range from around 15% to 21%, suggesting that the models explain a modest portion of the variation in the Gini index. Nonetheless, as manifested in both Chapters 1 and 2, the endogeneity problem does not allow us to fully rely on this biased finding to reject Ho1. But overall, in this stage is at least encouraging that the sign of the independent variables to the gini index is the one expected.

In conclusion, the results of the linear regressions mentioned above cannot be considered definitive due to endogeneity bias. However, this section has provided confirmation of the necessity to incorporate country-level Fixed Effects for subsequent quasi-inferential analysis. Such analysis will enable the isolation of endogeneity bias through the implementation of a 2SLS strategy in the next subsection.

5.1.3. Instrumental Variables (IV) Findings

Hypothesis 1: Remittances role in Reducing Income Inequality

This subsection employs the IV approaches (2SLS and GMM) to examine the main hypothesis (Ho1) of this study, which states that Remittances do not reduce economic inequality. First, we start with 2SLS where we are going to use the predicted value of remittances to isolate the real impact of remittances in income inequality. Table 4 reports the results from the 2SLS estimations for both stages using country level fixed effects and adjusting std errors by income group for heteroskedasticity-robust standard error purposes.

Table 4: 2SLS regression output – Ho1 - Dependent variable: Gini Index

PANEL A – IV: 1 Year Remittances Lagged		
(y=gini)	**First Stage**	**Second Stage**
	(Model 4)	
(Intercept)	0.234	59.782***
	(0.931)	(2.257)
rm_l1	0.942***	
	(0.014)	
gov_e	-0.009	-1.075***
	(0.076)	(0.105)
debt_s	-0.003	0.043
	(0.007)	(0.024)
fit_rm		-0.214
		(0.383)
Num.Obs.	300	300
R2	0.984	0.571
R2 Adj.	0.983	0.545
AIC	711.4	1562.9
BIC	778.0	1629.5
RMSE	0.75	3.08
Std.Errors	by: incomegroup	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01

PANEL B – IV: 3 Years Remittances Lagged		
(y=gini)	**First Stage**	**Second Stage**
	(Model 5)	
(Intercept)	1.094**	58.413***
	(0.241)	(1.293)
rm_l3	0.119	
	(0.168)	
gov_e	-0.085**	-0.971***
	(0.018)	(0.044)
debt_s	0.010*	0.032
	(0.003)	(0.030)
fit_rm		0.912
		(0.852)
Num.Obs.	300	300
R2	0.932	0.432
R2 Adj.	0.928	0.398
AIC	1149.2	1647.1
BIC	1215.9	1713.8
RMSE	1.55	3.55
Std.Errors	by: incomegroup	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Author's Calculations

In Panel A, the instrumental variable used to tackle the endogeneity problem is 1-year lagged remittances "rm_l1" of which the coefficient is 0.942, statistically significant at 99%. Based on the results of the first stage, it can be verified that the instrumental variable in question is appropriate for predicting the endogenous variable of the model, rm. Nevertheless, in the second stage, upon seeing the impact of rm_l1 on income inequality "gini", the coefficient of "fit_rm" is -0.214 and shows a negative relationship with the Gini index, nonetheless, this coefficient is not statistically significant; thus, the null hypothesis that establishes that remittances reduce inequality for the countries studied cannot be rejected. Furthermore, the R-squared value of such a model in the second stage (0.57) suggests an explanatory power of 57%, suggesting a reasonably good fit.

In Panel B, the 3-year lagged remittances "rm_l3" is the instrumental variable of interest, while its coefficient is 0.119 yet it is statistically non-significant due to its standard error of 0.168 in the first stage, this could question the power of such variable to act as an instrument, however, in the next subsection when evaluating its validity, this variable is subject to the corresponding tests. For the second stage, remittances have an impact of 0.912 on Gini with a positive sign, an unexpected mixed result. Continuing the analysis of the model, the r of the second stage implies that it has a modest explanation potential of 43%.

Overall, the 2SLS regression results suggest that remittances "rm" have mixed relationship with the Gini index, something that was already hinted in the literature review on this thesis. Nonetheless, to have a second methodology to see if remittances play a role in reducing income inequality, we proceed to perform a GMM analysis.

Table 5: GMM regression output – Ho1 - 2 instruments

(y=gini)	GMM (Model 6)
(Intercept)	59.142***
	(4.121)
gov_e	-1.040***
	(0.266)
ca_balance	0.141
	(0.119)
debt_s	0.046*
	(0.026)
factor(country)Bolivia	8.437***
	(2.837)
factor(country)Brazil	13.877***
	(1.631)
factor(country)Colombia	8.533***
	(1.720)
factor(country)Costa Rica	6.344***
	(1.413)
factor(country)Dominican Republic	2.083
	(3.498)
factor(country)Ecuador	3.606*
	(2.113)
factor(country)El Salvador	9.337
	(7.078)
factor(country)Guatemala	4.263
	(4.133)
factor(country)Honduras	17.402***
	(4.416)
factor(country)Mexico	1.641
	(1.615)
factor(country)Panama	7.283**
	(3.353)
factor(country)Paraguay	1.990
	(1.972)
factor(country)Peru	-0.116
	(2.937)
factor(country)Uruguay	-4.055**
	(1.713)
rm	-0.470
	(0.347)
Num.Obs.	300
Std.Errors	by: incomegroup
* p < 0.1, ** p < 0.05, *** p < 0.01	

Source: Author's Calculations

Table 5 reports the results of the GMM method, this estimation has extra features than 2SLS in the sense that it only influenced by the GMM local average local effect, this is useful because it also allows to use more that one instrument at the time and allows to correct heteroscedasticity more directly. The instrumental variables used in this model are both rm_l1" and "rm_l3". Again, here the results suggest that evidence of rm coefficient being -0.470 with a std. error of (0.347) is not statistically significant ($p > 0.1$). Therefore, there is no strong evidence to support that current remittances have a significant relationship with the Gini index in this model. Consequently, the null hypothesis (Ho1) that says that "rm" does not reduce income inequality cannot be rejected.

Moreover, zooming into to the country fixed effects, some countries have statistically significant coefficients (e.g., Bolivia, Brazil, Colombia, Costa Rica, Honduras), indicating that income inequality varies significantly between these countries. Nonetheless, the sign of these countries is positive, contrary to the expectations of this research.

In conclusion this Instrumental Variables Findings section is that both 2SLS and GMM methods don't find enough evidence to support that remittances have a statistically significant relationship with the Gini index. These findings are analyzed in the next subsection to make a comprehensive analysis of the model and assess the statistical limitations and still discuss more over the comparison between the two Hypotheses of this study.

Hypothesis 2 : Public Sector role in Reducing Income Inequality

The available evidence shows that remittances alone are not sufficient to have a statistically significant impact on decreasing inequality in a country's income distribution. However, this study extends this question and uses an IV via GMM approach (equations 5.3 and 5.4) to answer a comparative exercise to find out if public spending has a significant impact that is superior to remittances. To this end, the hypothesis of this exercise is: ***Ho2: Remittances sent by migrants to LAC countries are less likely than Government Expenditure to reduce income inequality .*** Here, the formalization of the model is the following:

$$Gov\ Exp = \gamma_0 + \gamma_1 Debt\ Service_{1\ or\ 3\ years\ lagged} + \gamma_2 Control\ varibles + \upsilon \quad (5.3)$$

$$Palma\ index = \beta_0 + \beta_1 \widehat{Gov\ Exp} + \beta_2 Control\ variables + \varepsilon \quad (5.4)$$

Table 6: GMM regression output - Ho2 discussion

Y= palma	**IV= debt_s (Model 7)**
(Intercept)	4.529***
	(0.841)
gov_e	-0.133**
	(0.053)
ca_balance	0.039
	(0.028)
debt_s	
rm	-0.035
	(0.048)
Num.Obs.	297
Std.Errors	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Author's Calculations

Table 6 is a comparison of results from an Instrumental Variable Generalized Method of Moments (IV-GMM) model with country fixed effects for 15 Latin American countries from 2000 to 2019. The two columns provide the interaction coefficients between the instrumental, control variables and the common dependent variable: Palma Index (income inequality). The first column corresponds to the calculations in Table 8, column 2. This is included in this section in order to contrast it with the results of hypothesis Ho2 mentioned above. Consequently, looking at Column 2 of the current table allows us to analyze systematically the coefficients of the explanatory variable of interest: gov_e. Here, its coefficient is -13.3% and it is significant at 5%, which suggests that the increase in public expenditure is associated with a decrease in income inequality controlling for other variables and for endogeneity via GMM.

Therefore, contrasting with the findings found in the first Hypothesis in which the effect of remittances is lower in size and non-statistically significant, is possible to infer that Ho2 is accepted, evidence from Table 9 demonstrates that public spending is more effective than the flow of remittances by itself.

5.2. Robustness Tests

In this section I run alternative regression models and different dependent variables to see if the analysis regarding the effects of Remittances in Income Inequality is consistent across different models.

5.2.1. Validity Tests

Table 7 presents the results of two statistical tests[5]: (1) Instrument Relevance and (2) Exclusivity assumption. First, the under-identification test is conducted separately in the First Stage of S2SL to determine the statistical relevance of the instruments (1 and 3-year lagged Remittances as a percentage of GDP). Both tests yield p-values of 0.00, which leads us to reject the null hypothesis (Ho) that the model is underestimated. Secondly, the Sargan over-identification test is performed using both instruments together to examine if the exclusivity assumption is satisfied. The p-value of 0.30 does not allow to reject the null hypothesis that the two different effects in the first stage are the same. Consequently, there is no evidence of differential coefficients, indicating that none of the instruments are endogenous, allowing us to include both in the analysis.

[5] The tests are performed using Rstudio "estimatr" package.

Table 7: 2SLS Model Specification and instrument F statistic tests

Test	F-Statistic to evaluate	Instrument	Estimations (0.01 accuracy)			
			value	nomdf	dendf	p.value
Instrument Relevance	Under-identification	Rm_l1	7 371.70	1.00	295.00	0.00
		Rm_l3	1 169.94	1.00	295.00	0.00
Validity test	Over-identification	Rm_l1 & Rm_l3	1.07	-	-	0.30

Source: Author's Calculations

Regarding the Durbin-Wu-Hausman exogeneity tests, results are displayed in Table 8, where the DW statistic displays a p-value below the 0.01 significance level, allowing to reject the null hypothesis that suggests that OLS and IV estimates are consistent. Evidence shows that IV approach is preferred to correct the endogeneity potential biases.

Table 8: GMM Durbin-Watson test

Durbin-Watson test
data: gmm_gini_validity
DW = 0.80235, p-value < 2.2e-16
alternative hypothesis: true autocorrelation is greater than 0

Source: Author's Calculations

Overall, both methods satisfy the models assumptions and validity tests, which allows to validate that the specification of the models are statistically fit. In the following subsection, the specified model uses two alternative dependent variables that also measure income inequality to have a comprehensive robustness test.

5.2.2. Different Dependent Variable

The second chapter of this study established how Theil and Palma indexes can also be used to study income distribution at a country level. Therefore, we apply the GMM method to see if the results are consistent with the previous calculations using equations 5.1 and 5.2. The results are displayed in Table 9.

$$Palma\ index = \beta_0 + \beta_1 \widehat{Rm} + \beta_2 Control\ variables + \varepsilon \quad (5.1)$$

$$Theil\ index = \beta_0 + \beta_1 \widehat{Rm} + \beta_2 Control\ variables + \varepsilon \quad (5.2)$$

Table 9: IV GMM Models' Summary

	(1) Y=gini	(2) Y=palma	(3) Y=theil
(Intercept)	59.142***	4.382***	60.885***
	(4.121)	(0.770)	(8.423)
gov_e	-1.040***	-0.152***	-1.815***
	(0.266)	(0.052)	(0.549)
ca_balance	0.141	0.030	0.344
	(0.119)	(0.026)	(0.262)
debt_s	0.046*	0.014**	0.113**
	(0.026)	(0.006)	(0.054)
rm	-0.470	-0.100	-1.228
	(0.347)	(0.070)	(0.768)
Num.Obs.	300	300	300
Std.Errors	by: incomegroup	by: incomegroup	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Author's Calculations

The previous table enables us to verify that the Model specification is robust due to the results being transversally maintained among the three alternative dependent variables. This is possible because both the magnitudes and the signs for each coefficient remain within the specified trend. Moreover, two key findings are worth noting: the first is that the coefficient for remittances stays negative, even though the p-value does not allow us to reject the null hypothesis of this study. The second key finding is the magnitude and constant sign that the control variable, public expenditure "gov_e", has in the three income distribution scenarios. This second finding is the main driver of the next subsection where we discuss its real impact if endogeneity is isolated.

Chapter 6. Discussion

Based on the past two chapters, I use this chapter to summarize the public policy implications that can be drawn from the empirics considering the theory. In addition, the second section provides an overview of the empirical limitations of this study.

6.1. Findings and Policy Implications

In this section I report the findings of the study. Here I link the statistical finding found in the previous section in relation to the hypothesis: Ho1 that establishes that Remittances do not reduce economic inequality and Ho2 that established that remittances are less likely to reduce income inequality than government expenditure. Thus, in regard to the Ho1, both 2SLS and GMM provide weak negative effects from the instrument, lagged remittances to the Gini index, therefore, it is not possible to statistically confirm that remittances have a decreasing impact on income inequality for the Latin American countries studied between 1995 and 2019 (see table 5). Likewise, in regards of Ho2, we did a separate GMM model. Such model outcomes provided negative and significant estimates of a reduction in Gini index at 95% of confidence see (table 6). This, considering the IV using remittances has more robust coefficient and better overall fit as a model. Therefore, the results confirm that remittances are less likely to reduce income inequality than government expenditure for Latin-American countries according to the data panel used.

Likewise, the hypothesis testing has two broad policy implications in consideration with the Theoretical Framework of this study. Bringing back this results discussion to Chapter 3, to the LAC region's Income Inequality Barriers and Challenges from a Welfare Economics Perspective illustrated in Figure 4. The two areas of the Development Strategy to tackle Income Inequality must be put on the agenda for LAC. First, a more holistic approach to tackling income inequality, since empirically demonstrated reducing income goes beyond money flows to households. Two, take the evidence of the real impact that Redistribution Fiscal Policies have in redcing income ineqialities and regulate the markets. Finally and equally importantly, this study also brings as policy implication to take evidence-based aproaches to the realities of Latinamerica, investment in research and innovation. This is a sistematic point that is vital, but so intuitive that I have rather focused on the less obvius connections.

6.2. Limitations

This quantitative study involved a quasi-experimental quantitative strategy to measure the impact that both remittances and public spending have on income equality. In this regard, I stress the following three limitations to be taken into account when interpreting the findings of my research.

First, Section 4.3 Database states that 11.3% of the five variables were imputed to balance the 20-year panel. While this is a common forecasting practice that economists use, it is worthwhile vindicating it to avoid generating confusion. Furthermore, the conditioning of missing observations reflects governments' underreporting of macro-fiscal aggregates as a potential suggestion to carry out more rigorous macroeconomic inequality studies.

Second, the heterogeneity of Latin American countries that have been mentioned above also raises the concern of recalling that no generalizations can be made for all Latin American countries. Coherently with the theoretical framework, the conditions of each country correspond to its context coma and not only to its country-level context but also to its regions, productive sectors, trade, and commerce, among other points. For this reason, the evidence reflected in this study is not intended to be a prescription in itself, but rather an essential ingredient for the study of domestic development that each Latin American country should undertake strategically by its economic conditions.

The third and final point is that the results are the outcome of a methodology that has been accepted by both institutions and economists but is not in itself experimental and depends very much on the proper delimitation of an instrument. Ideally in a battery of methodology and empirical tools, natural experiments would be ideal for studying impact assessments. Final added note is that time constraints did not allow to dig deeper into the second hypothesis and calculate Interaction terms, which also had been valuable for further research.

Chapter 7. Conclusions and Recommendations

The important thing for Government is not to do things which individuals are doing already,
and to do them a little better or a little worse;
but to do those things which at present are not done at all
John M. Keynes (1926), *The End of Laissez Faire.*

This study aims to answer from the perspective of Wefare Economics to the research question: What is the impact of remittances received in Latin American countries in reducing income inequality? Can remittances be more effective in reducing income inequality than the redistribution capacity of a nation's public finances? In order to answer these two questions, I used a strategy of Instrumental Variables. An empirical approach based on the practices of previous studies on the subject and a theoretical framework supported by relevant macroeconomic theories of the last decades.

The evidence on the effect of remittances in reducing income inequality shows that the impact is negative but weak and not robust. Furthermore, contrary to market economy speculation, the Nations' Public Finance Redistribution capacity development is more effective than remittances in reducing inequality as measured by the Gini index and the Palma Index.

Likewise, this thesis contributes to the field of public sector economics as it studies the Remittances, Income Inequality and Governance Puzzle. Its approach of taking into account the role of public management in Latin American economies is a gap that needed to be historically filled. Bearing in mind the limitations addressed in the former chapter, the primary revelation of this thesis is that remittances cannot replace redistributive fiscal policies, and historically, as reflected in the theoretical framework, the market must be regulated and adjusted for inclusive growth and development. In this regard, 2 public policy recommendations are made in this study.

In the short term, it is essential that international organizations such as the World Bank and the International Monetary Fund allocate technical and financial resources to Latin American countries for the reconciliation of fiscal data. While this recommendation is considered quite obvious it is also strategic for developing research studies that are increasingly closer to the complexity and inequality of the region's realities.

In the medium term, the cooperation of the aforementioned international organizations is also required to develop fiscal governance capacity in low-income countries, especially in Pre-distribution and Income Redistribution Economic Policies (Atkinson, 2015). Especially in Pre-distribution and Redistribution of Income Economic Policies (Atkinson, 2015). This is the first step in the long term to transform policy decision-making towards evidence-based public policy formulation and evaluation based on domestically produced research.

Finally, to conclude, as mentioned in the literature review, the subject is a developing and emerging topic, which implies that there is room to broaden the scope of this analysis. For this reason, researchers interested in this topic are encouraged to contrast the results of this study with household-level data and experimental methodologies to not only define that remittances do not have a positive effect but also to investigate how evidence-based public policies can generate virtuous savings and investment.

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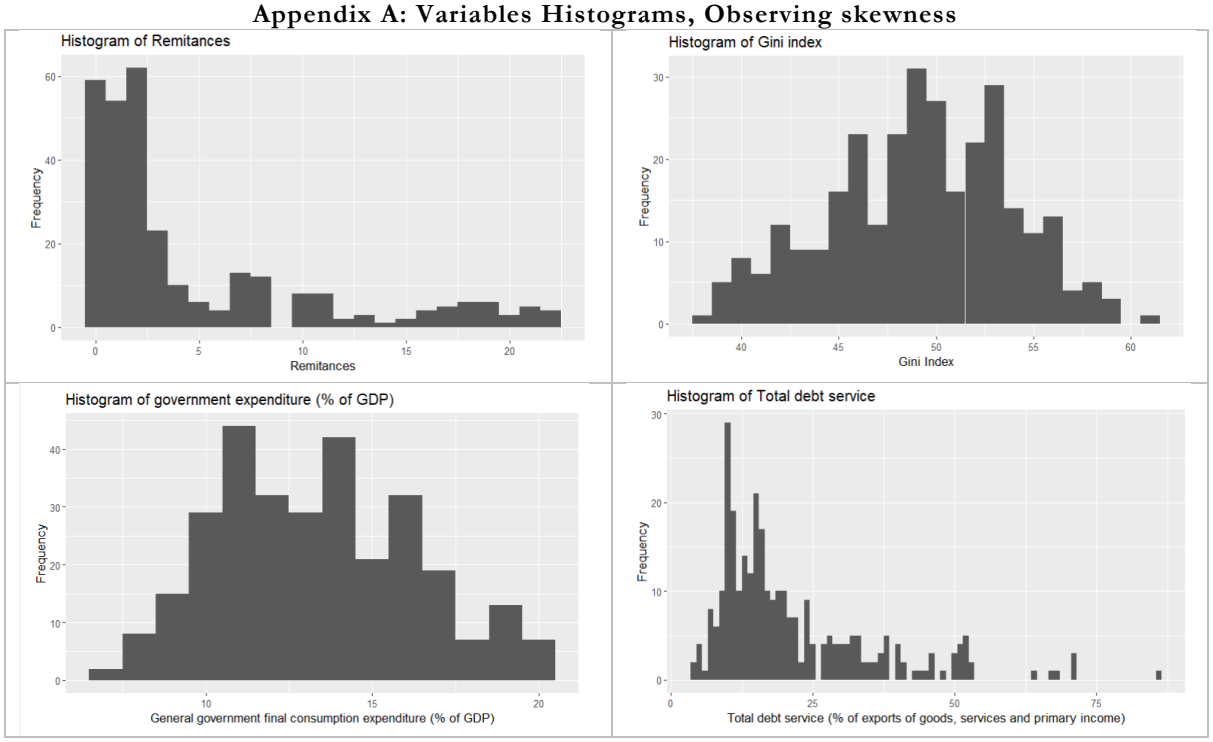
Appendix

Appendix A: Variables Histograms, Observing skewness



Appendix B: OLS regressions results

(y=gini)	OLS 1	OLS 2	OLS 1y	OLS 3y
(Intercept)	49.347***	48.602***	48.565***	48.444***
	(0.350)	(1.292)	(1.292)	(1.296)
rm	-0.047	-0.050		
	(0.046)	(0.048)		
gov_e		0.046	0.046	0.045
		(0.099)	(0.099)	(0.100)
debt_s		0.004	0.004	0.005
		(0.021)	(0.021)	(0.021)
ca_balance		-0.034	-0.032	-0.024
		(0.076)	(0.076)	(0.077)
rm_l1			-0.042	
			(0.046)	
rm_l3				-0.017
				(0.045)
Num.Obs.	300	300	300	300
R2	0.004	0.006	0.005	0.002
R2 Adj.	0.000	-0.008	-0.009	-0.011
AIC	1785.7	1791.1	1791.3	1792.0
BIC	1796.8	1813.3	1813.6	1814.3
Log.Lik.	-889.827	-889.525	-889.673	-890.025
F	1.054	0.410	0.337	0.163
RMSE	4.70	4.69	4.70	4.70

* p < 0.1, ** p < 0.05, *** p < 0.01

Appendix C. 2SLS with full country FE display for 1-year and 3-year Lagged Rm

(C1) One year results

(y=gini)	First Stage	Second Stage
(Intercept)	0.234	59.782***
	(0.931)	(2.257)
rm_l1	0.942***	
	(0.014)	
gov_e	-0.009	-1.075***
	(0.076)	(0.105)
debt_s	-0.003	0.043
	(0.007)	(0.024)
factor(country)Bolivia	0.101	7.537**
	(0.116)	(1.314)
factor(country)Brazil	0.086	13.657***
	(0.261)	(0.738)
factor(country)Colombia	0.066	7.642***
	(0.045)	(0.677)
factor(country)Costa Rica	0.031	5.334***
	(0.142)	(0.418)
factor(country)Dominican Republic	0.217	-0.552
	(0.404)	(2.340)
factor(country)Ecuador	0.406	2.504
	(0.231)	(1.333)
factor(country)El Salvador	0.660	3.962
	(0.235)	(7.129)
factor(country)Guatemala	-0.048	1.460
	(0.396)	(2.389)
factor(country)Honduras	0.086	12.698
	(0.194)	(6.586)
factor(country)Mexico	-0.086	0.707
	(0.220)	(0.505)
factor(country)Panama	-0.044	5.476***
	(0.119)	(0.354)
factor(country)Paraguay	-0.013	1.471
	(0.279)	(0.625)
factor(country)Peru	0.028	-0.883
	(0.191)	(0.374)
factor(country)Uruguay	0.002	-4.420***
	(0.164)	(0.158)
fit_rm		-0.214
		(0.383)
Num.Obs.	300	300
R2	0.984	0.571
R2 Adj.	0.983	0.545
AIC	711.4	1562.9
BIC	778.0	1629.5
RMSE	0.75	3.08
Std.Errors	by: incomegroup	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01

(C2) Three year results

(y=gini)	First Stage	Second Stage
(Intercept)	1.094**	58.413***
	(0.241)	(1.293)
rm_l3	0.119	
	(0.168)	
gov_e	-0.085**	-0.971***
	(0.018)	(0.044)
debt_s	0.010*	0.032
	(0.003)	(0.030)
factor(country)Bolivia	3.471**	3.108
	(0.731)	(3.651)
factor(country)Brazil	0.334**	13.239***
	(0.072)	(0.434)
factor(country)Colombia	1.553**	5.664*
	(0.295)	(1.498)
factor(country)Costa Rica	1.336**	3.653
	(0.205)	(1.548)
factor(country)Dominican Republic	6.553**	-8.918
	(1.382)	(7.034)
factor(country)Ecuador	3.428**	-1.872
	(0.718)	(3.539)
factor(country)El Salvador	16.421**	-17.077
	(3.204)	(15.951)
factor(country)Guatemala	8.384*	-9.525
	(2.177)	(9.996)
factor(country)Honduras	14.210*	-5.649
	(3.731)	(14.517)
factor(country)Mexico	1.579	-1.426
	(0.546)	(2.186)
factor(country)Panama	0.669*	4.616*
	(0.199)	(1.107)
factor(country)Paraguay	1.103*	0.073
	(0.334)	(1.886)
factor(country)Peru	1.128*	-2.323
	(0.300)	(1.580)
factor(country)Uruguay	-0.066	-4.343***
	(0.057)	(0.129)
fit_rm		0.912
		(0.852)
Num.Obs.	300	300
R2	0.932	0.432
R2 Adj.	0.928	0.398
AIC	1149.2	1647.1
BIC	1215.9	1713.8
RMSE	1.55	3.55
Std.Errors	by: incomegroup	by: incomegroup

* p < 0.1, ** p < 0.05, *** p < 0.01