
# Explaining The Gap between Multidimensional and Monetary Poverty:
## A Panel Data Analysis

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# List of Acronyms

| | |
|---|---|
| FEM | Fixed Effect Model |
| GDP | Gross Domestic Product |
| LIC | Low Income Countries |
| LMIC | Lower Middle Income Countries |
| MPI | Multidimensional Poverty Index |
| OPHI | Oxford Poverty and Human Development Initiative |
| PCA | Principal Component Analysis |
| REM | Random Effect Model |
| UMIC | Upper Middle Income Countries |
| UNDP | United Nations Development Programme |
| WDI | World Development Indicators |
| WGI | World Governance Indicators |

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## Abstract

This study aims to investigate the variation of the gap between multidimensional and monetary poverty, and to examine the impact of institutions on the gap between those two poverty measurements using cross-country panel data analysis between 2000 to 2020. Our results suggest that the gap between multidimensional and monetary poverty varies across countries, in which those classified as low-income and lower-middle-income tend to have considerable gaps. Applying fixed-effect panel data regression, this study reveals that control of corruption significantly reduces the gap between multidimensional and monetary poverty. However, the impact is found to be more meaningful in reducing the gap in upper-middle-income countries. On the other hand, when it comes to the general institutional index, it is more likely to play a critical role in low-income and lower-middle-income groups. The results also imply that growth, public health expenditure, and equal access to public services take parts in explaining the gap between multidimensional and monetary poverty in different country income groups. Hence, this study suggests, alongside social and economic interventions, it is essential to employ a broader strategy in combating poverty by involving institutional transformations in the country.

## Relevance to Development Studies

Poverty is one of the primary issues in many countries, especially in developing countries. Hence, to date, poverty eradication is still an essential component of most countries' development agendas. In this regard, investigating issues related to the measurements of poverty is critical to support the debate on the development field. This study provides an analysis of the gap in the poverty incidence between the two commonly used global poverty measurements, the global Multidimensional Poverty Index (MPI) and the World Bank poverty line. It examines the role of institutions alongside the countries' socioeconomic variables in explaining the gap between those two poverty measurements.

### Keywords

Multidimensional poverty; monetary poverty; poverty measurement; panel data; poverty discrepancies; fixed-effect

# Chapter 1
# Introduction

## 1.1 Motivation and Relevance of the Study

The alleviation of poverty continues to be one of the primary concerns in many countries' development agendas. As such, in 2015, the United Nations (UN) member countries committed to adopting 17 goals of the 2030 Agenda for Sustainable Development[1], in which one of the goals is to "End poverty in all its forms everywhere". Along with adopting this agenda, member countries pledged to ensure that "no one will be left behind". By committing to this ambition, measuring poverty becomes critical for keeping poverty alleviation on track. However, the debate on the meaning of being poor and what best measurement for it is evolving, from a monetary perspective, which commonly associates poverty with the lack of income, to a broader perspective of multidimensionality, which assesses poverty from deprivation in multiple dimensions of well-being (Thorbecke, 2015). Until recently, there is still no consensus on the best approach to capture poverty experience. Hence, investigating poverty from different measurements is essential to sharpen policy formulation on poverty eradication strategy.

### 1.1.1 Global Poverty Measurements

Notwithstanding the uncertainties about the most appropriate way to conceptualize poverty and which measurement can reflect poverty best, the evolving conceptualization of poverty allows us to distinguish poverty measurements into two prominent groups: unidimensional monetary poverty and multidimensional poverty measurements. The former assesses poverty based on the income shortfall of a person to afford basic needs expressed in the form of the poverty line (Ravallion, 2010), while the latter attempts to capture poverty beyond the monetary aspect, considering multiple dimensions of capabilities (Sen, 1992). From an income-based approach, people are said to be poor if they live below the poverty line, even though being slightly above the line does not necessarily guarantee that a person can meet basic needs. Proponents of this approach claim that economic resources are highly correlated to all other dimensions of poverty (Burchi, 2018), yet, having sufficient income does not necessarily mean they have the opportunity to fulfil a certain standard of well-being.

On the other hand, the latter notion of poverty attempts to go beyond the monetary perspective in measuring poverty. The perspective was developed based on the notion that the complexity of poverty cannot be fully reflected by a monetary approach, but instead relies on basic human capabilities' deprivation (Sen, 1983; Sen, 1992). Sen's capabilities approach is conceptualized and designed to make it possible to capture poverty from a multidimensional aspect, both monetary and non-monetary. Principally, under normal circumstances, the monetary and non-monetary aspects may improve with the increase in income (Wang *et al.*, 2016), but in many cases, the capabilities of individuals or households in accessing other dimensions of well-being, such as better quality of health care and education, inevitably differ, especially between countries that have different capabilities in managing the provision of public goods and services. In other words, the development of monetary and multidimensional poverty among countries might not go in the same direction.

[1] see https://sdgs.un.org/goals

To date, two prominent poverty measurements are frequently used to capture the development of global poverty. The first measurement is the World Bank's global income poverty line based on the basic need approach. The measurement classifies the poor as those living below a particular international poverty line, for instance, US$1.90 purchasing power parity (PPP) per day per person for measuring extreme poverty. The other measurement is the global Multidimensional Poverty Index (MPI) produced by the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI), which has been published since 2010 as the alternative for global poverty measurement. The measurement was built from a deprivation perspective based on the capability approach and involved three primary dimensions: health, education, and standard of living (Alkire and Santos, 2014).

According to World Bank (2022c), the global population living in extreme poverty, or below the poverty line of US$1.90 per day, has considerably decreased in the last decades. In 2019, for instance, around 8.4 percent of the world's population lived on less than US$1.90 per day. It means that by using the standard global poverty line, about 645.12 million of the world's population live in extreme poverty. It indicates a magnificent improvement compared to the figure in 2000, when around 1.6 billion people, or 27.7 percent of the population, lived in extreme poverty. By contrast, the report from UNDP and OPHI (2021) pointed out that 21.7 percent, or 1.3 billion people across 109 countries, suffered from acute multidimensional poverty, which mostly lived in rural areas and middle-income countries. It implies that employing different measurements can result in different figures of poverty and eventually become a challenge for the countries to formulate their policies. Hence, looking further into the discrepancies or the gap between multidimensional and income poverty measurements across countries and understanding the reason behind it can be critical for the debate on poverty reduction analysis.

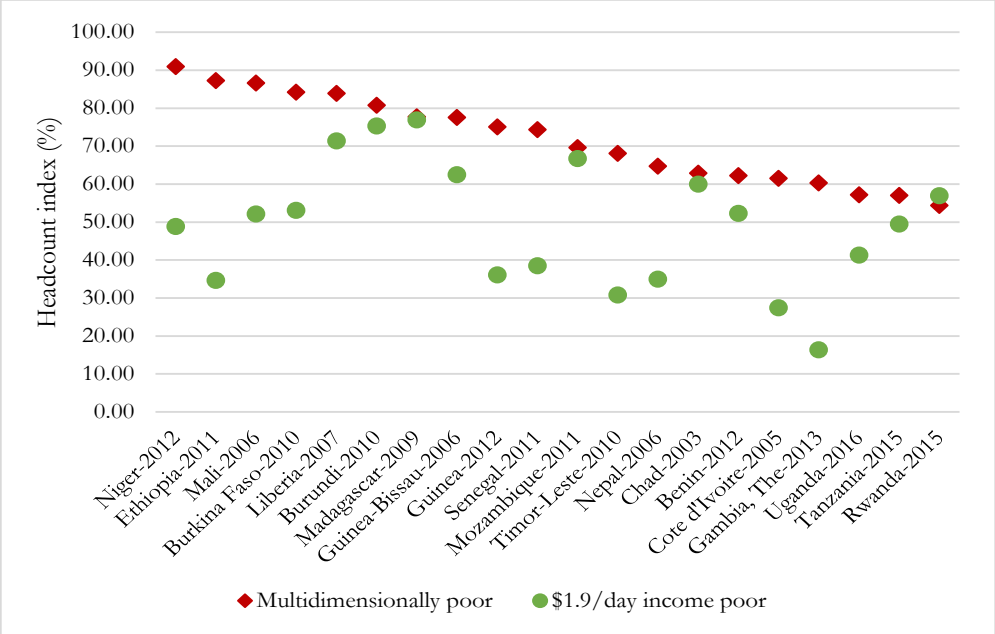
### 1.1.2 Discrepancies of Poverty Incidence from Different Measurements

Figure 1.1 depicts the headcount index or the percentage of people who are poor based on multidimensional and $1.90 a day (monetary-based) approaches across 20 countries with a relatively high incidence of multidimensional poverty (more than 50 percent). The figure clearly shows that the gap between both measurements varies across countries. For instance, Niger and Tanzania, located in Sub-Saharan Africa, had relatively similar estimates of the monetary poverty level, which was slightly below 50 percent. However, Niger's population classified as MPI poor was considerably higher compared to Tanzania's. The headcount index of multidimensional poverty in Niger was around 90 percent, or 40 percentage points higher than the monetary poverty, while Tanzania had about 57 percent of MPI poor, or only around 7 percentage points higher compared to its monetary poverty. Eventually, it raises a question, why do some countries with a relatively similar level of monetary poverty have considerable differences in multidimensional poverty levels?

Recent empirical studies have attempted to investigate the relationship between the two poverty measurements (Tran *et al.*, 2015; Wang *et al.*, 2016; Salecker *et al.*, 2020; and Bersisa and Heshmati, 2021). However, most focused on a single-country case study or a region-specific analysis. Tran *et al.* (2015), for instance, investigated the relationship between multidimensional and monetary poverty in Vietnam and pointed out that those considered poor (non-poor) based on the monetary approach are not always poor (non-poor) based on multidimensional approach, indeed they found that the overlap between both measurements is below 50 percent. Likewise, Wang *et al.* (2016) undertook a study in China and found that the discrepancy between multidimensional and monetary poverty reached around 45.16 percent. A disparity between poverty measurements was also highlighted by Salecker *et al.* (2020) in the context of Rwanda. Their study pointed out that extreme poverty incidence based on

the multidimensional measurement is relatively higher than those found on the monetary approach, with a difference of around 22.19 percent in 2010/11. Meanwhile, focusing in Ethiopia, Bersisa and Heshmati (2021) found that 36 percent of households were poor based on the monetary approach, while 80 percent were considered multidimensionally poor. Though there are discrepancies in the incidence of poverty, the use of the monetary poverty approach to identify poverty is still dominant in the national and global poverty analysis. Unfortunately, policies based on the income poverty measures alone can foster the formulation of poverty alleviation strategy narrowly emphasizing income generation (Laderchi *et al.*, 2003), and eventually could lead to the lack of alternative non-monetary aspect policy that may improve other aspects of well-being beyond income.

**Figure 1.1**
The Headcount Index of Global MPI and $1.90 a Day Poverty in 20 Countries




Notes: The figures were built upon the most recent data of countries with headcount index data from global MPI and World Bank $1.90 a day poverty line. Some of the $1.90 a day poverty data are interpolated using linear interpolation, as will be discussed in Chapter 3.

*Source*: processed by Author.

Many reasons may explain why some households in a country are considered multidimensionally poor but not monetary poor. One possible explanation is associated with the inaccessibility or unavailability of non-monetary attributes, such as public goods, in the market (Thorbecke, 2015). If the market does not exist, a higher income may not lead to the improvement in individuals' non-monetary well-being (Bourguignon and Chakravarty, 2003). In other words, people living above the income poverty line might still have low educational attainment, bad health conditions, and even inadequate water or electricity. It implies that improving public goods and services may become the key to enhancing well-being beyond income. In this light, Deolalikar *et al.* (2002) pointed out that institutional quality is critical in determining the availability of public services and the accessibility of the poor to those services. Other studies also highlighted the crucial role of institutional factors, such as corruption and government effectiveness, in poverty alleviation (Klugman, 2002; Santos *et al.*, 2019; Jindra and Vaz, 2019). It conveys the potentially critical role of institutions in explaining the gap between multidimensional and monetary poverty. Once public goods and services

proportionally exist for the poor and non-poor, people may have more opportunities to convert their income to various dimensions of well-being. It may eventually reduce the gap between multidimensional and monetary poverty incidences in the country.

Another point of contention is the role of institutions in poverty reduction at the different stages of development (Sachs *et al.*, 2004; Jindra and Vaz, 2019). Jindra and Vaz (2019) found that good governance can considerably reduce multidimensional poverty in middle-income countries but not low-income countries. It indicates that the role of institutions in explaining the gap between two poverty measurements may also differ between country income groups. Indeed, there may be no single reason to explain the measurement gap between multidimensional and monetary poverty. Still, the grounds are likely embodied in the countries' institutional quality. However, other variables that explain poverty reduction may also play a role. It is because some factors may more effectively reduce the income poverty incidence yet are less effective for multidimensional poverty, or the other way around. For instance, alongside institutional factors, economic growth is recognized as a prone variable that may play an essential role in reducing poverty, but is more likely to have an immediate and far greater impact in alleviating income poverty than multidimensional poverty (Tran *et al.*, 2016; Santos *et al.*, 2016). On that account, the gap between the two poverty measurements may be attributed to differences in institutional, economic, and social capacities among countries.

Despite significant progress in studies analyzing the association between monetary and multidimensional poverty in a regional- or country- specific context, to the best of our knowledge, no studies have examined the causes of the gap in the global context. Alkire *et al.* (2017) investigated the trend of income and multidimensional poverty and found a significant difference between both approaches. Nonetheless, their analysis focused on 37 countries in Sub-Saharan Africa and did not provide evidence using an empirical model of what might cause the gap. Hence, in this study, we attempt to analyze the gap between multidimensional and monetary poverty approaches in the global context and assess what might cause the gap to vary across countries.

## 1.2 Research Questions and Objectives

Based on the background above, this study attempts to answer the main research question, "How to explain the gap between multidimensional and monetary poverty level across countries?". In more detail, there are three sub-questions as follows.

1) How diverse is the gap between multidimensional and monetary poverty across countries?
2) How do countries' institutional aspects affect the gap between multidimensional and monetary poverty?
3) How does the effect of institutions on the gap between multidimensional and monetary poverty differ based on country's income groups?

The objectives of this study then to analyze the measurement gap between multidimensional and monetary poverty across countries and to what extent the institutional factors explain the variation of the gap. Besides, it is also to assess whether the impact of institutions relies on the country's income groups.

## 1.3 Contribution to the Literature

This study contributes to the literature on poverty measurement and analysis in two main respects. First, this study attempts to explain the reason behind the gap between multidimensional and monetary poverty by using an empirical model. Recent studies have considered analyzing the gap between multidimensional and monetary poverty, but most focused on descriptive statistics analysis. Some investigated the empirical model further but concentrated on finding the relationship between two poverty measurements or examining the determinant of poverty by setting multidimensional or monetary poverty as a standalone dependent variable. Therefore, they cannot empirically confirm which aspect is critical in explaining the gap between both measurements. Constructing the dependent variable by subtracting the incidence of monetary poverty from multidimensional poverty allows us to investigate the reason behind the gap empirically. Second, this study employed panel data of cross-country over many points in time (year). By this means, it allows us to get a global perspective on the gap between multidimensional and monetary poverty, complemented by good time coverage. Until recently, studies examining the gap between both measurements in the global context are still limited. Most studies focused on a region- or country-specific analysis, such as in Rwanda (Salecker *et al.*, 2020), Vietnam (Tran *et al.*, 2015), China (Wang *et al.*, 2016), and Ethiopia (Bersisa and Heshmati, 2021). Examining a global perspective of the gap between both measurements over time can provide a broader view to support the formulation of a poverty eradication strategy.

## 1.4 Scope of Study

This study covers a cross-country analysis within the period of 2000-2020. To assess the impact of institutions on the gap between multidimensional and monetary poverty, this study uses panel data regression analysis primarily on two global poverty measurements, namely global MPI and $1.90 a day poverty, that have both poverty figures in the same period. The data in this study are obtained from secondary sources such as OPHI-UNDP, the World Bank, and the Varieties of Democracy (V-Dem). To enrich the study, we also investigate the gap between multidimensional poverty and three other alternatives of monetary poverty (the $3.20 day, $5.50 a day, and the national poverty line) in some parts of the analysis. Due to the nature of the data, this study could not determine whether the percentage of the poor between different measurements resulted from the same individual. Hence, we restrict the study to focus on aggregate poverty measurement across countries, particularly the headcount index or the percentage of the poor.

## 1.5 Research Outline

This research paper is organized as follows. Chapter 1 presents the background narrative of this research, the research questions and objectives, the contribution to the literature, and the scope of the study. Having a grasp on the background of this research, Chapter 2 encompasses the literature review as a foundation to develop this research, which describes the poverty concepts, the standard measurements, and existing studies related to the relationship between multidimensional and monetary poverty and prone variables determining poverty alleviation. This chapter tries to unravel some possible variables explaining the gap between two poverty measurements. Chapter 3 dwells on the data and methodology used in this research. Chapter 4 contains the results and discussion. Finally, Chapter 5 concludes the research and offers recommendations.

# Chapter 2
# Literature Review and Conceptual Framework

Before investigating the issue of the gap between multidimensional and monetary poverty, the most basic question to answer is, perhaps, how do we define poverty? It is an essential question as people might define poverty using different approaches, which leads to different measurements of poverty. After understanding the poverty concept, the next question is how do we measure or identify the poor? How many people are poor? Whether different measurements reflect similar figures? Hence, in this chapter, we elaborate on the definition and measurements of poverty, review previous studies related to the gap between multidimensional and monetary poverty, and unravel possible prone variables explaining those gaps.

## 2.1 The Definition and Measurement of Poverty

### 2.1.1 Defining Poverty

Poverty is a dynamic concept that evolves. Different approaches may imply different definitions of poverty and eventually lead to the different measurements used to identify the poor. Despite the evolving approach, understanding and determining the concept and measurement of poverty are essential as they induce different policy formulations, especially when it comes to poverty-targeted interventions. Two profound approaches frequently used to understand poverty are the monetary and capability approach. The concept of monetary poverty lies in the utility maximization assumption in which the expenditure may be used as the proxy to reflect the utility individuals place on commodities (Laderchi *et al.*, 2003). By this concept, 'the poor' may refer to those who are not able to meet a particular level of welfare, which is mostly characterized by the inability of individuals to meet the minimum bundle of consumption to continue their life (Ravallion, 1998).

The other notion of poverty emphasized poverty as a multifaceted phenomenon, which goes beyond the monetary perspectives. One of the most comprehensive concepts attempts to capture the complexity of poverty is the notion of 'functionings and capabilities' by Amartya Sen (Sen, 1992). According to Sen, the concept of 'functionings and capabilities' is different from the standard welfare economics poverty concept, which tends to focus on incomes, utilities, and wealth. From this perspective, poverty is not only about deprivation in income but can also be defined as having a lack of opportunities to fulfil minimum standard capabilities of well-being. It implies that poverty is a multifaceted phenomenon, which defining it should be broadened to prevent leaving some poor out of poverty reduction programs, by capturing multiple disadvantages beyond lack of income that the poor might experience.

### 2.1.2 Poverty Measurements

A credible measure of poverty is critical to support policy formulation since it distinguishes the poor as the target of various poverty reduction programs from the non-poor. Poverty could be measured by two primary approaches: the unidimensional monetary measurement and the multidimensional measurement. So far, the World Bank's standard poverty line and the global Multidimensional Poverty Index (MPI) are two frequently used measurements by academics and international organizations to capture global poverty. The former is related to

the monetary poverty measurement while the latter attempts to accommodate the measurement of poverty from a multidimensional perspective.

Monetary poverty, which is usually measured by the amount of those who experience a shortfall in income or consumption expenditure to meet certain standard of basic needs, was generally known as the most common indicator to measure poverty in most countries (Ravallion, 2010). This approach is the traditional estimate of poverty, which identifies the poor by assessing the economic welfare of the households using a threshold of the poverty line. By this approach, there are three indicators used to assess poverty (Foster *et al.*, 1984): 1) the headcount index, 2) the poverty gap index, and 3) the poverty severity. Many countries have adopted these indicators to gauge national poverty lines. However, it is more likely to reflect national-specific perceptions of the income level needed to classify people as non-poor. Thus, the threshold between poor and non-poor typically arises along with an increase in a country's average income.

To allow the cross-country comparison and global aggregation, since 1990, the World Bank has employed the standardized poverty measurement developed by Ravallion *et al.* (1991), which quantifies poverty as the number of those living under a $1 a day threshold at the 1985 Purchasing Power Parity (PPP). This threshold was constructed based on the national poverty line of the poorest 15 countries in the world, and it was used to capture the global extreme poverty. The threshold has been revised upwards periodically, to $1.25 a day (2005 PPP) in 2008, and to $1.90 a day (2011 PPP) in 2015. Alongside the $1.90 a day threshold, since 2015, the World Bank has also tracked two other higher standards of poverty line, at $3.20 and $5.50 a day, each reflecting the national poverty lines in lower-middle-income and upper-middle-income countries, respectively. In September 2022, following the release of the 2017 PPP, the World Bank revised the international extreme poverty line from $1.90 to $2.15 a person a day. In addition, the other two higher poverty lines are also updated to $3.65 a day for lower-middle-income groups and to $6.85 a day for upper-middle-income groups. Principally, the revision is periodically conducted to accommodate the change in the price level, which tends to increase over time. However, even though it may matter at the regional level, it does not substantially change global poverty (World Bank, 2022a).

Despite the abundant use of the monetary concept for poverty identification, the income or expenditure could not necessarily depict the complexity of poverty (Nishimwe-Niyimbanira, 2020). It is because poverty is not merely about insufficient income to make ends meet but also about deprivations of basic human capabilities (Sen, 1992). Hence, relying solely on monetary poverty to identify the poor and formulate policy could lead to policy bias if it encourages poverty eradication strategy focusing only on generating income, omitting other possible essential attributes of well-being, such as access to adequate water, education, and health. In this light, Alkire and Santos (2014) designed an alternative to measuring poverty, the Multidimensional Poverty Index (MPI), using the technique proposed by Alkire and Foster (2011). MPI attempts to directly measure deprivation on several critical dimensions in human life (Alkire and Santos, 2014), and may help policymakers to allocate resources more effectively (Asongu and Kodila-Tedika, 2017). It is divided into two components, the incidence of poverty or the headcount ratio (H) that refers to the proportion of people classified as multidimensionally poor based on the deprivation they experience, and the intensity of poverty or average deprivation share (A) that represents the average proportion of deprivations experienced by the poor. The MPI, which is usually denoted by $M_0$ referring to adjusted headcount ratio, is the product of poverty incidence and intensity ($M_0$ = H X A) (Alkire *et al.*, 2018).

In principle, the MPI is flexible with the country's determination of its poverty indicators and dimensions (Alkire *et al.*, 2011). However, for the possibility of countries' comparison, OPHI and UNDP have developed a global MPI consisting of three primary dimensions:

health, education, and living standard (Alkire and Santos, 2014). It considers 10 indicators, which is distributed into three equally weighted dimensions. Its indicators and deprivation cut-offs capture various deprivation within a household, such as lack of education, child mortality, undernutrition, or lack of access to adequate sanitation and water, and are equally weighted within each dimension (see Table 2.1). People are considered multidimensionally poor if their deprivation score exceeds the cut-off point of one-third. The measurement is well-known as an international measure to assess worldwide acute poverty, and comparable to the World Bank's $1.90 extreme income poverty rate (Santos *et al.*, 2019).

**Table 2.1**
Global MPI: Dimensions, Indicators, Deprivation Cutoffs, and Weights

| Dimensions | Indicators | Deprived if… | Weight |
|---|---|---|---|
| Education | Years of schooling | No household member has completed 5 years of schooling | 1/6 |
| | Child attendance to school | Any school-aged child is not attending school in years 1 to 8 | 1/6 |
| Health | Mortality | Any child has died in the family | 1/6 |
| | Nutrition | Any adult to child for whom there is nutritional information is malnourished* | 1/6 |
| Living Standard | Electricity | The household has no electricity | 1/18 |
| | Sanitation | The household's sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households** | 1/18 |
| | Water | The household does not have access to safe drinking water (according to MDG guidelines) or safe drinking water is more than 30 min walking from home roundtrip*** | 1/18 |
| | Floor | The household has dirt, sand, or dung floor | 1/18 |
| | Cooking Fuel | The household cooks with dung, wood, or carbon | 1/18 |
| | Assets | The household does not own one of the following assets: radio, TV, telephone, bicycle, motorbike, refrigerator, and does not own a car or truck | 1/18 |

* Adults are considered malnourished if their BMI is below 18.5. Children are considered malnourished if their z-score of weight-for-age is below minus two standard deviation from the median of the reference population.
** A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared.
*** A household has access to safe drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a distance of 30 min' walk (roundtrip).

*Source*: Alkire and Santos (2014).

Poverty reduction strategy might vary depending on who is identified as poor and how much poverty incidence is found in society (Evans *et al.*, 2020). A poverty alleviation policy based on income-based measurement is often expected to eliminate poverty incidence effectively. However, unless income growth could help alleviate multidimensional poverty, eradicating income poverty alone would not necessarily mean ending poverty (Wang *et al.*, 2016). There are two primary shortcomings of using income-based measurement solely to capture poverty incidence. First, a household may have a sufficient income to cover its need but cannot satisfy some essential non-monetary attributes due to the market does not exist or incomplete (Thorbecke, 2015; Nishimwe-Niyimbanira, 2020). It means that even if individuals have income above the poverty line, they may still not have access to necessities like clean water or education. In this regard, institutions such as governmental, non-governmental, and supranational organizations are needed to provide those essential needs (Alkire and Santos, 2013). Second, the ability of individual may differ in allocating their income into a minimum standard of 'capabilities' and 'functionings' (Alkire and Santos, 2013), which means

even with the same resources, one might be able to efficiently allocate their income to improve their households' well-being while other could not. For instance, a head of household may choose to allocate their money to satisfy personal immediate needs, such as purchasing cigarettes or alcohol, rather than allocate them for the children's minimum calorie needs (Thorbecke, 2015). From the monetary measurement, that household would be identified as non-poor even though some household members should be considered poor from the multidimensional perspective.

Notwithstanding the difference in the concept and measurement of monetary and multidimensional poverty, these drawbacks indicate the importance of public goods and service provisions in eliminating multidimensional poverty alongside monetary poverty. Thus, institutional quality might be critical in explaining the gap between those two poverty measurements. To further understand the explanation of the association and the gap between multidimensional and monetary poverty, in the next section, we elaborate studies examining the relationship between income and multidimensional poverty.

## 2.2 The Discrepancies and Relationship between Monetary and Multidimensional Poverty

To date, studies analyzing the discrepancies and relationship between income and multidimensional poverty have evolved (Tran *et al.*, 2015; Wang *et al.*, 2016; Salecker *et al.*, 2020; and Bersisa and Heshmati, 2021), and most confirmed that both approaches resulted in considerable disparity in poverty incidence, as provided in Table 2.2. For instance, Tran *et al.* (2015) investigated discrepancies between monetary and multidimensional poverty in Vietnam. Their study found that among those who were multidimensionally poor (16 percent of the population), two-thirds were considered non-poor in monetary measure. Further, in the context of China, Wang *et al.* (2016) highlighted a huge mismatch of 45.16 percent between multidimensional and monetary poverty. Applying the logit model, their study revealed that the increase in income could significantly reduce the probability of multidimensional poverty incidence, albeit with a small impact. Two above studies highlighted the potential role of sectoral policies or the public goods and services provisions to improve the non-income dimensions more directly.

Another research was conducted in Rwanda by Salecker *et al.* (2020). Their study highlighted a significantly different number of poverty incidences from multidimensional and monetary poverty. Using Rwanda Integrated Household Living Conditions Survey data, their study found that the proportion of extreme monetary poverty in 2010/11 was around 21.78 percent, while multidimensional poverty incidence was 43.97 percent, indicating a gap of around 22.19 percent. Likewise, a discrepancy of 10.95 percent was found in 2013/14. Additionally, applying logistic regression to the 2010/11 dataset, their study highlighted a relatively weak relationship between monetary resources and multidimensional poverty reduction. Another piece of evidence by Bersisa and Heshmati (2021) from a rural and small town in Ethiopia found a large gap of 44 percent between two poverty incidences, in which only 36 percent of households were identified as income poor while 80 percent were multidimensionally poor. Employing the logit model, they found that household characteristics including residing in rural areas significantly determine the prevalence of being poor in both poverty measures.

In general, most studies highlighted considerable discrepancies between multidimensional and monetary poverty incidence and that using monetary measurement solely in estimating poverty may result in downward bias. Some also empirically found a limited impact of monetary resources in reducing multidimensional poverty, which indicates that relying

only on the income dimension is insufficient to enhance non-income attributes of well-being. It fosters the importance of a multidimensional perspective in poverty-related policy formulation. However, existing studies mainly focused on a limited scope, and few investigated a global perspective. Hence, to enrich the literature, assessing the gap between multidimensional and monetary poverty using cross-country panel data analysis is essential. Additionally, it is noteworthy that the gap between two poverty measurements from previous studies may refer to two main definitions. First, it may refer to the difference in aggregate numbers of poverty incidence between two poverty measurements at the country or regional level. Second, it may refer to the mismatch in identifying the poor, whether those identified as poor from multidimensional and monetary perspectives are from the same groups of individuals. However, since the nature of our data does not allow us to identify the mismatch at the individual or household level, we focus on the difference between countries' aggregate value of multidimensional and monetary poverty incidence as a measure for the gap.

**Table 2.2**
Summary of Previous Empirical Studies on the Discrepancies and Relationship between Monetary and Multidimensional Poverty

| Author | Scale | Period | Methodology (Empirical Model) | Main Findings |
|---|---|---|---|---|
| Tran *et al.* (2015) | Vietnam | 2007, 2008, and 2010 | - | **Discrepancies**: two-thirds of 16 percent considered multidimensionally poor are classified as non-poor based on monetary-based poverty (2008). |
| Wang *et al.* (2016) | China | 2011 | Logit | **Discrepancies**: 45.16 percent of mismatch. **Empirical model result**: increase in income has only limited impact on multidimensional poverty reduction. |
| Salecker *et al.* (2020) | Rwanda | 2010/11, 2013/14 | Logit | **Discrepancies**: 22.19 percent (2010/11) and 10.95 percent (2013/14) of difference. **Empirical model result**: weak relationship between monetary resources and multidimensional poverty reduction (2010/11). |
| Bersisa and Heshmati (2021) | Ethiopia | 2011, 2014 | Logit | **Discrepancies**: 44 percent of difference. **Empirical model result**: households' characteristics significantly affect the probability of being poor based on multidimensional and monetary-based poverty. |

*Source*: Author's elaboration.

## 2.3 The Impact of Institutional and Socioeconomic Variables on Poverty Reduction

As our outcome variable is the gap between multidimensional and income poverty, we attempt to investigate variables that influence poverty incidence from both perspectives. In this section, we inspect previous studies assessing the impact of institutions and countries' socioeconomic characteristics on poverty, either multidimensional or monetary poverty.

### 2.3.1 Institutions and Poverty

The main challenge in conducting empirical studies involving institutions is there is no generally accepted definition and measurement of institutions. One of the most frequently used

definitions provided in Kaufmann *et al.* (2008, p.7), which pointed out that there are three components that constitute governance[2]:

> "[1] the process by which governments are selected, monitored, and replaced; [2] the capacity of the government to effectively formulate and implement sound policies; and [3] the respect of citizens and the state for the institutions that govern economic and social interactions among them."

Corresponded to this definition, they provided indicators of governance by measuring six dimensions: 1) control of corruption, 2) political stability and absence of violence, 3) voice and accountability, 4) government effectiveness, 5) regulatory quality, and 6) rule of law.

Despite no exact limitation of what best depicts the institutional quality in a country, those indicators, published by the World Bank's Worldwide Governance Indicators (WGI), are among the few popular ones. Table 2.3 summarizes some studies on the impact of institutions on poverty reduction. They all utilized at least one of WGI's institutional indicators to proxy institutions. Tebaldi and Mohan (2010), for instance, used eight indicators of institutions, including those six indicators from WGI, to examine the role of institutions in income poverty reduction across countries between 2000 to 2004. By using two-stage least-squares regression, their study found that a better system of corruption control, an effective government, and a stable political condition can create a condition to promote growth and ultimately reduce poverty. Following that study, Asongu and Kodila-Tedika (2017) re-examined the institutions' role in poverty reduction utilizing MPI data. They confirmed that institutions could have an indirect effect on poverty. Further, for robustness purposes, both studies constructed the Principal Component Analysis (PCA) from WGI's six institutional indicators to obtain the general index of institutions and found a significant negative impact of it on poverty.

Criticizing the lack of literature focusing on non-income factors determining poverty, Akanbi (2015) examined the role of governance on poverty in 19 selected Sub-Saharan African (SSA) countries between 1990 and 2010. Applying a two-stage least-square regression, they found that governance level, measured by the average value of six indicators from WGI, significantly affects income poverty (FGT index) and non-income poverty (Human Poverty Index). Another study by Jindra and Vaz (2019) uncovered that government effectiveness is associated with a lower poverty level by employing a multilevel probit model on global MPI data in 71 low- and middle-income countries between 2009 to 2014. Interestingly, investigating further between country's income groups, it only works in middle-income countries but not in low-income countries. Utilizing global MPI data between 1999 and 2014 in 110 countries, another finding from Santos *et al.* (2019) found that higher control of corruption would result in lower poverty incidence.

Previous studies above suggested that institutional quality is critical for poverty reduction. Better institutions would lead to a more efficient allocation of resources and access to public goods and services (Deolalikar *et al.*, 2002). Eventually, they would enhance non-monetary dimensions of well-being alongside the income dimension, such as access to water, sanitation, and nourishment. However, most studies focused on analyzing or comparing the impact of institutions on each poverty measurement standalone, and hence can not necessarily confirm the role of institutions in explaining the gap between multidimensional and monetary poverty. Subject to this limitation, assessing the impact of institutions on the gap between the two poverty measurements is essential to enrich the literature. Considering the comprehensiveness of WGI institutional indicators, which covers political governance (voice and accountability; political stability and the absence of violence), economic governance

[2] Following previous studies, such as Asongu and Kodila-Tedika (2017), we use the term of governance and institutions interchangeably to improve readability.

(government effectiveness; regulatory quality), and institutional governance (control of corruption; the rule of law) (Asongu and Kodila-Tedika, 2017), this study relies on those six components in assessing the impact of institutions on the gap between two poverty measurements. Hypothetically, a better quality of institutions is expected to reduce the gap between multidimensional and monetary poverty incidences through a faster reduction in multidimensional poverty.

**Table 2.3**
Summary of Previous Studies Related to the Impact of Institutional Variables on Poverty Reduction

| Authors | Scale & Period | Dependent variable | Independent variables & results | Methodology |
|---|---|---|---|---|
| Tebaldi and Mohan (2000) | World; 1999-2004 | Monetary poverty ($2 a day) | ▪ Control of corruption (Sig., -)<br>▪ Regulatory quality (Insig.)<br>▪ Rule of law (Insig.)<br>▪ Government effectiveness (Sig., -)<br>▪ Voice and accountability (Insig.)<br>▪ Political stability (Sig., -)<br>▪ Expropriation risk (Insig.)<br>▪ Institutional PCA index (Sig., -) | Two-stage least-squares estimates |
| Akanbi (2015) | SSA countries; 1990-2010 | Non-income poverty (Human Poverty Index); income poverty (FGT index) | ▪ Governance level, proxied by average value of 6 institutional variables from WGI (Sig., -) | Two-stage least-squares estimates |
| Asongu and Kodila-Tedika (2017) | World; 1996-2005 | Multidimensional poverty (global MPI) | ▪ Government effectiveness (Sig., -)<br>▪ Political stability (Insig.)<br>▪ Regulatory quality (Sig., -)<br>▪ Voice and accountability (Sig., -)<br>▪ Control of corruption (Sig., -)<br>▪ Rule of law (Sig., -)<br>▪ Expropriation risk (Sig., -)<br>▪ Institutional PCA index (Sig., -) | Two-stage least-squares estimates |
| Jindra and Vaz (2019) | 71 countries; 2009-2014 | Multidimensional poverty | ▪ Government effectiveness (Sig., -) | Multilevel probit model |
| Santos *et al.* (2019) | World; 1999-2014 | Multidimenisonal poverty (global MPI incidence) | ▪ Control of corruption (Sig., -) | Cross section OLS estimates |

Notes: Sig. = significant; Insig. = insignificant
*Source*: Author's elaboration.

### 2.3.2 Countries' Socioeconomic Characteristics and Poverty

The gap between multidimensional and monetary poverty cannot be explained solely by the quality of institutions but also by countries' socioeconomic characteristics. Table 2.4 summarizes studies assessing the impact of socioeconomic variables on poverty. Some found a significant relationship between GDP per capita and poverty reduction. Akanbi (2015), for instance, found that increased GDP per capita significantly reduces income poverty and non-income poverty in SSA countries, with a more substantial effect on income poverty. Further, Jindra and Vaz (2019) demonstrated that GDP per capita is negatively associated with the probability of being multidimensionally poor. Alongside GDP per capita, literature highlighted the importance of growth in poverty reduction. Santos *et al.* (2019) examined the relationship between growth and poverty and found a significantly negative impact of growth, but with a more immediate and greater impact on income poverty than multidimensional poverty. This finding is supported by other literature (Tran *et al.*, 2015; Bader *et al.*, 2016) that claimed rapid economic growth may give more remarkable impact on monetary

poverty reduction than multidimensional poverty. Those studies indicates that GDP per capita and growth is necessary but insufficient for multidimensional poverty reduction. Hence, increased GDP per capita and growth might lead to a higher gap between multidimensional and monetary poverty.

Additionally, inequality is highlighted as essential variable to mediate the impact of growth on poverty (Kakwani *et al*, 2004; Santos *et al.*, 2019). It may also play a role as a channel for institutions affecting poverty, alongside the GDP per capita (Tebaldi and Mohan, 2010; Asongu and Kodila-Tedika, 2017). However, Santos *et al.* (2019) found an insignificant impact of the Gini coefficient on the change in multidimensional and income poverty. Still, they argued that it might be due to the limited sample, subjecting to the availability of Gini coefficient data. Interestingly, Yang and Vizard (2017) found a relatively strong correlation between inequality and income poverty, but a weak correlation in multidimensional poverty. It suggests that income inequality might worsen monetary poverty more than multidimensional poverty. It might then reduce the gap between multidimensional and monetary poverty. Furthermore, expecting a direct impact of government expenditure on education and health in improving education and health outcomes, Santos *et al.* (2019) investigated the impact of those two variables on multidimensional poverty incidence, yet found insignificant results.

Social inclusion may also take part in explaining poverty reduction, and hence the gap between two poverty measurements. Akanbi (2015) found that social inclusion, measured by the ratio of female to male labour force participation rate, reduces poverty. However, it only significantly reduces non-income poverty but not income poverty. It indicates that a higher level of social inclusion might be followed by a lower gap between two poverty measurements through a faster reduction in multidimensional poverty. Furthermore, Bader *et al.* (2016) found that living in rural areas increases the chance of being multidimensionally and monetary poor, with a more substantial impact on the multidimensionally poor. Similarly, Jindra and Vaz (2019) found that living in a country with a higher share of the urban population lowers the chance of households being multidimensionally poor. However, other studies showed contradictory results (Chen *et al.*, 2019; Salecker *et al.*, 2020). In the context of Taiwan in 2009, Chen *et al.* (2019) revealed that the urbanization level significantly contributes to multiple deprivations of well-being. Likewise, Salecker *et al.* (2020) confirmed a higher risk of being multidimensionally poor than monetary poor in urban areas in Rwanda. Hence, deliberating on these studies, a higher level of urbanization in the country may lower or raise the gap between multidimensional and monetary poverty, depending on the direction of its impact on multidimensional poverty.

The above findings have identified socioeconomic factors that may be essential in explaining the gap between multidimensional and monetary poverty incidences. In general, studies indicate that country's socioeconomic characteristics may reduce or increase the gap between the two poverty measurements. In the case of increased GDP per capita, growth, government expenditure, social inclusion, and level of urbanization leading to a faster reduction in multidimensional poverty than monetary poverty, the gap will eventually decrease. However, if they lead to a faster reduction in monetary poverty, the gap will eventually increase. In the case of the Gini coefficient, it is expected to narrow the gap between multidimensional and monetary poverty since higher income inequality is more likely to increase monetary poverty faster than multidimensional poverty.

**Table 2.4**
Summary of Previous Studies Related to the Impact of Socioeconomic Variables on Poverty Reduction

| Authors | Scale & Period | Dependent variable | Independent variables & results | Methodology |
|---|---|---|---|---|
| Akanbi (2015) | SSA countries; 1990-2010 | Non-income poverty (Human Poverty Index); Income poverty (FGT index) | ▪ GDP per capita (Sig., -)<br>▪ Social inclusion (Sig., -); only on non-income poverty. | Two-stage least-squares estimates |
| Bader *et al.* (2016) | Lao PDR; 2007/2008 | Monetary poverty; multidimensional poverty (Probability) | ▪ Rural location (Sig., +)<br>▪ Low market access (Sig., +) | Multinomial logit |
| Santos *et al.* (2019) | World; 1999-2014 | Global MPI; change in global MPI; change in $1.25 a day income poverty | ▪ Growth (Sig., -)<br>▪ Coefficient Gini (Insig.)<br>▪ Health expenditure (Insig.)<br>▪ Education expenditure (Insig.) | First difference estimates; cross-section estimates |
| Jindra and Vaz (2019) | 71 countries; 2009-2014 | Multidimensional poverty | ▪ GDP per capita (Sig., -)<br>▪ Urban share (Sig., -) | Multilevel probit model |
| Chen *et al.* (2019) | Taiwan; 2009 | Multidimensional poverty | ▪ Level of urbanization (Sig, +) | Multilevel regression model |
| Salecker et al. (2020) | Rwanda; 2010/11, 2013/14 | Monetary poverty; multidimensional poverty (Probability) | ▪ Rural location (Sig, +) | Logit model |

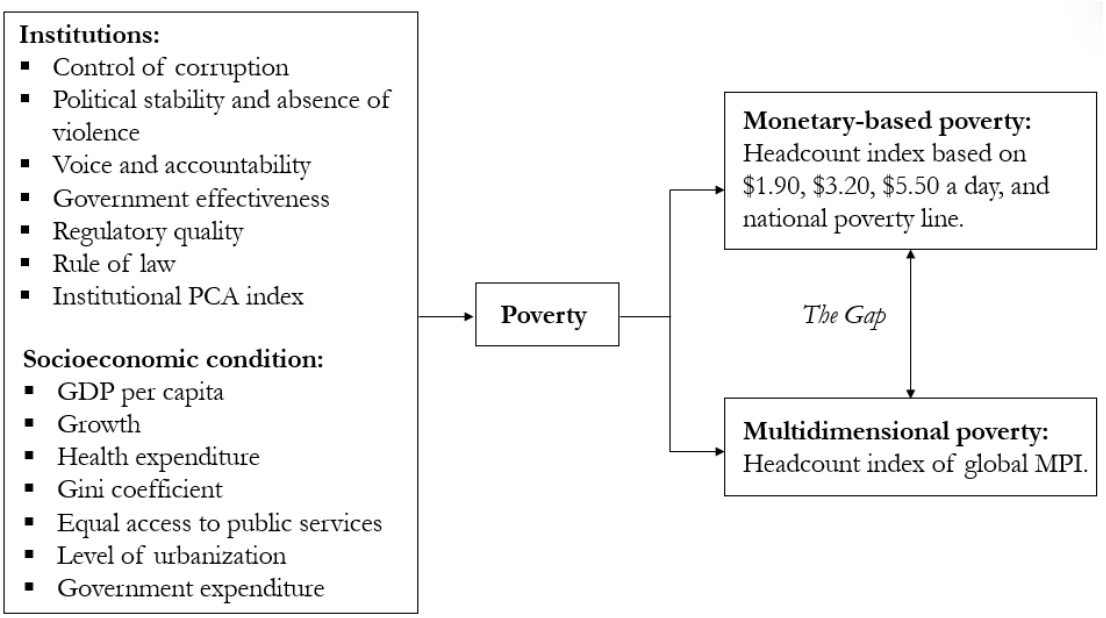
Notes: Sig. = significant; Insig. = insignificant

*Source*: Author's elaboration.

## 2.4 Conceptual Framework

The conceptual framework in this study, as depicted in Figure 2.1, was built based on the existing literature and empirical evidence. Our primary focus is the gap between two global poverty measurements, the global MPI and the $1.90 a day headcount index. Investigating the gap becomes our interest since an individual could be shaken off income poverty yet still experience deprivation in well-being dimensions beyond income. The choice of global MPI is because it is the only indicator for multidimensional poverty measurement reported for a number of countries, hence allowing a cross-country analysis to represent the global perspective. On the other hand, the choice of $1.90 a day poverty line is because it is the most used measures to track global poverty by the World Bank and other international development organizations. Besides, it is argued to be comparable with the acute multidimensional poverty from global MPI (Santos *et al.*, 2019). However, to enrich our analysis, we also assess the gap between multidimensional and other monetary-based poverty in some parts of the analysis, including $3.20 a day, $5.50 a day, and the national poverty line. The choice of explanatory variables is also based on prior empirical findings related to poverty reduction.

**Figure 2.1**
Conceptual Framework




*Source*: Author's elaboration

## 2.6 Hypotheses

Building on the literature and previous empirical studies, this study expected that the gap between multidimensional and monetary poverty varies across countries, with the incidence of multidimensional poverty is likely to be relatively higher compared to the monetary poverty, especially those at $1.90 a day poverty line threshold, given the comprehensiveness of multidimensional poverty measures in identifying the poor. Besides, it is also expected that the variation of the gap between both poverty measurements is influenced by country's institutional quality and socioeconomic characteristics, with main hypotheses:

**Hypothesis 1.** Better institutions (control of corruption, political stability, voice and accountability, government effectiveness, regulatory quality, rule of law, and institutional PCA index) are expected to significantly reduce the gap between multidimensional and monetary poverty.

**Hypothesis 2.** Countries' socioeconomic characteristics are expected to significantly influence the gap between multidimensional and monetary poverty.

# Chapter 3
# Data and Methodology

Chapter 3 presents the data description and the methodology used in this study. This involves the explanation of the data sources, the interpolation employed, the summary statistics for all variables involved, and the empirical model developed to address research questions.

## 3.1 Data Description

### 3.1.1 Data Sources

This study uses a panel dataset from secondary sources such as OPHI, the World Bank's World Development Indicator (WDI), Worldwide Governance Indicators (WGI), and Varieties of Democracy (V-Dem). The dependent variable in this study is constructed by subtracting the headcount index of global MPI reported by OPHI (2022) and the headcount index from 2011 PPP $1.90 a day poverty from World Bank (2022c), which is used to represent the gap between both poverty measures. As we mentioned previously, to enrich the analysis, we also investigate the gap between the headcount index of global MPI and three other alternatives of monetary-based poverty measurements: the $3.20 a day, the $5.50 a day, and the national poverty line. The period of study falls between 2000 to 2020, given the availability of multidimensional and monetary poverty data.

Until October 2021, OPHI (2022) had published global MPI for 127 countries with at least one-point MPI estimates. The observations are dominantly from the low-income countries (LIC), lower-middle-income countries (LMIC), and upper-middle-income countries (UMIC), wherein most are considered developing countries. To increase the country coverage, if the multidimensional poverty data is available from the survey conducted over two years, we used the data to represent the figure for those two points of time consecutively. Due to the limitation in the data availability between global MPI and monetary poverty, wherein some countries do not have both data in the same year, this study applies linear interpolation for income poverty data, as will be discussed in the next subsection. After the interpolation, the countries included in our analysis will be restricted only to those having information on global MPI and monetary poverty headcount index in the same year. The purpose is to minimize potential bias by comparing both figures in different years. However, important to note that the country's coverage in the analysis also depends on the availability of information from explanatory variables. A more detailed variable description and the source of data are provided in Table 3.1.

### 3.1.2 Interpolation of Income Poverty Data

Due to the nature of our data, some countries may have the headcount index estimates from global MPI but not from income poverty in the same year, or the other way around. Hence, to increase the number of observations and maintain the data reliability, we do the interpolation before doing the analysis. However, we only interpolate for the monetary poverty headcount index since global MPI data is more likely to have a more frequent gap year for some countries. It is also to avoid less accurate results if we use data that is interpolated from both measurements.

**Table 3.1**
Descriptions and Sources of Variables

| Variable Name | Description | Source |
|---|---|---|
| | **Dependent Variable** | |
| The gap (MPI and $1.90 a day) | The difference between the headcount index of global MPI and 2011 PPP $1.90 a day income poverty. | OPHI (2022) & World Bank (2022) |
| The gap (MPI and $3.20 a day) | The difference between the headcount index of global MPI and 2011 PPP $3.20 a day income poverty. | OPHI (2022) & World Bank (2022) |
| The gap (MPI and $5.50 a day) | The difference between the headcount index of global MPI and 2011 PPP $5.50 a day income poverty. | OPHI (2022) & World Bank (2022) |
| The gap (MPI and national poverty line) | The difference between the headcount index of global MPI and the national poverty line. | OPHI (2022) & World Bank (2022) |
| | **Independent Variable** | |
| ***Institutional Variables*** | | |
| Control of corruption | Perceptions on the extent the public power is used for private gain, also involving state "capture" by private and elite' interests. | WGI (2022) |
| Political stability and absence of violence | Measures perceptions on the likelihood of political instability and/or politically motivated violence, including terrorism. | WGI (2022) |
| Voice and accountability | Captures perceptions on the extent to which citizens can participate in the selection of government, as well as freedom of expression, freedom of association, and free media. | WGI (2022) |
| Government effectiveness | Represents perceptions on the quality of public service, civil service quality, policy formulation and implementation quality, and the government's commitment's credibility to such policies. | WGI (2022) |
| Regulatory quality | Denotes perceptions on government capacity to provide and implement sound policies and regulations that facilitate and promote the development of private sectors. | WGI (2022) |
| Rule of law | Measures the extent to which agents have confidence in and abide by society's rules, including the contract enforceability, the police and courts effectiveness, and the crime likelihood. | WGI (2022) |
| Institutional PCA index | Principle Component Analysis (PCA) of institutions constructed from first eigenvalue of six institutional variables from WGI using STATA 17.0. | Author's calculation |
| ***Socioeconomic Variables*** | | |
| Ln (GDP pc) | Gross Domestic Product (GDP) per capita based on constant 2015 US$ (in logarithm form) | World Bank (2022) |
| Growth (%) | Growth of Gross Domestic Product (GDP) per capita based on constant 2015 US$ (annual %) | World Bank (2022) |
| Gov. health expenditure (%) | Share of government expenditure on health from domestic sources (%). | World Bank (2022) |
| Gini coefficient | Represents the measure of income inequality. | World Bank (2022) |
| Equal access to public services | Access to public services distributed equally by socio-economic position. | V-Dem (2022) |
| Urban population (%) | Percentage of urban population of total population (%) | World Bank (2022) |
| Ln (Gov. consumption pc) | Refers to government consumption per capita, which was constructed by dividing total government consumption to number of population (in logarithm form). | World Bank (2022) |

*Source*: Author's elaboration.

This study follows the interpolation used by Alkire *et al.* (2017). In the case of income poverty data unavailable, they employed a linear interpolation to estimate the $1.90 a day headcount index. They used the two closest data points of the $1.90 a day poverty that is available less than four years apart from the year of the surveys used for estimating multidimensional poverty. However, since we have a long span of the study, we extend the gap year for estimating the income poverty headcount index. Since a larger time gap between two data used for interpolation may lead to a larger risk for inaccurate results, we restrict the interpolation only for income poverty data with the information in a maximum of four years apart from the year of global MPI headcount index data. The interpolation formula is as follows (Alkire *et al.*, 2017):

$$H_t = \frac{H_1 - H_0}{t_1 - t_0}(t - t_0) + H_0 \quad (1)$$

where $t$ is the year of missing data of income poverty headcount index $H_t$ that is interpolated, $H_0$ and $H_1$ are the two closest points of income poverty headcount index in $t_0$ and $t_1$ respectively, $t_0 < t$ and $t_1 > t$ for which we have observed $H_{t0}$ and $H_{t1}$. After we interpolate the $1.90 a day headcount index, of 127 countries, we finally have 83 countries with comparable multidimensional and $1.90 a day income poverty data, where 19 are LIC, 35 are LMIC, and 29 are UMIC. We applied the same interpolation method for all alternatives of monetary poverty data used in this study.

### 3.1.3 Summary Statistics

This subsection presents the summary statistics of variables involved in our study, which provides information about the dataset, such as the mean value, the maximum value, the minimum value, and the dispersion. Table 3.2 presents the summary statistics for observations having the data on the gap between global MPI and the World Bank income poverty headcount index ($1.90, $3.20, and $5.50 a day). It shows a relatively large dispersion of the gap between multidimensional and income poverty. The minimum value for the gap between multidimensional and $1.90 a day headcount index, for instance, was -26.27 percent, which was in South Africa in 2003, while the maximum value was 52.66 percent, which was in Ethiopia in 2011. It conveys that some countries may have a relatively higher multidimensional poverty incidence than the $1.90 a day, while others may experience the opposite way. The huge dissipation might be due to some countries' poverty alleviation policies in a particular year effectively reducing either multidimensional or income poverty faster. On average, the incidence of poverty based on global MPI is higher than the $1.90 a day.

On the other hand, the mean value of the gap between the global MPI and the other two alternatives of income poverty based on the World Bank poverty line ($3.20 and $5.50 a day) is less than zero, which indicates that, on average, countries have a lower incidence of $3.20 and $5.50 a day poverty than multidimensional poverty. Further, in terms of institutional aspects, Table 3.2 demonstrates that the mean value of each six institutional indicators lies below zero, which suggests that, on average, countries have a relatively low quality of institutions, despite a quite large dispersion. Additionally, Table 3.3 provides summary statistics for observations having data on the gap between the global MPI and national poverty line. Interestingly, the dispersion of the gap between those two poverty measurements seems more extensive.

**Table 3.2**
Summary Statistics for Observations Having Poverty Headcount Index Data from Global MPI and the World Bank ($1.90, $3.20, and $5.50 a Day)

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| The gap (MPI and $1.90 a day) | 208 | 8.11 | 14.33 | -26.27 | 52.66 |
| The gap (MPI and $3.20 a day) | 208 | -9.63 | 12.85 | -52.40 | 24 |
| The gap (MPI and $5.50 a day) | 208 | -30.81 | 15.69 | -75.00 | -1.61 |
| MPI headcount index | 208 | 28.23 | 27.08 | 0.18 | 92.40 |
| $1.90 a day headcount index | 208 | 20.11 | 22.07 | 0.00 | 76.90 |
| $3.20 a day headcount index | 208 | 37.87 | 28.76 | 0.20 | 91.30 |
| $5.50 a day headcount index | 208 | 59.04 | 28.14 | 3.20 | 97.80 |
| Control of corruption | 202 | -0.59 | 0.45 | -1.44 | 0.91 |
| Political stability and absence of violence | 202 | -0.53 | 0.76 | -2.82 | 1.15 |
| Voice and accountability | 202 | -0.41 | 0.60 | -1.73 | 1.10 |
| Government effectiveness | 202 | -0.46 | 0.48 | -1.71 | 0.69 |
| Regulatory quality | 202 | -0.37 | 0.52 | -1.93 | 1.12 |
| Rule of law | 202 | -0.55 | 0.44 | -1.78 | 0.59 |
| Institutional PCA index | 202 | -0.00 | 1.97 | -5.33 | 5.23 |
| Ln (GDP pc) | 207 | 7.65 | 0.89 | 5.66 | 9.43 |
| Growth (%) | 207 | 3.19 | 3.32 | -9.83 | 14.64 |
| Gov. health expenditure (%) | 208 | 41.31 | 8.55 | 24.70 | 63.2 |
| Coefficient gini | 208 | -0.15 | 0.84 | -2.30 | 2.31 |
| Equal access to public services | 208 | 47.97 | 18.63 | 10.64 | 90.03 |
| Urban population (%) | 204 | 8.96 | 4.62 | 1.76 | 31.90 |
| Ln (Gov. consumption pc) | 183 | 5.70 | 1.02 | 2.60 | 7.61 |

*Source*: processed by Author.

**Table 3.3**
Summary Statistics for Observations Having Poverty Headcount Index Data from Global MPI and National Poverty Line

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| The gap (MPI and national poverty line) | 155 | -2.26 | 20.76 | -49.90 | 58.92 |
| MPI headcount index | 155 | 32.08 | 26.87 | 0.34 | 87.30 |
| National poverty line headcount index | 155 | 34.35 | 15.39 | 4.10 | 72.60 |
| Control of corruption | 150 | -0.60 | 0.47 | -1.63 | 0.91 |
| Political stability and absence of violence | 150 | -0.61 | 0.82 | -2.82 | 1.01 |
| Voice and accountability | 150 | -0.41 | 0.59 | -1.75 | 1.10 |
| Government effectiveness | 150 | -0.50 | 0.50 | -1.71 | 0.61 |
| Regulatory quality | 150 | -0.42 | 0.50 | -1.93 | 1.12 |
| Rule of law | 150 | -0.58 | 0.48 | -1.89 | 0.48 |
| Institutional PCA index | 150 | 0.00 | 2.02 | -5.15 | 4.86 |
| Ln (GDP pc) | 155 | 7.48 | 0.86 | 5.66 | 9.43 |
| Growth (%) | 155 | 2.93 | 3.45 | -13.63 | 12.45 |
| Gov. health expenditure (%) | 129 | 41.20 | 7.94 | 26.80 | 63.20 |
| Coefficient gini | 155 | -0.25 | 0.87 | -2.30 | 2.31 |
| Equal access to public services | 155 | 44.72 | 16.13 | 10.64 | 90.97 |
| Urban population (%) | 151 | 8.16 | 4.38 | 2.01 | 27.81 |
| Ln (Gov. consumption pc) | 135 | 5.52 | 0.98 | 3.13 | 7.60 |

*Source*: processed by Author.

Since we will also examine the impact of institutions in different countries' income groups, we provide the summary statistics based on income groups. In this case, we only focus on the gap between global MPI and the World Bank's $1.90 a day poverty. The classification of the country's income group is based on the World Bank's income classification constructed from the 2020 GNI per capita (Atlas method) threshold. The countries with GNI per capita below 1,035 are classified into low-income, $1,035- $4,045 into the lower-middle-income, $4,046-$12,535 into the upper-middle-income, and above $12,535 into high-

income groups. This study focuses solely on low-income, lower-middle-income, and upper-middle-income country groups. As shown in Tables 3.4 to 3.6, the characteristics of low-income groups are relatively similar to lower middle-income groups. For instance, the mean value of the gap between multidimensional and $1.90 a day headcount index is about 13.89 percent in low-income countries and 12.02 percent in lower-middle-income countries. On the other hand, it is only 0.56 percent in upper-middle-income countries, albeit with some dispersion. Those tables also reveal that, on average, upper-middle-income countries have better institutions than other income groups.

**Table 3.4**
Summary Statistics for Low-Income Groups

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| The gap (MPI and $1.90 a day) | 37 | 13.89 | 18.30 | -14.95 | 52.66 |
| Control of corruption | 37 | -0.71 | 0.50 | -1.44 | 0.76 |
| Political stability and absence of violence | 37 | -0.66 | 0.72 | -2.66 | 0.41 |
| Voice and accountability | 37 | -0.75 | 0.51 | -1.73 | 0.29 |
| Government effectiveness | 37 | -0.82 | 0.40 | -1.64 | -0.02 |
| Regulatory quality | 37 | -0.66 | 0.41 | -1.44 | 0.24 |
| Rule of law | 37 | -0.67 | 0.44 | -1.40 | 0.05 |
| Institutional PCA index | 37 | -0.00 | 2.01 | -4.15 | 3.86 |
| Ln (GDP pc) | 37 | 6.36 | 0.36 | 5.66 | 7.20 |
| Growth (%) | 37 | 3.02 | 3.20 | -6.65 | 10.38 |
| Gov. health expenditure (%) | 37 | 41.00 | 4.83 | 32.40 | 52 |
| Coefficient gini | 37 | -0.89 | 0.68 | -2.30 | 0.55 |
| Equal access to public services | 37 | 27.28 | 11.90 | 10.64 | 57.82 |
| Urban population (%) | 37 | 6.66 | 2.68 | 2.09 | 13.54 |
| Ln (Gov. consumption pc) | 27 | 4.42 | 0.40 | 3.85 | 5.57 |

*Source*: processed by Author.

**Table 3.5**
Summary Statistics for Lower-Middle-Income Groups

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| The gap (MPI and $1.90 a day) | 94 | 12.02 | 14.55 | -19.30 | 49.30 |
| Control of corruption | 88 | -0.70 | 0.40 | -1.40 | 0.91 |
| Political stability and absence of violence | 88 | -0.60 | 0.85 | -2.67 | 1.15 |
| Voice and accountability | 88 | -0.48 | 0.57 | -1.73 | 0.47 |
| Government effectiveness | 88 | -0.59 | 0.38 | -1.37 | 0.58 |
| Regulatory quality | 88 | -0.58 | 0.43 | -1.93 | 0.31 |
| Rule of law | 88 | -0.66 | 0.43 | -1.78 | 0.24 |
| Institutional PCA index | 88 | 0.00 | 1.93 | -4.93 | 3.98 |
| Ln (GDP pc) | 93 | 7.40 | 0.42 | 6.44 | 8.35 |
| Growth (%) | 93 | 3.22 | 3.20 | -7.46 | 12.45 |
| Gov. health expenditure (%) | 94 | 39.51 | 7.94 | 24.70 | 59.50 |
| Coefficient gini | 94 | -0.07 | 0.78 | -1.22 | 2.07 |
| Equal access to public services | 94 | 44.74 | 14.60 | 15.46 | 75.11 |
| Urban population (%) | 90 | 7.61 | 4.61 | 1.76 | 31.90 |
| Ln (Gov. consumption pc) | 85 | 5.32 | 0.75 | 2.60 | 6.88 |

*Source*: processed by Author.

**Table 3.6**
Summary Statistics for Upper-Middle-Income Groups

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| The gap (MPI and $1.90 a day) | 77 | 0.56 | 6.98 | -26.27 | 23.84 |
| Control of corruption | 77 | -0.40 | 0.43 | -1.44 | 0.85 |
| Political stability and absence of violence | 77 | -0.39 | 0.64 | -2.82 | 1.04 |
| Voice and accountability | 77 | -0.16 | 0.58 | -1.63 | 1.10 |
| Government effectiveness | 77 | -0.13 | 0.42 | -1.71 | 0.69 |
| Regulatory quality | 77 | 0.01 | 0.42 | -1.39 | 1.12 |
| Rule of law | 77 | -0.37 | 0.41 | -1.67 | 0.59 |
| Institutional PCA index | 77 | 0.00 | 1.90 | -7.27 | 4.47 |
| Ln (GDP pc) | 77 | 8.57 | 0.39 | 7.75 | 9.43 |
| Growth (%) | 77 | 3.22 | 3.52 | -9.83 | 14.64 |
| Gov. health expenditure (%) | 77 | 43.65 | 10.07 | 26.80 | 63.20 |
| Coefficient gini | 77 | 0.09 | 0.79 | -1.43 | 2.31 |
| Equal access to public services | 77 | 61.85 | 14.18 | 36.02 | 90.03 |
| Urban population (%) | 77 | 11.64 | 4.11 | 3.19 | 27.81 |
| Ln (Gov. consumption pc) | 71 | 6.64 | 0.51 | 5.41 | 7.61 |

*Source*: processed by Author.

### 3.1.4 Correlation between Variables

To ensure that the estimation results in a stable and precise coefficient, it is necessary to investigate collinearity issues among independent variables. The correlation coefficient is measured on a scale between -1 to 1. The former indicates a perfect negative linear correlation, while the latter shows a perfect positive linear correlation. As suggested by Evans (1996), the strength of correlation can be divided into five categories: very weak (0.00-0.19), weak (0.20-0.39), moderate (0.40-0.59), strong (0.60-0.79), and very strong (0.80-1.00). Using that guidance, Table 3.7 indicates some variables have a strong and very strong correlation, as shown in the light grey shades and dark grey shades, respectively. In this light, we provided estimates using multiple specifications, including a specification excluding variables with strong and very strong correlations. We then assess whether it substantially affects the robustness of our results.

**Table 3.7**
Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | 1.000 | | | | | | | | | | | | | |
| (2) | 0.389 | 1.000 | | | | | | | | | | | | |
| (3) | 0.483 | 0.302 | 1.000 | | | | | | | | | | | |
| (4) | 0.771 | 0.295 | 0.495 | 1.000 | | | | | | | | | | |
| (5) | 0.664 | 0.270 | 0.581 | 0.800 | 1.000 | | | | | | | | | |
| (6) | 0.832 | 0.383 | 0.513 | 0.818 | 0.752 | 1.000 | | | | | | | | |
| (7) | 0.882 | 0.495 | 0.686 | 0.898 | 0.869 | 0.918 | 1.000 | | | | | | | |
| (8) | 0.301 | 0.242 | 0.412 | 0.574 | 0.540 | 0.355 | 0.507 | 1.000 | | | | | | |
| (9) | 0.012 | 0.049 | -0.076 | 0.055 | -0.077 | -0.014 | -0.011 | -0.010 | 1.000 | | | | | |
| (10) | 0.337 | 0.251 | 0.337 | 0.386 | 0.456 | 0.297 | 0.428 | 0.525 | -0.093 | 1.000 | | | | |
| (11) | 0.277 | 0.185 | 0.403 | 0.185 | 0.204 | 0.131 | 0.276 | 0.222 | -0.181 | 0.366 | 1.000 | | | |
| (12) | 0.296 | 0.377 | 0.176 | 0.396 | 0.292 | 0.345 | 0.385 | 0.302 | 0.132 | 0.208 | -0.361 | 1.000 | | |
| (13) | 0.196 | 0.243 | 0.457 | 0.354 | 0.462 | 0.181 | 0.383 | 0.779 | -0.125 | 0.416 | 0.311 | 0.167 | 1.000 | |
| (14) | 0.374 | 0.293 | 0.423 | 0.556 | 0.537 | 0.385 | 0.534 | 0.922 | -0.078 | 0.586 | 0.272 | 0.327 | 0.747 | 1.000 |

Notes: (1) Control of corruption; (2) Political stability and absence of violence; (3) Voice and accountability; (4) Government effectiveness; (5) Regulatory quality; (6) Rule of law; (7) Institutional PCA index; (8) Ln (GDP pc); (9) Growth (%); (10) Gov. health expenditure (%); (11) Gini coefficient; (12) Equal access to public services; (13) Urban population (%); (14) Ln (Gov. consumption pc).

*Source*: processed by Author.

## 3.2 Methodology

To answer the first research sub-question, this study uses scatter plot analysis to investigate the heterogeneity of the gap between multidimensional and monetary poverty. Meanwhile, for the second and third sub-questions, this study employs a cross-country panel data regression analysis as will be discussed in the following subsection.

### 3.2.1 Model Specification: Panel Data Regression

This study applies panel data regression model to cross-country datasets to examine the impact of institutions on the gap between two poverty measurements and whether the effect of institutions varies between country income group. The model specification is as follows equation:

$$Y_{it} = \beta + \theta \boldsymbol{X_{it}} + \boldsymbol{\gamma Z_{it}} + \lambda_t + \alpha_i + \varepsilon_{it} \quad (2)$$

The dependent variable $Y_{it}$ in this study is the gap, which is measured by the difference between headcount index, resulting from multidimensional and monetary poverty measurement between the period of 2000 to 2020. The $\boldsymbol{X_{it}}$ is institutional variable, while vector $\boldsymbol{Z_{it}}$ contains countries' socioeconomic variables as control variables. The $\lambda_t$ refers to the time-fixed effect, $\alpha_i$ is the country-specific effect, and $\varepsilon_{it}$ denotes the error term.

The institutional variables $\boldsymbol{X_{it}}$ in this study utilize six measures of institutions from WGI, including control of corruption, political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, and rule of law. The description of institutional variables, as presented in Table 3.1, is obtained from Kaufmann *et al.* (2008), and a higher score denotes better institution quality. To avoid multicollinearity that may make our estimates become unstable, this study separately regresses each variable of institutions with the same specification. By doing this, we could still assess which institutional aspect plays a critical role in explaining the gap between different poverty measurements. Additionally, following other studies (Tebaldi and Mohan, 2010; Asongu and Kodila-Tedika, 2017), we built the PCA index from six indicators of institutions to obtain a general index for institutions. We then assess the impact of it on our dependent variable.

To capture the impact of institutions on our dependent variable, socioeconomic variables $\boldsymbol{Z_{it}}$ are included as control variables. They were chosen based on prior studies on variables underlying poverty reduction and considering data availability for each variable. Those include GDP per capita, growth, government health expenditure, the Gini coefficient, equal access to public services, level of urbanization, and government consumption expenditure per capita. The GDP per capita is used as a proxy for the average individual economic welfare in society. It is transformed into the logarithm form to reduce the skewness of the original data to make our statistical analysis more valid. On the other hand, the growth of real GDP per capita is included to measure the economic growth in the country. A higher level of economic welfare and growth is expected to reduce multidimensional and income poverty but in different velocity, hence influencing the variation of our dependent variable.

Government health expenditure is a proxy for sectoral policy specifically on health. The choice of this variable follows the argument by Tran *et al.* (2005) that sectoral policies may affect non-income dimensions more directly but affect income poverty only after some time. A higher proportion of resources channelled by the government to health sector, such as transfers and subsidies to health insurance beneficiaries, is expected to directly impact the health outcomes considered in the global MPI, and hence may reduce the gap between multidimensional and monetary poverty.

Furthermore, the Gini coefficient is included as a measure of income inequality. It captures the extent of development results distributed equally among the country's population. Controlling the Gini coefficient is essential to control the impact of growth on our dependent variable. The scale ranges from 0 to 100 where 0 represents perfect equality while 100 refers to perfect inequality. Considering the similar nature of the Gini coefficient data with income poverty, the same interpolation as for income poverty data is applied for Gini coefficient.

We also include the variable of equal access to public services as a proxy for social inclusion. This variable specifically captures whether access to public services distributed equally by socio-economic position, such as occupation, wealth, or other economic attributes. For instance, whether costs related to health access are set at a high rate that is unaffordable for the poor (Coppedge, 2022). A higher index denotes more equal access to public services by socio-economic position, and hence it is expected to reduce the gap between two poverty headcount index through faster improvement in multiple dimensions of well-being.

Additionally, the percentage of urban population is included as a measure of urbanization level, which is also expected to influence the gap between multidimensional and income poverty. Lastly, government consumption expenditure is involved to capture a broader context of social policies, which can represent the public spending on health, education, and subsidies for the poor. Public spending is expected to directly improve several dimensions of well-being and reduce the gap between multidimensional and monetary poverty. We also take the logarithm form of this variable. Important to note that we develop specifications by eventually adding or removing regressors in the model. It allows us to check the robustness of our estimates by examining how our main variable behave under different specifications.

To investigate the impact of institutions and socioeconomic variables on our dependent variable, we need to decide which regression method is more appropriate, either the fixed-effect model (FEM) or the random effect model (REM). Principally, considering that our panel data may contain fixed-effect countries-specific heterogeneity, such as geographical features and historical background, that may correlate with independent variables in our specification, the use of FEM is likely to be more appropriate to avoid inconsistency in the estimates. However, to choose between FEM or REM empirically, we will initially conduct the Hausman test. The rejection of the null hypothesis denotes that random-effect is not the consistent estimator, and thus the use of the fixed-effect estimator is more appropriate. Furthermore, considering that the presence of heteroscedasticity may result in a wrong standard error, we will conduct a diagnostic test of Wald test. If it indicates heteroscedasticity exists, we will address them by utilizing robust (White) standard error.

### 3.2.2 Model Specification: Cross-Section Regression

Notably, what may matter is not only the gap but also the change in the gap size. Hence, in this study, we also attempt to investigate whether institutional and socioeconomic variables affect the annual change of the gap between multidimensional and monetary poverty. In doing so, we apply a cross-section regression model using Ordinary Least Square (OLS) to the following equation:

$$Y_i = \beta + \theta \boldsymbol{X_i} + \boldsymbol{\gamma Z_i} + \varepsilon_i \tag{3}$$

The dependent variable $Y_i$ is the annual change of the gap between multidimensional and monetary poverty for country $i$ = 1, 2, …, n. The annual change is measured from the two last observations of the gap having positive value in each country. Similar to the panel data regression model, institutional variable $\boldsymbol{X_i}$ and socio-economic $\boldsymbol{Z_i}$ may include multiple

alternative variables of institutions and countries' socio-economic characteristics, respectively, depending on the selected specification in the analysis.

### 3.2.3 Standardized Coefficient

Considering the explanatory variables in this study mostly have different units of measurement, we convert our variables to standardized variables to assess the relative contribution of the explanatory variables on the dependent variable in some parts of the analysis. The standardized variable can be constructed by subtracting the mean value of the variable from its individual value and dividing them by the standard deviation of the variable, as shown in the following equation (Gujarati and Porter, 2009):

$$X^* = \frac{X-\mu}{\sigma} \tag{4}$$

where $X^*$ refers to the standardized variable, $X$ is the individual value of the variable, $\mu$ is the mean value of the variable, and $\sigma$ is the standard deviation of the variable. It rescales the variable to have a mean of zero and a standard deviation of one. The estimates resulting from the regression of those standardized variables are known as standardized coefficients or beta coefficients. It represents the extent of the change in the standard deviation of the (standardized) dependent variable with the increase in the standard deviation of the (standardized) explanatory variables. On that account, it allows us to investigate which variables contribute most to explaining the dependent variable.

# Chapter 4
# Results and Discussions

In this chapter, we first provide the discussion of the variation in the gap between multidimensional and income-based poverty using scatter plot analysis. Then, the discussion is continued for the impact of institutions and other variables on the gap between two poverty measures by analyzing the regression results.

## 4.1 The Gap Size between Multidimensional and Monetary Poverty – Scatter Plot Analysis

Before going further into regression results to investigate the reason behind the gap, this study began the analysis by investigating the plots between the headcount index based on global MPI and four alternatives of monetary poverty using the most recent data available in the same year, as presented in Figure 4.1. It is an essential initial step to understanding the variation in the gap between multidimensional and monetary poverty across countries and investigating how the gap takes place.

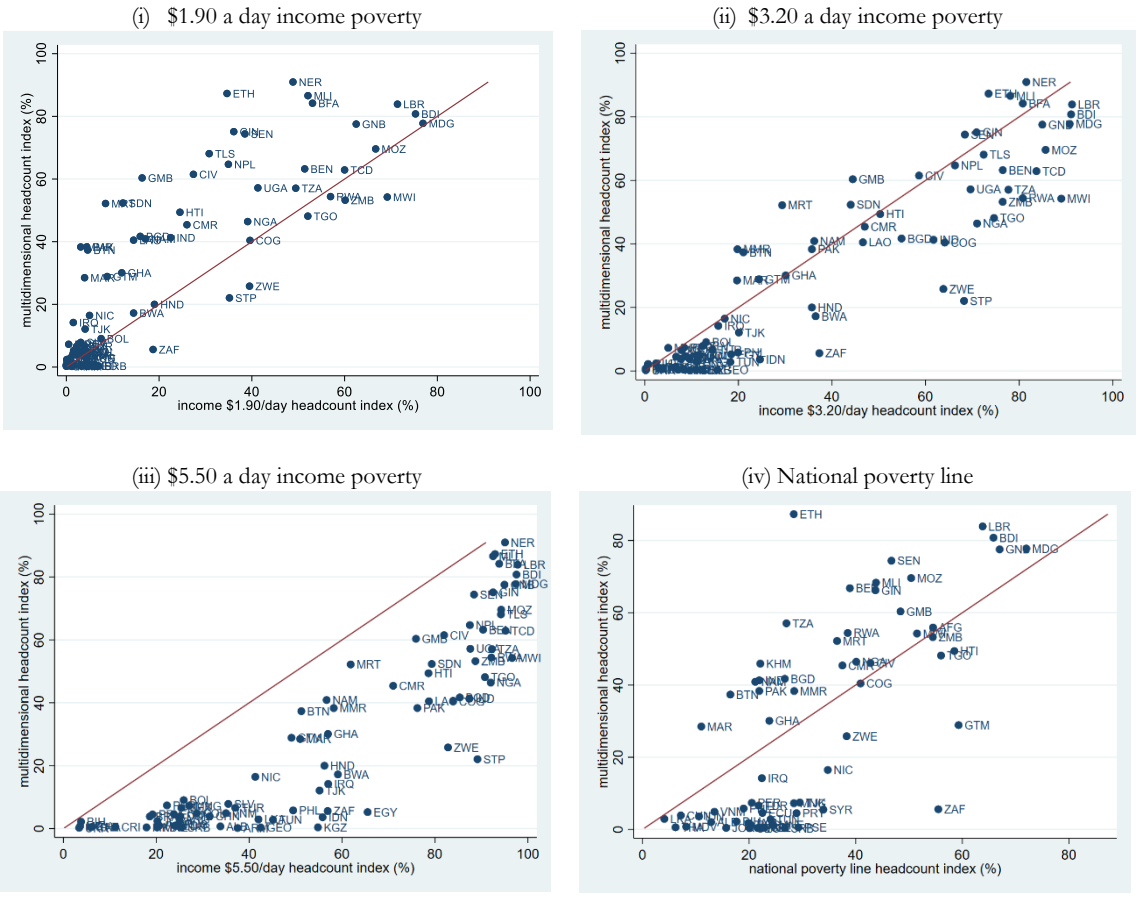
Comparing the headcount index based on global MPI and the $1.90 a day poverty line, Figure 4.1.(i) illustrates that the gap is mostly characterized by a higher incidence of multidimensional poverty. Most countries, or 65 of 83 countries, have a higher percentage of the poor based on multidimensional poverty compared to the $1.90 a day, as shown by the plots that mostly fall above the 45° line. It means that individuals may have income above $1.90 a day, which lifts them out of extreme poverty, yet still experience deprivations in other dimensions of well-being. This result corroborates findings from other studies that found the presence of discrepancies between the incidence of income and multidimensional poverty (Tran *et al.*, 2015; Wang *et al.*, 2016; Salecker *et al.*, 2020; and Bersisa and Heshmati, 2021). There might be some possible explanations for this. First, it may be the case that people sacrifice better education, healthcare, good nutrition in food, or other necessities to gain personal immediate needs or entertainment (Alkire and Santos, 2013). Second, it may also be the case that the market for public goods and services does not necessarily exist (Nishimwe-Niyimbanira, 2020). Consequently, even with sufficient income, it leaves them with disadvantages in numerous aspects of well-being beyond income and may increase the incidence of multidimensional poverty.

Looking further into the most recent gap between multidimensional and $1.90 a day headcount index across countries, Ethiopia had the highest gap, reaching around 52 percent. There are also some noticeable differences in other countries, especially those in low-income countries, such as Niger (NER), Sudan (SDN), and Gambia (GMB), with a gap of around 40 percent. Interestingly, some countries may have a relatively similar $1.90 a day headcount index but a considerable difference of multidimensional poverty incidence. For instance, the percentage of the poor based on the $1.90 a day threshold in Nigeria (NGA) and Senegal (SEN) was around 39 percent each, while their multidimensional poverty incidence was around 46 percent and 74 percent, respectively.

Besides the $1.90 a day poverty line, the World Bank also tracks two other internationally comparable poverty lines: the $3.20 a day and $5.50 a day. As illustrated in Figure 4.1.(ii) and 4.1.(iii), the gap variation is slightly different for those two poverty lines. When it comes to the $3.20 a day threshold, of 83 countries, only 24 had a higher incidence of multidimensional poverty than income poverty. On the other hand, when comparing multidimensional and

the $5.50 a day headcount index, all countries have a higher incidence of monetary poverty than multidimensional poverty. It might be because the $3.20 and $5.50 a day poverty line were constructed based on the standard of living in lower-middle-income and upper-middle-income groups, respectively (Jolliffe and Prydz, 2016), while the one-third cut-off in global MPI is constructed to capture the incidence of acute poverty, which is morer likely to be associated to the incidence of extreme poverty based on the $1.90 a day threshold. Still, the gap varies across countries. Countries with a relatively similar incidence of $5.50 a day poverty, for instance, may significantly differ in the incidence of multidimensional poverty. Interestingly, when we look further at the gap between the headcount index based on global MPI and the national poverty line in Figure 4.1.(iv), the plots seem more scattered, which is in line with our summary statistics in Chapter 3.

**Figure 4.1**
The Headcount Index based on Global MPI and the Monetary Poverty



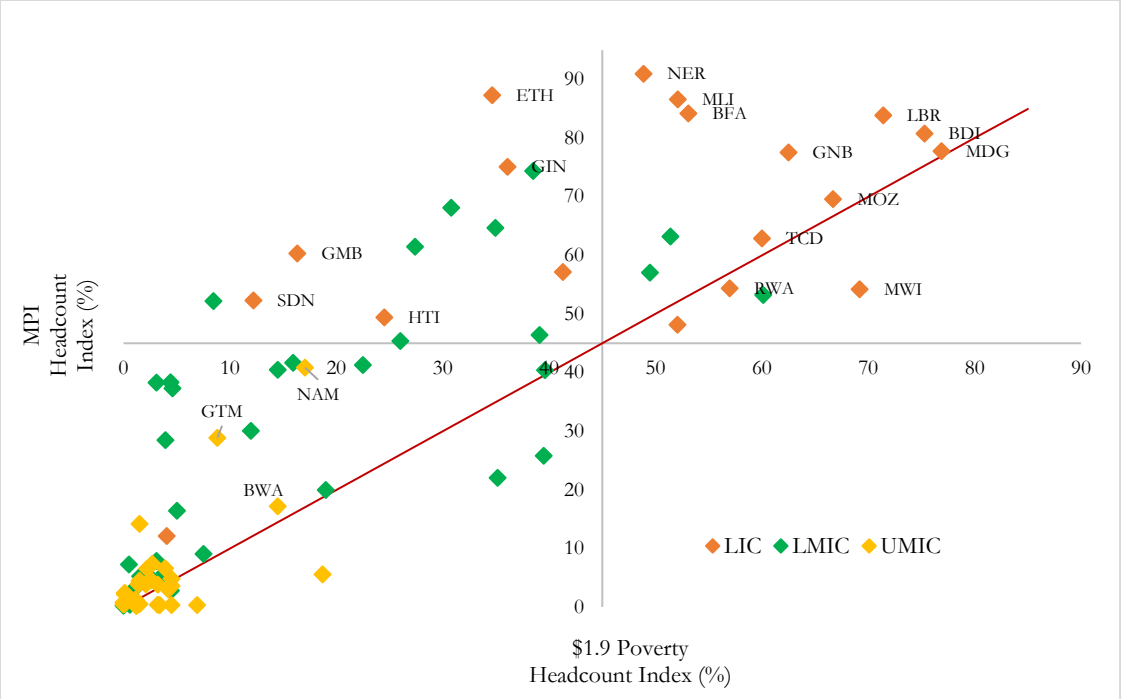

Notes: The red line is the 45° diagonal threshold. The figures were built upon the most recent data of countries that have headcount index from multidimensional and monetary poverty approaches ($1.90, $3.20, $5.50 a day, and national poverty line). After interpolating monetary poverty data, there are 83 countries that can be compared for the World Bank's poverty line and 64 countries for the national poverty line.

*Source*: processed by Author.

Although the monetary approach is the most widely used measurement to monitor poverty incidence in most developing countries (Bader *et al.*, 2016), our initial finding suggests that the commonly used monetary poverty of $1.90 a day could not necessarily capture the multifaceted poverty. It tends to underestimate the poverty incidence from the global MPI compared to the other two higher World Bank poverty lines. It seems reasonable since the

$3.20 and $5.50 a day are more likely to capture the living standards in lower-middle-income and upper-middle-income groups, respectively, which might be too high to be compared to the global MPI with a one-third cut-off. Nonetheless, our finding contradicts the view of the monetary poverty proponents that suggests economic resources, such as income, are highly correlated to all other dimensions of poverty (Burchi, 2018), since if it were the case, we would find a similar incidence of poverty based on multidimensional and $1.90 a day. It is questionable, then, whether lifting people out of $1.90 a day poverty will eventually allow them to meet their necessities. This finding indicates that the $1.90 a day might be too low to demonstrate the complexity of global extreme poverty. Hence, if the policy intervention for poverty reduction is targeted solely at reducing the number of the poor based on the $1.90 a day threshold, some people might be left out to continually suffer from several disadvantages in life beyond income, preventing them from having better quality of life.

**Figure 4.2**
The Headcount Index of Global MPI Against the $1.90 a Day by Country Income Groups




Notes:
1) The red line is the 45° diagonal threshold. The figures were built upon the most recent data of countries that have headcount index from global MPI and $1.90 a day income poverty. There are 86 countries that can be compared after interpolating income poverty data.
2) The classification of income groups is based on the World Bank's income classification in 2020. LIC=low-income countries, LMIC=lower-middle-income countries, UMIC=upper-middle-income countries.

*Source*: processed by Author.

Observing further on the variation of the multidimensional and $1.90 a day headcount index by country income groups, Figure 4.2 reveals that countries with relatively high percentages of poverty are concentrated in low-income and lower-middle-income groups. On the other hand, those having relatively low incidence of poverty are mostly classified as upper-middle-income. Despite $1.90 a day threshold might be too miserly to capture poverty experience of lower-middle-income and upper-middle-income groups (Jolliffe and Prydz, 2016), the gap between global MPI and the $1.90 a day headcount index also varies in those income groups. However, a considerable gap seems to happen mostly in low-income and

lower-middle-income groups. One possible explanation might be owing to the low quality of institutions in those income groups. The quality of institutions can determine the availability of public services (Deolalikar *et al.*, 2002), in which the unavailability of those services in the market may not allow individuals with sufficient income to access those necessities (Thorbecke *et al.*, 2015), resulting in a higher deprivation of well-being. As pointed out by Andrews *et al.* (2012), compared to middle-income countries, low-income groups tend to have a lower quality of governance with limited capacities to provide adequate healthcare, education, and infrastructure. Health insurance products in low-income countries, for instance, are often limited and targeted only at those working in formal and public sectors. Thus, even with an accepted standard income, some individuals may not have better reach to their needs, including adequate medical care, nutritious foods, and better education. It may increase the chance of being multidimensionally poor and lead to a higher gap between the two poverty measurements.

Even though the gap seems to be more pronounced in low-income and lower-middle-income groups, Figure 4.2 indicates that a country with a higher income does not always have a small gap. Some countries classified as upper-middle-income can have a considerable gap, such as Namibia (NAM), which reached roughly 23 percent. As pointed out by World Bank (2022b), Namibia has made progress in reducing income poverty, yet a large portion of its population still does not have access to basic services, which might be due to misallocation of resources. It indicates that despite having a sufficient income of $1.90 a day, individuals in upper-middle-income groups may still experience deprivation in multiple well-being dimensions due to the inefficiency of public goods provision. Ultimately, it can shake individuals off from income poverty but are still considered multidimensionally poor. Interestingly, the fact that some countries experienced a lower level of poverty based on a multidimensional approach compared to the $1.90 a day threshold is somehow surprising, even though only a few of them are. It conveys that some people may suffer from the $1.90 a day poverty but still be able to make ends meet at least in one dimension of health, education, or living standard. Further investigation will be presented in the next section to investigate variables determining the gap variations empirically.

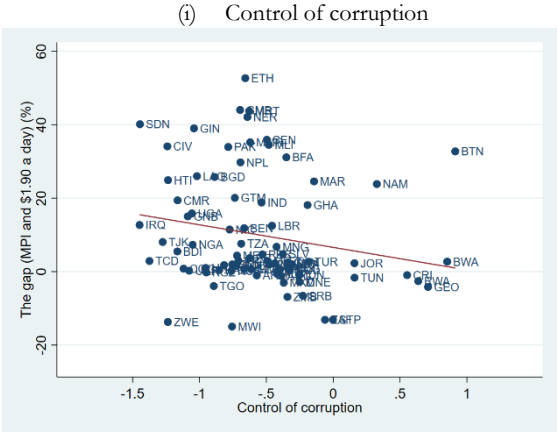
## 4.2 The Determinants of the Gap between Multidimensional and Monetary Poverty

Investigating the plots between multidimensional and monetary headcount index demonstrates basic information about the gap's variation across countries. However, it could not explain the determinants of the variation empirically. Hence, this section examines the impact of institutions and countries' socio-economic characteristics on the gap between multidimensional and monetary-based poverty. Bear in mind that institutional factors are our main variable of interest since they are more likely to play a critical role in determining the efficiency of public service provisions in the country (Deolalikar *et al.*, 2002). Hence, they are expected to substantially matter in explaining the gap between multidimensional and monetary poverty. We first focus on the gap between global MPI and the $1.90 a day headcount index in the analysis, concerning that this threshold is the most common measure used in tracking the incidence of global extreme poverty by the World Bank and other international development organizations. Further, we also investigate the impact of institutions and socio-economic variables on the gap between multidimensional and other alternatives of monetary poverty, including those at $3.20 a day, $5.50 a day, and the national poverty line.

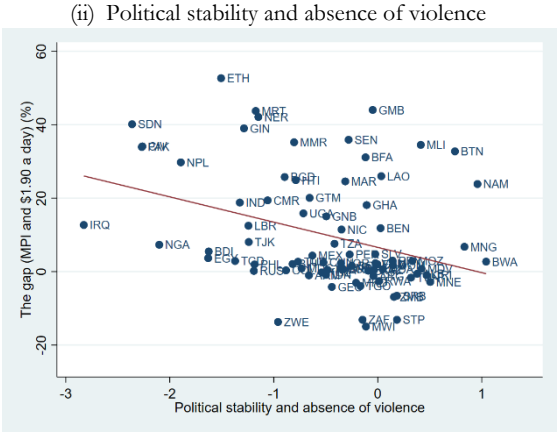
### 4.2.1 The Determinants of the Gap between Multidimensional and $1.90 a Day Poverty

**Figure 4.3**
The Gap between Multidimensional and the $1.90 a Day Poverty Against the Institutional Variables

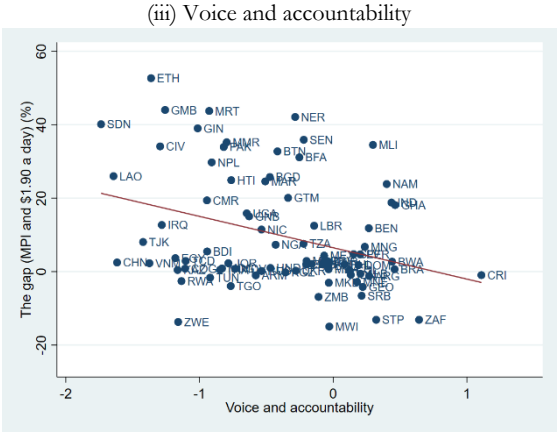
(i) Control of corruption



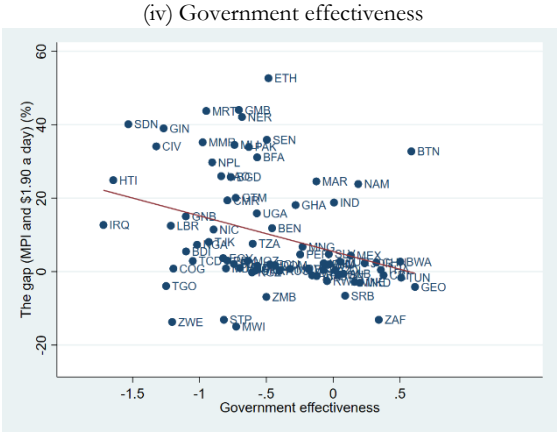

(ii) Political stability and absence of violence



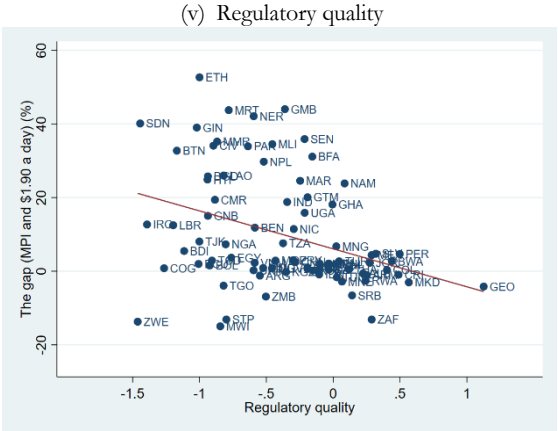

(iii) Voice and accountability



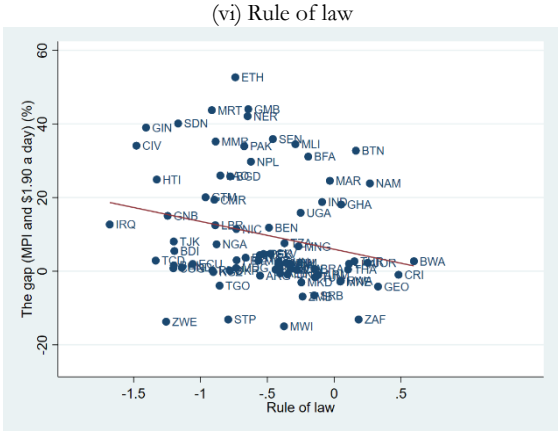

(iv) Government effectiveness




(v) Regulatory quality




(vi) Rule of law




Notes: The red line denotes the fitted values. The figures were built upon the most recent data that have the information on the gap between multidimensional and $1.90 a day income poverty headcount and the most recent data of institutions in the corresponding year.

*Source*: processed by Author using STATA 17.0.

Before investigating the regression analysis results, Figure 4.3 shows the association between the six institutional variables from WGI and the gap between multidimensional and the $1.90 a day headcount index using the most recent data available in the same year. The gap is

negatively correlated to each institutional variable involved in this study. It indicates that countries with better institutions have a lower gap between multidimensional and $1.90 a day income poverty. However, simple plots cannot allow us to infer whether the gap between both measurements of poverty significantly decreases due to better institutions. Hence, we further provide an empirical model analysis using cross-country panel data between 2000 to 2020 to investigate the impact of institutions on the gap between multidimensional and the $1.90 a day poverty.

Table 4.1 reports the result of fixed effect estimates of the impact of institutions and socioeconomic variables on the gap between multidimensional and $1.90 a day headcount index. We first focus on the control of corruption as a measure for institutional variables since plenty of studies have pointed out its essential role in reducing poverty from monetary and multidimensional perspectives (Tebaldi and Mohan, 2000; Asongu and Kodila-Tedika, 2017; Santos *et al.*, 2019), thus indicating its potential role in explaining the gap between those two poverty measurements. As explained in Chapter 3, we conduct the Hausman test to choose between fixed-effect or random-effect model empirically. As shown in Table 4.1, the result of the Hausman test suggests the fixed-effect estimates are mostly preferable for our specifications, at least at a 5% significance level, except for specifications (1), (8), and (9). In this light, we focus on fixed-effect estimates for all specifications in our primary analysis. The result of random-effect estimates is relatively consistent with the fixed-effect estimates in terms of their significance (see Appendix 1). Furthermore, the Wald test shows the presence of heteroscedasticity. Hence, we applied robust standard error for our estimates.

In the regression process, we include additional variables one by one in ten different specifications to assess the robustness of our estimation results, numbered sequentially at the top of each column of the table. As can be seen, the sign for control of corruption variable in the specification (1) to (10) comes out in line with our expectations, which shows a negative and significant effect. Control of corruption seems to play an essential role in explaining the gap, regardless of the change in the control variables involved. In more detail, the analysis starts by examining control of corruption as a standalone explanatory variable as provided in specification (1), which suggests that without controlling for any additional variables, a 1-point increase in the control of corruption index, on average, leads to a 6.059 percent decrease in the gap between multidimensional and $1.90 income poverty. However, its magnitude tends to increase once we gradually include more control variables. In specification (7), for instance, the gap between multidimensional and $1.90 a day headcount index can decrease by around 7.253 percent, on average, with a 1-point increase in the control of corruption index, holding other variables constant. It indicates that control of corruption has a substantial effect in reducing the gap between multidimensional and $1.90 a day poverty. Our finding is supported by other studies (Tebaldi and Mohan, 2010; Asongu and Kodila-Tedika, 2017; Santos *et al.*, 2019), that found the importance of controlling corruption levels for poverty alleviation. A negative sign of the coefficient estimates indicates that control of corruption is more likely to reduce multidimensional poverty faster than $1.90 a day poverty.

As pointed out by Klugman (2002), corruption can distort the composition of public spending, shifting funds from pro-poor programs to infrastructure projects that can give higher payoffs. It means that when it comes to a country with high corruption level, it can be a shortcoming for the poor since the government officials tend to use their public power to obtain private gain. The formulation of public policies related to providing and distributing public goods and services may benefit only the elite or well-connected ones. Eventually, it can disproportionally disadvantage the less fortunate group in terms of difficult access to necessities. Instead, a country with better control of corruption may facilitate a more effective and efficient allocation of public services, allowing individuals to have easier access to basic services. It hence can improve the capacities of people in the country regarding their

education, health, and standard of living, which is fundamental for people to evade multidimensional poverty. By this account, even though control of corruption is expected to reduce poverty from multidimensional and monetary perspectives, it is more likely to help multidimensional poverty alleviation faster, hence reducing the gap between multidimensional and $1.90 a day headcount index.

**Table 4.1**
Fixed-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Income Poverty

| Variable | Specification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Control of corruption | -6.059** | -6.893** | -7.101** | -7.181** | -8.084*** | -7.716*** | -7.253*** | -6.523** | -9.138*** | -8.748*** |
| | (2.702) | (2.855) | (2.840) | (2.829) | (2.956) | (2.751) | (2.677) | (2.657) | (1.866) | (1.865) |
| Ln (GDP pc) | | 4.041 | 4.748 | 3.352 | 5.074 | 5.388 | 4.592 | | 3.291 | |
| | | (5.649) | (5.785) | (5.864) | (5.329) | (5.474) | (5.473) | | (6.958) | |
| Growth (%) | | | 0.277 | 0.260 | 0.168 | 0.184 | 0.169 | 0.161 | 0.142 | 0.140 |
| | | | (0.222) | (0.207) | (0.179) | (0.188) | (0.185) | (0.184) | (0.210) | (0.202) |
| Gov. health expenditure (%) | | | | -0.670** | -0.659** | -0.654** | -0.670** | -0.692** | -0.933*** | -0.951*** |
| | | | | (0.303) | (0.293) | (0.300) | (0.297) | (0.293) | (0.330) | (0.315) |
| Gini coefficient | | | | | -0.440* | -0.468* | -0.481* | -0.456* | -0.448 | -0.438 |
| | | | | | (0.261) | (0.255) | (0.254) | (0.263) | (0.298) | (0.299) |
| Equal access to public services | | | | | | -2.387 | -2.755 | -2.542 | -9.062 | -8.889 |
| | | | | | | (6.206) | (6.278) | (6.317) | (6.654) | (6.606) |
| Urban population (%) | | | | | | | 0.208 | 0.243 | -0.007 | |
| | | | | | | | (0.242) | (0.252) | (0.324) | |
| Ln (Gov. consumption pc) | | | | | | | | | 1.322 | 1.641 |
| | | | | | | | | | (3.892) | (3.224) |
| Constant | 22.38** | -18.94 | -24.71 | -9.811 | -2.792 | -4.042 | -4.404 | 27.58* | 5.261 | 27.61 |
| | (10.17) | (42.44) | (43.33) | (44.23) | (43.84) | (45.09) | (44.47) | (14.78) | (50.20) | (19.95) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 180 | 178 | 178 | 178 | 178 | 178 | 178 | 178 | 155 | 155 |
| **Countries** | 59 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 50 | 50 |
| **$R^2$-within** | 0.414 | 0.393 | 0.408 | 0.443 | 0.465 | 0.467 | 0.470 | 0.467 | 0.446 | 0.445 |
| **$R^2$-between** | 0.076 | 0.012 | 0.033 | 0.023 | 0.016 | 0.038 | 0.006 | 0.072 | 0.120 | 0.191 |
| **$R^2$-overall** | 0.134 | 0.008 | 0.001 | 0.095 | 0.078 | 0.115 | 0.053 | 0.148 | 0.213 | 0.288 |
| **Hausman test[a)]** | 0.242 | 0.000 | 0.000 | 0.000 | 0.004 | 0.020 | 0.037 | 0.139 | 0.097 | 0.045 |
| **Wald test [b)]** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between the multidimensional and $1.90 a day headcount index. [a)] P-value of Hausman test is used to find whether REM or FEM is more appropriate to estimate the model. [b)] P-value of the Wald test is used to indicate the presence of heteroscedasticity before deciding to use the robust (White) standard error.

*Source*: estimated by author using STATA 17.0.

Considering other potential essential factors underlying the variation in the gap between the two poverty measurements, we move our focus to socioeconomic variables. We start with specifications (2) and (3) to investigate the role of GDP per capita and growth in explaining the gap. However, our results found an insignificant impact of those two variables, even after adding other control variables in the rest of the specifications. A conceivable reason is that the poor do not necessarily gain the benefit from growth but rather depending on the level of inequality in the country (Kakwani, 2004; Santos *et al.*, 2019). However, even after controlling income inequality, as presented in the specification (5), the impact of growth remains insignificant. Our finding conveys that economic welfare and growth are likely to have no meaningful role in explaining the gap between multidimensional and $1.90 a day poverty. Interestingly, even though the impact is not significant, the coefficient of growth

shows a positive sign. It supports Tran *et al.* (2015) that claimed growth matters more in reducing monetary poverty than multidimensional poverty, hence may increase the gap between the two poverty measurements.

Moving to the government health expenditure, our finding demonstrates that it plays an essential role in explaining the gap between multidimensional and $1.90 a day poverty. In contrast to Santos *et al.* (2019), which found no significant effect of health expenditure on multidimensional poverty reduction, we found a significant negative impact of public health expenditure on the gap between two poverty measurements at least at a 5 percent significance level, as shown in specifications (4) to (10). It means that accompanying better institutions, the increase in the allocation of government expenditure to health sector could reduce the gap between multidimensional and $1.90 a day poverty. This result indicates that public health expenditure tends to have a more considerable and immediate impact in reducing multidimensional poverty than monetary poverty, which is in agreement with the argument by Tran *et al.* (2015) that sectoral policies can affect non-income dimensions more directly but take some time to affect income poverty. A higher proportion of public health spending indicates that a country could provide a better functioning healthcare system, such as in the form of transfer or subsidies to health insurance beneficiaries, which can directly affect the health outcomes of individuals. Besides, dimensions of well-being are also generally correlated to each other (Tran *et al.*, 2015), for instance, a better state of health may allow individuals to participate in better education and more productive work, hence eventually improve fundamental dimensions of well-being considered in the global MPI.

In terms of the inequality, our result found that the increase in the Gini coefficient can reduce the gap between multidimensional and $1.90 a day income poverty, albeit at a 10% significance level, as shown in specifications (5) to (8). Important to note, after the government expenditure is included in the last two specifications, the Gini coefficient is no longer significant. It is quite possibly because of the restricted sample on government expenditure, which greatly reduces the number of observations, and hence affect the estimates of Gini coefficient. Thus, we only focus on specifications (5) to (8) to investigate the role of income inequality in explaining the gap variable. Specification (7), for instance, shows that a 1-point increase in the Gini coefficient can reduce the gap between multidimensional and $1.90 a day headcount index by around 0.456 percent on average, holding other variables constant. It indicates that the increase in the Gini coefficient could immediately increase income poverty yet does not substantially impact multidimensional poverty, which is in line with Yang and Vizard (2017) that pointed out a stronger correlation between inequality and income poverty than multidimensional poverty. It is somehow not surprising since the Gini coefficient and income poverty are measured from the same distribution of income or consumption expenditure, while global MPI is constructed from other dimensions beyond income. Further, even though insignificant, our finding also shows that once we control for the Gini coefficient, it seems to dampen the effect of growth on the gap between multidimensional and $1.90 a day poverty, as shown by a lower coefficient of growth in the specification (5).

Considering the possible impact of social inclusion in explaining the variation in the gap between multidimensional and $1.90 a day poverty, we now move our focus to equal access to public services. A more equal access to public services by different socio-economic positions is essential to achieve social equality in the country and hence improving the non-income dimensions of well-being proportionally. However, even though the result shows a negative coefficient as we expected, it is insignificant. It implies that social inclusion measured by equal access to public services by socio-economic groups is insufficient to explain the gap between multidimensional and $1.90 a day poverty.

Moving to the level of urbanization, the variable is expected to take part in explaining the variation in the gap between multidimensional and $1.90 a day poverty. Living in rural

areas may increase the chance of people being multidimensionally poor since there is a lack of concern in public services provisions, such as education, health, and infrastructure development (ILO, 2008). In contrast, easier access to public services might be provided in urban areas. Hence, a higher proportion of people living in urban areas is expected to result in a faster decrease in multidimensional poverty incidence, and thus lowering the gap between multidimensional and $1.90 a day headcount index. However, our finding in specification (7) shows that the level of urbanization does not have a significant impact in explaining the gap. Interestingly, even though insignificant, the result shows a positive coefficient. It conveys that a higher proportion of population living in the urban areas might lead to a higher gap between multidimensional and $1.90 a day income poverty. It might be due to a lower living standard in urban areas as a negative impact of rural to urban migration, eventually resulting in higher deprivations of well-being dimensions (Levine *et al.*, 2012; Chen *et al.*, 2019; Salecker *et al.*, 2020). Nevertheless, we also consider that the insignificant result of the urbanization level might be due to the strong correlation of urban population variable to other regressor in the model, in particular the GDP per capita. Hence, we also assess the impact of urbanization on the gap variable without involving the GDP per capita as explanatory variable, as shown in specification (8). Yet, the results show a consistent insignificant impact of urban population. It indicates that our results are not sensitive to the presence of a correlation between urbanization and GDP per capita, allowing us to use specification (7) for some next extended part of the analysis.

Furthermore, we also attempt to assess the impact of government consumption expenditure per capita on the gap between multidimensional and $1.90 a day headcount index. We first add the government expenditure variable in the specification involving all explanatory variables in the study as presented in the specification (9). However, once we include the government expenditure, the significance and size of some other coefficient of estimate seems to be affected. There are two possible reasons. First, it might be due to the limited government expenditure data availability that restricts the number of observations in our regressions, affecting the estimates of other regressors. Second, it might be due to the presence of a strong correlation between government expenditure and other regressors. To address this issue, we dropped two variables strongly correlated to government expenditure, including the GDP per capita and urban population, as presented in specification (10).

Our finding shows that government expenditure per capita has insignificant impact on the gap between multidimensional and $1.90 a day poverty. It indicates that increased government expenditure per capita does not necessarily translate into better well-being outcomes. One possible explanation is that the country's government consumption expenditure is not effectively spent to improve the well-being of the poor, for instance, due to mistargeted transfers or subsidies (Anderson *et al.*, 2018). Another explanation is related to the broad coverage of government expenditure variable, and thus the composition of the spending is essential to explain its impact on poverty reduction (Chude *et al.*, 2019), whether it is more likely to be allocated to health and education facilities, infrastructure development, subsidies, and other social expenditures that improve the welfare of people, or to other fiscal policy that might not impact directly on education, health, and living standard outcomes. Hence, it cannot significantly reduce the gap between multidimensional and $1.90 a day poverty.

### 4.2.2 The Determinants of the Gap between Multidimensional and $1.90 a Day Poverty, Controlling for Income Poverty

Important to note that a major concern in using difference as the proxy for the gap between multidimensional and income poverty is that difference does not distinguish those having a similar gap between countries but with a different level of poverty. For instance, one country might have a ten percent difference, with relatively high incidence of multidimensional and income poverty of 60 and 50 percent, respectively. In contrast, another country with the same value of a ten percent difference might have a relatively low poverty level, such as 20 percent of multidimensional poverty and 10 percent of income poverty. In this light, it is essential to assess how controlling for income poverty affects our estimates' coefficient, particularly the control of corruption (see Appendix 2). After controlling the income poverty level, the results demonstrate that the control of corruption variable remains significant and negatively affects the gap. Similarly, health expenditure and the Gini coefficient have a negative sign, even though they turn out to be insignificant. It, again, suggests that control of corruption plays a critical role in explaining the variation in the gap between both poverty measurements, regardless of the country's income poverty level. Hence, employing a broader strategy by involving the improvement in institutional quality, particularly better control of corruption level, is needed to support targeted poverty alleviation to be more effective and meaningful for improving non-income dimensions.

### 4.2.3 Comparing the Impact of Institutional Variables on the Gap between Multidimensional and $1.90 a Day Poverty

Two previous subsections have assessed the impact of the control of corruption on the gap between multidimensional and $1.90 a day headcount index. However, since a growing body of literature has also suggested an essential role of institutional quality besides control of corruption in poverty reduction, in this subsection, we regress other indicators of institutions from WGI and the constructed institutional PCA index on the gap between multidimensional and $1.90 a day poverty. We replicate the same specification as in Table 4.1 column (7) and (10) to accommodate all potential underlying variables in the analysis.

As shown in Table 4.2, aside from control of corruption, other institutional factors do not significantly affect the gap, except for the institutional PCA index in column (14). It confirms the essential role of control of corruption among institutional variables in explaining the gap between multidimensional and $1.90 a day poverty. Reflecting on this result, there might be some possible reasons that make the control of corruption matters most among institutional factors included in the analysis. It might be the case that corruption is the most prominent issue in many developing countries that can hinder socioeconomic development, hence controlling corruption can be an effective way to combat poverty. Countries with a high level of corruption tend to leave the poor deprived of their essential needs since the public policy formulation might only disproportionally benefit people in power, for instance, in terms of the allocation of public funds and the provision of public goods and services. Once the corruption is better controlled, the policy formulation might be more pro-poor, allowing more proportional accessibility to basic needs, such as education, medical care, nutritious food, and access to adequate water and sanitation. It eventually could effectively improve the individuals' well-being dimensions beyond income. However, it is noteworthy that it might also be the case that the impact of other institutional factors on poverty reduction is possibly indirect. For instance, political stability is known to have an interdependent relationship with the corruption level in the country (Khan and Farooq, 2019), indicating that it might indirectly impact the gap between the two poverty measurements. However, further study is needed to confirm this issue.

**Table 4.2**

Comparison of Fixed-Effect Estimates of Institutional Impact
on the Gap between Multidimensional and $1.90 a Day Poverty Headcount Index

| Variable | Specification | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| Control of corruption | -7.253*** | -8.748*** | | | | | | | | | | | | |
| | (2.677) | (1.865) | | | | | | | | | | | | |
| Political stability and no violence | | | -1.560 | -1.669 | | | | | | | | | | |
| | | | (1.885) | (1.698) | | | | | | | | | | |
| Voice and accountability | | | | | -2.857 | -2.906 | | | | | | | | |
| | | | | | (3.068) | (3.533) | | | | | | | | |
| Government effectiveness | | | | | | | 1.199 | -0.055 | | | | | | |
| | | | | | | | (4.480) | (4.115) | | | | | | |
| Regulatory quality | | | | | | | | | -2.449 | -4.542 | | | | |
| | | | | | | | | | (4.371) | (3.689) | | | | |
| Rule of law | | | | | | | | | | | -2.637 | -6.039 | | |
| | | | | | | | | | | | (4.716) | (4.014) | | |
| Institutional PCA index | | | | | | | | | | | | | -1.272 | -1.897** |
| | | | | | | | | | | | | | (1.220) | (0.868) |
| Ln (GDP pc) | 4.592 | | 0.453 | | 0.247 | | -1.587 | | 1.216 | | 0.205 | | 2.939 | |
| | (5.473) | | (6.374) | | (6.036) | | (6.672) | | (6.528) | | (5.910) | | (6.464) | |
| Growth (%) | 0.169 | 0.140 | 0.197 | 0.123 | 0.181 | 0.124 | 0.178 | 0.107 | 0.150 | 0.102 | 0.147 | 0.0660 | 0.154 | 0.111 |
| | (0.185) | (0.202) | (0.199) | (0.212) | (0.192) | (0.215) | (0.190) | (0.208) | (0.185) | (0.206) | (0.189) | (0.202) | (0.183) | (0.202) |
| Gov. health expenditure | -0.670** | -0.951*** | -0.627** | -0.812** | -0.712** | -0.902*** | -0.690** | -0.858** | -0.658** | -0.875** | -0.680** | -0.900*** | -0.649** | -0.881*** |
| | (0.297) | (0.315) | (0.277) | (0.312) | (0.294) | (0.330) | (0.297) | (0.340) | (0.294) | (0.327) | (0.300) | (0.324) | (0.293) | (0.313) |
| Gini coefficient | -0.481* | -0.438 | -0.471* | -0.293 | -0.402 | -0.263 | -0.424 | -0.263 | -0.432 | -0.339 | -0.410 | -0.243 | -0.439* | -0.341 |
| | (0.254) | (0.299) | (0.270) | (0.304) | (0.269) | (0.307) | (0.269) | (0.312) | (0.267) | (0.317) | (0.263) | (0.294) | (0.262) | (0.295) |
| Equal access to public services | -2.755 | -8.889 | -5.212 | -10.66 | -5.505 | -11.25 | -5.697 | -11.11 | -4.686 | -11.49 | -5.010 | -11.43 | -4.107 | -10.31 |
| | (6.278) | (6.606) | (6.499) | (7.323) | (6.401) | (7.108) | (6.354) | (7.183) | (7.141) | (7.582) | (6.866) | (7.525) | (7.031) | (7.606) |
| Urban population (%) | 0.208 | | 0.324 | | 0.280 | | 0.373 | | 0.332 | | 0.330 | | 0.261 | |
| | (0.242) | | (0.307) | | (0.320) | | (0.306) | | (0.286) | | (0.279) | | (0.262) | |
| Ln (Gov. consumption pc) | | 1.641 | | -1.329 | | -0.920 | | -1.250 | | 0.270 | | 0.0371 | | 0.692 |
| | | (3.224) | | (3.188) | | (2.969) | | (2.924) | | (3.061) | | (2.855) | | (3.216) |
| Constant | -4.404 | 27.61 | 23.49 | 38.60* | 24.02 | 35.87* | 36.36 | 38.17* | 16.26 | 32.24* | 22.09 | 26.98 | 7.379 | 32.74* |
| | (44.47) | (19.95) | (47.00) | (19.86) | (45.63) | (19.60) | (51.65) | (20.44) | (49.14) | (19.18) | (45.74) | (18.20) | (48.51) | (19.21) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 178 | 155 | 178 | 155 | 178 | 155 | 178 | 155 | 178 | 155 | 178 | 155 | 179 | 159 |
| **Countries** | 58 | 50 | 58 | 50 | 58 | 50 | 58 | 50 | 58 | 50 | 58 | 50 | 59 | 54 |
| **$R^2$-within** | 0.470 | 0.445 | 0.438 | 0.384 | 0.438 | 0.382 | 0.434 | 0.376 | 0.438 | 0.394 | 0.438 | 0.403 | 0.446 | 0.411 |
| **$R^2$-between** | 0.006 | 0.191 | 0.048 | 0.268 | 0.084 | 0.252 | 0.053 | 0.256 | 0.029 | 0.236 | 0.046 | 0.211 | 0.023 | 0.282 |
| **$R^2$-overall** | 0.053 | 0.288 | 0.122 | 0.352 | 0.164 | 0.332 | 0.118 | 0.334 | 0.092 | 0.324 | 0.112 | 0.296 | 0.093 | 0.336 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.

*Source*: estimated by author using STATA 17.0

### 4.2.4 Cross-sectional Model Analysis on the Annual Change in the Gap between Multidimensional and $1.90 a Day Poverty

Important to bear in mind that what may matter is not only the gap, but also whether the gap size changes or reduces over time. Our former analysis allows us to assess the impact of institutions and socioeconomic variable on the gap between multidimensional and $1.90 a day poverty yet could not allow us to investigate whether they are also matter on the change in the gap size over time. Hence, in this study, we also investigate the impact of institutional quality alongside countries' socio-economic characteristics on the annual change in the gap between multidimensional and $1.90 a day poverty by applying OLS regression estimates on the average annual change on the gap variable, as presented in Appendix 3. We, again, replicate the specification (7) and (10) in Table 4.1. Pertaining to our previous result that pointed out the importance of control of corruption and institutional in explaining the gap between multidimensional and $1.90 a day poverty, we only focus on control of corruption and institutional PCA index for the measure of institutions. Unfortunately, most annual changes in the gap between multidimensional and $1.90 a day income poverty remain unexplained, shown by the insignificance result of our estimates.

### 4.2.5 The Determinants of the Gap between Multidimensional and Other Three Alternatives of Monetary Poverty ($3.20 a Day, $5.50 a Day, and the National Poverty Line)

Tables 4.1 to 4.2 allow us to investigate the impact of institutional and socioeconomic variables on the gap between multidimensional and monetary poverty. However, it only focused on the $1.90 a day threshold. Hence, to enrich the analysis, we also investigate the impact of multidimensional and monetary poverty at three other alternatives threshold, including $3.20 a day, $5.50 a day, and the national poverty line. In this regard, we replicate the specification (7) and (10) in Table 4.1.

In line with the result in Table 4.1, the estimates in Table 4.3 show that corruption control has a significant impact in explaining the gap between multidimensional and two higher thresholds of the World Bank income poverty line, the $3.20 and $5.50 a day. Interestingly, the coefficient magnitude increases at higher poverty line thresholds. It indicates that better control of corruption may have a greater impact on improving the well-being of people in higher income groups, thereby reducing the gap between multidimensional and monetary poverty more rapidly. Similarly, GDP per capita is significant and seems to have a greater impact at higher poverty line thresholds. It might be because it is easier to lift people out from income poverty at a higher threshold than from extreme poverty. Hence, since increased GDP per capita is less substantial for multidimensional poverty reduction (Akanbi, 2015), a faster reduction in income poverty at a higher threshold could result in a higher gap between multidimensional and monetary poverty. On the other hand, the impact of control of corruption and GDP per capita on the gap between multidimensional and the national poverty line is less substantial.

Further, growth seems to be significant only in explaining the gap between multidimensional and the national poverty line, but with a less robust result since different specifications show different significance, as shown in columns (5) and (6). Moreover, public health spending and income inequality levels significantly affect the gap between multidimensional and monetary poverty, depending on the level of poverty lines. Public health spending, for instance, seems to be more substantial in reducing the gap between multidimensional and $3.20 a day poverty, while the Gini coefficient is more likely to matter in reducing the gap between multidimensional and national poverty line.

**Table 4.3**
Fixed-Effect Estimates on The Gap between Multidimensional and Three Alternatives of Monetary Poverty ($3.20, $5.50 a Day, and the National Poverty Line)

| Variables | $3.20 a day Poverty Line | | $5.50 a day Poverty Line | | National Poverty Line | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Control of corruption | -13.58** | -10.29** | -18.25** | -13.00* | -3.263 | -7.707 |
| | (5.337) | (4.770) | (6.889) | (6.577) | (4.788) | (4.851) |
| Ln (GDP pc) | 19.77** | | 31.75*** | | 18.86* | |
| | (7.675) | | (8.024) | | (9.676) | |
| Growth (%) | 0.167 | -0.073 | -0.015 | -0.378 | 0.378 | 0.611** |
| | (0.284) | (0.305) | (0.371) | (0.397) | (0.250) | (0.292) |
| Gov. health expenditure (%) | -0.790** | -1.182*** | -0.184 | -0.631 | -0.348 | -0.725* |
| | (0.349) | (0.329) | (0.403) | (0.387) | (0.357) | (0.380) |
| Gini coefficient | -0.563* | -0.432 | -0.908** | -0.697 | -1.108*** | -1.144** |
| | (0.322) | (0.386) | (0.417) | (0.489) | (0.401) | (0.461) |
| Equal access to public services | 1.725 | -5.551 | 7.992 | 0.204 | -6.219 | -14.56 |
| | (6.990) | (7.946) | (8.158) | (9.653) | (7.357) | (10.00) |
| Urban population (%) | -0.423 | | -0.334 | | 0.787* | |
| | (0.417) | | (0.526) | | (0.444) | |
| Ln (Gov. consumption pc) | | -3.203 | | -3.420 | | 13.55** |
| | | (5.763) | | (7.193) | | (6.555) |
| Constant | -109.5* | 37.24 | -210.5*** | 25.95 | -145.4** | -35.72 |
| | (62.53) | (32.02) | (62.35) | (38.61) | (68.74) | (34.28) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 178 | 155 | 178 | 155 | 106 | 94 |
| **Countries** | 58 | 50 | 58 | 50 | 35 | 33 |
| **Hausman test**[a)] | 0.000 | 0.013 | 0.000 | 0.008 | 0.000 | 0.000 |
| **Wald test**[b)] | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **$R^2$-within** | 0.554 | 0.506 | 0.492 | 0.431 | 0.645 | 0.628 |
| **$R^2$-between** | 0.001 | 0.000 | 0.002 | 0.021 | 0.306 | 0.049 |
| **$R^2$-overall** | 0.063 | 0.015 | 0.009 | 0.006 | 0.209 | 0.004 |

Note: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and monetary-based poverty ($3.20 a day, $5.50 a day, and the national poverty line). a) P-value of Hausman test is used to find whether REM or FEM is more appropriate to estimate the model. b) P-value of the Wald test is used to indicate the presence of heteroscedasticity before deciding to use the robust (White) standard error.
*Source*: estimated by author using STATA 17.0.

The rest of the variables, including equal access to public services, urbanization level, and government consumption, seem to matter less in explaining the gap between multidimensional and monetary poverty, even at different poverty line thresholds. For instance, the urban population significantly and positively affects the gap between multidimensional and the national poverty line, but only at a 10 percent level of significance. However, it conveys that increased urbanization levels can lead to a higher gap between multidimensional and monetary poverty, at the national poverty line threshold. As mentioned previously, a lower living standard in urban areas might occur due to a negative impact of rural-to-urban migration (Levine *et al.*, 2012). It then might generate more people to experience deprivations in basic needs such as health and education, ultimately increasing the gap between multidimensional and monetary poverty. Notably, our finding generally indicates that the role of institutions and socioeconomic characteristics on the gap between multidimensional and monetary poverty is sensitive to the choice of the poverty line thresholds. It signifies that when the poverty reduction policy formulation is built upon the monetary-based poverty one, it is essential to consider some thresholds of poverty lines.

### 4.2.6 The Relative Contribution of Institutions and Socioeconomic Variables

Tables 4.1 to 4.3 allow us to assess the impact of institutions and socioeconomic variables on the gap between multidimensional and monetary poverty. However, it does not enable us to reveal which factors have relatively the greatest impact in explaining the gap. One measure that might allow us to assess the relative contribution of each regressor on the dependent variable is the standardized coefficient obtained from the standardized variables (Gujarati and Porter, 2009).

After standardizing variables in our study and applying fixed effect regression, we obtained the standardized coefficient of estimates for each explanatory variable on the gap between multidimensional and monetary poverty at four different levels of poverty lines ($1.90, $3.20, $5.50 a day, and the national poverty line), shown in Appendix 4. The results revealed that the size varies depending on the income poverty threshold chosen. For instance, among significant variables, the control of corruption appears to have the greatest impact on the gap between multidimensional and monetary poverty at the $1.90 a day threshold. If corruption control increases by one standard deviation, the gap between the multidimensional and $1.90 a day headcount index reduce by around 0.230 standard deviations on average. However, the second specification in column (2) yields an ambiguous result since it indicates that health expenditure has the greatest impact. Still, it may be due to the restricted sample once the government consumption variable is included, changing the size of other variables' coefficients. However, when it comes to a higher poverty line threshold, our finding underpinned that GDP per capita is more likely to have the most considerable impact, followed by corruption control. This finding demonstrates the importance of corruption control and GDP per capita in explaining the gap between multidimensional and monetary poverty.

## 4.3 The Determinants of the Gap between Multidimensional and $1.90 a Day Poverty by Country Income Groups

As pointed out by Sachs *et al.* (2004), the stage of development might determine the association between institutions and poverty in the country. Hence, it is essential to investigate the impact of institutions on our dependent variable in different country income groups. To assess whether the impact of institutions on the gap between multidimensional and $1.90 headcount index differs between income groups, we distinguish countries into two groups and regress the same specification as in Table 4.1 columns (7) and (10). We group them into low-income and lower-middle-income group and upper-middle-income group. We combine low-income and lower-middle-income countries in one group considering the limited number of observations and that those countries have relatively similar characteristics in terms of their gaps, institutional quality, and socioeconomic condition, indicating a similar development stage. For instance, on average, those classified as low-income and lower-middle-income groups have lower quality of institutions, lower urbanization levels, and more unequal access to public services than upper-middle-income groups (see Tables 3.4 to 3.6). In this section, we only focus on corruption control and institutional PCA index as the measure of institutions since they seem to significantly impact the gap between multidimensional and $1.90 a day poverty, as found in Tables 4.1 and 4.2.

Similar to the result from Table 4.1, Table 4.4 shows that even after separately regressing control of corruption on the gap between multidimensional and $1.90 a day poverty in different income groups, it consistently has a negative sign, as shown in column (1)-(2) and (5)-(6). However, the impact seems more meaningful in upper-middle-income groups. For instance, comparing the same specification as in columns (1) and (5), control of corruption is

found to be significant only in upper-middle-income groups. As shown in column (5), a 1-point increase in the control of corruption index reduces the gap between multidimensional and $1.90 a day headcount index in upper-middle-income countries by around 7.804 percent, on average, at a 5 percent level of significance. This finding is partially supported by Jindra and Vaz (2019), which found that better governance is associated with lower multidimensional poverty in middle-income country groups, yet not in low-income groups. It could be due to the resources in the country being too low to allow good institutions to generate positive outcomes for poverty reduction.

**Table 4.4**
Fixed-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Poverty by Country Income Group

| Variable | Low income and lower middle income groups | | | | Upper middle income groups | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Control of corruption | -5.210 | -8.433*** | | | -7.804** | -11.37** | | |
| | (3.104) | (2.778) | | | (2.809) | (4.612) | | |
| Institutional PCA index | | | -1.378** | -2.528*** | | | -1.077 | -1.669 |
| | | | (0.663) | (0.734) | | | (0.640) | (1.178) |
| Ln (GDP pc) | -10.52 | | -9.627 | | 2.514 | | -1.145 | |
| | (7.473) | | (7.657) | | (4.656) | | (5.274) | |
| Growth (%) | 0.504** | 0.538** | 0.481** | 0.528** | -0.564*** | -0.477** | -0.547** | -0.400 |
| | (0.219) | (0.224) | (0.216) | (0.223) | (0.196) | (0.200) | (0.229) | (0.266) |
| Gov. health expenditure (%) | -1.054*** | -1.066** | -1.078*** | -1.041** | -0.050 | -0.197 | -0.174 | -0.215 |
| | (0.371) | (0.461) | (0.345) | (0.400) | (0.256) | (0.361) | (0.243) | (0.366) |
| Gini coefficient | -0.436 | -0.565 | -0.396 | -0.521 | 0.049 | -0.084 | 0.109 | 0.017 |
| | (0.437) | (0.435) | (0.400) | (0.377) | (0.198) | (0.360) | (0.231) | (0.358) |
| Equal access to public services | -17.99*** | -19.95*** | -19.16*** | -22.94*** | 16.63*** | 13.29** | 14.31*** | 12.07* |
| | (5.628) | (5.791) | (5.749) | (6.035) | (2.887) | (4.969) | (3.520) | (6.058) |
| Urban population (%) | -0.367 | | -0.355 | | 0.239 | | 0.324 | |
| | (0.416) | | (0.396) | | (0.172) | | (0.238) | |
| Ln (Gov. consumption pc) | | 2.051 | | 2.829 | | 5.346 | | -1.136 |
| | | (2.632) | | (2.765) | | (5.525) | | (4.552) |
| Constant | 104.2* | 20.83 | 99.28 | 21.35 | -28.74 | -21.50 | -1.706 | 17.12 |
| | (57.42) | (21.73) | (60.44) | (19.20) | (33.81) | (46.26) | (36.62) | (39.62) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 109 | 93 | 110 | 95 | 69 | 62 | 69 | 64 |
| **Countries** | 37 | 32 | 38 | 34 | 21 | 18 | 21 | 20 |
| **$R^2$-within** | 0.701 | 0.681 | 0.702 | 0.692 | 0.818 | 0.761 | 0.781 | 0.693 |
| **$R^2$-between** | 0.097 | 0.162 | 0.102 | 0.171 | 0.179 | 0.144 | 0.205 | 0.115 |
| **$R^2$-overall** | 0.113 | 0.279 | 0.118 | 0.259 | 0.015 | 0.012 | 0.017 | 0.004 |
| **Hausman test[a)]** | 0.186 | 0.000 | 0.002 | 0.038 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Wald test [b)]** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.

*Source*: estimated by author using STATA 17.0.

Interestingly, despite our finding highlighting a more meaningful impact of corruption control in the low-income and lower-middle-income groups, a contradictory result is shown when it comes to the impact of a general institutional index measured by the PCA. Focusing on columns (3) and (7), for instance, a 1-point increase in institutional PCA index reduces the gap between multidimensional and $1.90 a day headcount index in low-income and lower-middle-income groups, on average, by around 1.378 percent. At the same time, the impact is insignificant in upper-middle-income groups. It indicates that countries in low-

income and lower-middle-income groups could benefit more from a profound transformation of institutions rather than relying merely on one institutional factor. This finding conveys the importance of the transformation in entire institutions in improving multiple dimensions of well-being beyond income to combat poverty in low-income and lower-middle-income countries.

Moving to the socioeconomic variables, the GDP per capita have no significant impact in explaining the gap between multidimensional and $1.90 a day poverty in both groups. However, in terms of growth, it turns out to have considerable contribution in explaining the gap once we regress it separately in different income groups. Yet, the direction of the coefficient seems ambiguous. In low-income and lower-middle-income groups, the increase in growth significantly lead to a higher gap between multidimensional and $1.90 a day poverty, while in upper-middle-income groups, it is more likely to decrease the gap. It indicates that the increase in growth in low-income and lower-middle-income groups is insufficient to improve individuals' well-being and might only affect the reduction in income poverty, and thus increasing the gap between the two poverty measurements. On the other hand, a negative and significant coefficient of growth in upper-middle-income groups suggests that growth might simultaneously benefit the non-income dimensions of well-being alongside the increase in income.

Pertaining to government health expenditure, our finding demonstrates its significant role in explaining the gap in low-income and lower-middle-income groups while insignificantly affecting the gap in upper-middle-income groups. Focusing on column (1), for instance, a 1-percent increase in the proportion of public health expenditure reduces the gap between multidimensional and $1.90 a day headcount index in low-income and lower-middle-income groups by around 1.054, on average, holding other variables constant. It is worth noting that lower-middle-income countries tend to have lower healthcare capacities, such as insufficient health infrastructure and insurance (Andrews *et al.*, 2012). Hence, a higher proportion of public spending targeted at the health sector might matter for a country to improve the capacities of its healthcare services, and eventually improve the health outcomes of individuals effectively, reducing the gap between the multidimensional and $1.90 day headcount index. In terms of income inequality, it becomes insignificant once we investigate its impact in different income groups.

On the other hand, the social inclusion measured by equal access to public services turns out to be an essential factor in explaining the gap between the two poverty measurements. However, our finding shows contradictory results between different income groups. In low-income and lower-middle-income groups, equitable distribution of public services by socioeconomic positions may lead to a lower gap between multidimensional and $1.90 a day headcount index, while in upper-middle-income groups, it increases the gap. A possible explanation is that discrimination in accessing public services by socioeconomic position is still a primary issue in the former income groups. For instance, social insurance programs in low-income countries often cover only those working in the public and formal sectors (Andrews *et al.*, 2012), leaving other groups lacking access to those necessities. Hence, an equal distribution of public services through socioeconomic position in low-income and lower-income groups may substantially improve multiple well-being outcomes and, eventually, reduce the gap between multidimensional and monetary poverty.

On the contrary, the discrimination in public services access by socioeconomic position might matter less in upper-middle-income countries. Hence, they might only gain a small benefit from it to improve well-being outcomes besides income. However, it is worth noting that our variable can only capture equal access to public services by socioeconomic position, such as occupation background, education level, or any other economic circumstances. Thus, it could not necessarily explain the impact of discrimination in public services distribution

by other factors, such as gender or ethnicity. However, our finding indicates that ensuring equal distribution of public services through socioeconomic positions in low-income and lower-middle-income countries is essential to combat poverty more rapidly from a broader perspective.

Moving to the level of urbanization, we expect that living in an urban area might allow individuals to have better access to fundamental needs such as education, healthcare services, adequate water, and electricity, regardless of their countries' income groups. However, we found no significant impact of the urban population in explaining the gap between the multidimensional and $1.90 a day headcount index. Similarly, government expenditure per capita is found to have no significant impact in explaining the gap between those two poverty measurements in both income groups.

In general, our finding suggests that institutional quality, especially control of corruption, is critical to reducing the gap between multidimensional and monetary poverty in both income groups. Hence, employing a broader strategy of institutional transformations to support poverty alleviation is essential alongside social and economic interventions.

# Chapter 5
# Conclusions and Recommendations

## 5.1 Conclusions

This study suggested that the gap between multidimensional and monetary poverty varies across countries. It is characterized mainly by a higher incidence of multidimensional than monetary poverty, at a $1.90 a day poverty line threshold. It implied that individuals could live above the $1.90 a day threshold but still deprive in multiple dimensions of well-being beyond income. However, when it comes to the gap between multidimensional and the other three alternatives of monetary poverty lines, we found a different pattern. The incidence of poverty based on global MPI tends to be lower than the other two higher World Bank poverty lines, at $3.20 and $5.50 a day. Meanwhile, the gap is more likely to scatter when we use the national poverty line as a measure for monetary poverty. A higher percentage of multidimensional than $1.90 a day poverty is concentrated in low-income and lower-middle-income countries, indicating a low level of public service provisions in those income groups.

Applying fixed-effect panel data regression analysis, we found that control of corruption, alongside health expenditure and income inequality, substantially explains the gap between multidimensional and the $1.90 a day poverty. Better corruption control in the country leads to a lower gap between multidimensional and $1.90 a day headcount index, while other institutions' indicators have insignificant impacts. It might be the case that corruption is the most prominent issue in most developing countries, hence controlling corruption might matter more for better allocation of education, health, and infrastructure, improving non-income dimensions of well-being. However, it might also be the case that the impact of other institutional factors is possibly indirect. Further, this study also found a negative and significant effect of control of corruption on the gap between multidimensional and monetary poverty at a higher level of the poverty line. Interestingly, when it comes to a higher threshold of income poverty, GDP per capita turns out to take part as well in explaining the gap.

Investigating further the impact of institutions in the low-income and lower-middle-income groups and in the upper-middle-income groups, this study found that better corruption control is associated with a lower gap between multidimensional and $1.90 a day poverty in both groups. Nonetheless, it is likely to matter more in upper-middle-income groups. However, when it comes to the general institutional index, constructed from six institutional indicators using principal component analysis, this study found contradictory results. A weighted measure of institutions significantly affects the gap only in the low-income and lower-middle-income groups. It indicates that countries in the low-income and lower-middle-income groups might benefit more in improving people's well-being from profound transformations of entire institutions, rather than relying only on one aspect of institutional quality, still, without leaving other socioeconomic interventions, such as more efficient allocation of public health expenditure and equal distribution of public services in the country.

To conclude, our research confirms that institutions play a critical role in explaining the gap between multidimensional and monetary poverty. While control of corruption is more likely to take an essential part in reducing the gap in upper-middle-income countries, the general index of institutions plays a critical role in low-income and lower-middle-income countries. Therefore, the formulation of poverty reduction policy focusing merely on the social and economic interventions without considering the country's institutional quality might not necessarily allow individuals, with and without sufficient income, to improve their well-being dimensions beyond income.

## 5.2 Policy Recommendations

Based on the research findings, this study comes up with two main policy recommendations. First, given that the $1.90 a day poverty line could not fully depict the multifaceted of poverty from various dimensions, this study suggests that the policy formulation related to poverty reduction needs to be completed with the capability-based multidimensional poverty measurement. On this account, it can help to support poverty alleviation programs to be more effectively targeted from an income and multidimensional perspective. Second, considering the importance of better control of corruption and institutions in general in reducing the gap between multidimensional and monetary poverty, institutional reforms should be considered as a broader strategy to combat poverty, along with social and economic interventions. It is due to the potential role of better-quality institutions in improving individuals' standard of living, education, and health outcomes more rapidly.

## 5.3 Limitations and Future Studies

This research has some limitations. First, given the nature of our data, we only focused on the aggregate value of poverty using the headcount index at the country level. The use of headcount index at the country level cannot allow us to analyze the transitions of individuals moving in or out of poverty and does not necessarily depict the depth of poverty. Second, to ensure the availability of sufficient data, we estimated some missing data points of income poverty in the same year of multidimensional poverty using linear interpolation. Hence, this study assumed that the income poverty data lie on the linear line joining the closest two data points. Third, due to the limitation in data availability, we ended up with variables underlying poverty reduction that the data mostly available in the same year as our dependent variable, although there might be other potential variables explaining our dependent variable.

Given our limitations, some areas can be considered for future research. First, besides the headcount index, further studies can consider the depth of poverty in the analysis to assess the gap between poverty depth based on multidimensional and monetary measurements. Second, we suggest exploring more potential explanatory variables to explain the gap between multidimensional and monetary poverty, especially those related directly to social policy, such as gender or ethnicity inclusion in public services. Lastly, considering the periodic update of the World Bank poverty line threshold, we suggest that future extended studies utilize the latest update of the extreme poverty line, in this case, the $2.15 a day poverty line, to analyze the gap between multidimensional and monetary poverty.

# Appendices

**Appendix 1**
Random-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Income Poverty

| Variable | Specification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Control of corruption | -6.841*** | -5.685** | -5.767** | -5.734** | -5.839** | -4.944* | -7.253*** | -6.523** | -9.138*** | -8.748*** |
| | (2.114) | (2.488) | (2.500) | (2.533) | (2.643) | (2.680) | (2.677) | (2.657) | (1.866) | (1.865) |
| Ln (GDP pc) | | -4.781** | -4.754** | -3.417 | -3.003 | -1.917 | 4.592 | | 3.291 | |
| | | (2.304) | (2.307) | (2.350) | (2.296) | (2.370) | (5.473) | | (6.958) | |
| Growth (%) | | | 0.211 | 0.192 | 0.138 | 0.154 | 0.169 | 0.161 | 0.142 | 0.140 |
| | | | (0.223) | (0.206) | (0.192) | (0.190) | (0.185) | (0.184) | (0.210) | (0.202) |
| Gov. health expenditure | | | | -0.655*** | -0.624*** | -0.585** | -0.670** | -0.692** | -0.933*** | -0.951*** |
| | | | | (0.233) | (0.223) | (0.229) | (0.297) | (0.293) | (0.330) | (0.315) |
| Gini coefficient | | | | | -0.239 | -0.345* | -0.481* | -0.456* | -0.448 | -0.438 |
| | | | | | (0.177) | (0.189) | (0.254) | (0.263) | (0.298) | (0.299) |
| Access to public services | | | | | | -3.830* | -2.755 | -2.542 | -9.062 | -8.889 |
| | | | | | | (2.282) | (6.278) | (6.317) | (6.654) | (6.606) |
| Urban population (%) | | | | | | | 0.208 | 0.243 | -0.007 | |
| | | | | | | | (0.242) | (0.252) | (0.324) | |
| Ln (Gov. consumption pc) | | | | | | | | | 1.322 | 1.641 |
| | | | | | | | | | (3.892) | (3.224) |
| Constant | 22.22** | 47.25** | 46.68** | 41.44** | 49.11** | 45.54** | -4.404 | 27.58* | 5.261 | 27.61 |
| | (9.688) | (18.84) | (18.86) | (18.64) | (20.15) | (20.03) | (44.47) | (14.78) | (50.20) | (19.95) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 180 | 178 | 178 | 178 | 178 | 178 | 178 | 178 | 155 | 155 |
| **Countries** | 59 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 50 | 50 |
| **$R^2$-within** | 0.411 | 0.379 | 0.392 | 0.434 | 0.449 | 0.452 | 0.470 | 0.467 | 0.446 | 0.445 |
| **$R^2$-between** | 0.093 | 0.222 | 0.211 | 0.214 | 0.210 | 0.249 | 0.006 | 0.072 | 0.120 | 0.191 |
| **$R^2$-overall** | 0.146 | 0.211 | 0.208 | 0.236 | 0.242 | 0.296 | 0.053 | 0.148 | 0.213 | 0.288 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.
*Source*: estimated by author using STATA 17.0.

**Appendix 2**

Fixed-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Poverty Headcount Index, Controlling for Income Poverty

| Variables | Specification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** |
| Control of corruption | -6.745* | -6.995* | -7.049** | -7.096** | -7.416** | -6.918** | -6.630** | -6.473** | -7.804*** | -7.913*** |
| | (3.485) | (3.531) | (3.517) | (3.522) | (3.511) | (3.294) | (3.260) | (3.173) | (2.346) | (2.362) |
| Ln (GDP pc) | | 0.704 | 0.947 | 0.365 | 1.067 | 1.463 | 0.983 | | -0.603 | |
| | | (4.168) | (4.165) | (4.216) | (4.014) | (4.003) | (4.354) | | (6.104) | |
| Growth (%) | | | 0.074 | 0.075 | 0.049 | 0.070 | 0.061 | 0.059 | 0.040 | 0.043 |
| | | | (0.164) | (0.161) | (0.145) | (0.151) | (0.152) | (0.149) | (0.171) | (0.162) |
| Gov. health expenditure | | | | -0.371 | -0.377 | -0.369 | -0.380 | -0.384 | -0.584** | -0.580** |
| | | | | (0.245) | (0.244) | (0.255) | (0.257) | (0.252) | (0.264) | (0.256) |
| Gini coefficient | | | | | -0.154 | -0.190 | -0.200 | -0.193 | -0.230 | -0.231 |
| | | | | | (0.230) | (0.213) | (0.215) | (0.222) | (0.221) | (0.222) |
| Equal access to public services | | | | | | -3.207 | -3.434 | -3.392 | -10.92 | -10.93* |
| | | | | | | (6.115) | (6.236) | (6.252) | (6.579) | (6.498) |
| Urban population (%) | | | | | | | 0.131 | 0.139 | 0.016 | |
| | | | | | | | (0.264) | (0.254) | (0.336) | |
| Ln (Gov. consumption pc) | | | | | | | | | -1.303 | -1.294 |
| | | | | | | | | | (3.813) | (2.927) |
| Income | -0.789*** | -0.747*** | -0.735*** | -0.698*** | -0.676*** | -0.680*** | -0.676*** | -0.679*** | -0.654*** | -0.652*** |
| | (0.121) | (0.126) | (0.122) | (0.112) | (0.113) | (0.111) | (0.109) | (0.105) | (0.125) | (0.122) |
| Constant | 35.89*** | 20.85 | 18.67 | 24.74 | 26.07 | 24.57 | 24.18 | 31.04*** | 47.39 | 43.37*** |
| | (8.632) | (32.01) | (32.00) | (32.65) | (32.68) | (33.13) | (33.37) | (11.56) | (43.58) | (15.76) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 180 | 178 | 178 | 178 | 178 | 178 | 178 | 178 | 155 | 155 |
| **Countries** | 59 | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 50 | 50 |
| **$R^2$-within** | 0.606 | 0.587 | 0.588 | 0.598 | 0.601 | 0.604 | 0.606 | 0.605 | 0.586 | 0.586 |
| **$R^2$-between** | 0.007 | 0.009 | 0.010 | 0.003 | 0.002 | 0.000 | 0.001 | 0.000 | 0.033 | 0.029 |
| **$R^2$-overall** | 0.002 | 0.001 | 0.001 | 0.006 | 0.008 | 0.017 | 0.010 | 0.014 | 0.088 | 0.082 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.

*Source*: estimated by author using STATA 17.0.

**Appendix 3**

Cross-section Estimates on the Annual Change of the Gap between Multidimensional and $1.90 a Day Poverty

| Variable | Specification | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Control of corruption | 0.126 | 0.372 | | |
| | (0.718) | (0.729) | | |
| Institutional PCA index | | | 0.004 | 0.046 |
| | | | (0.154) | (0.159) |
| Ln (GDP pc) | -0.342 | | -0.357 | |
| | (0.485) | | (0.478) | |
| Growth (%) | -0.051 | -0.060 | -0.050 | -0.064 |
| | (0.076) | (0.106) | (0.076) | (0.106) |
| Gov. health expenditure | -0.024 | 0.017 | -0.021 | 0.020 |
| | (0.077) | (0.083) | (0.077) | (0.083) |
| Gini coefficient | -0.017 | -0.036 | -0.016 | -0.036 |
| | (0.039) | (0.041) | (0.039) | (0.041) |
| Equal access to public services | 0.146 | -0.056 | 0.168 | -0.025 |
| | (0.432) | (0.493) | (0.434) | (0.501) |
| Urban population (%) | -0.010 | | -0.010 | |
| | (0.021) | | (0.022) | |
| Ln (Gov. consumption pc) | | -0.448 | | -0.448 |
| | | (0.296) | | (0.301) |
| Constant | 4.483 | 4.430* | 4.450 | 4.162* |
| | (3.436) | (2.308) | (3.442) | (2.231) |
| **Observations** | 44 | 41 | 44 | 41 |
| **$R^2$** | 0.112 | 0.107 | 0.111 | 0.102 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.

*Source*: estimated by author using STATA 17.0

**Appendix 4**

Fixed-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Poverty Headcount Index using Standardized Variables

| Variable | $1.90 a day | | $3.20 a day | | $.5.50 a day | | The national poverty line | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Control of corruption | -0.230*** | -0.278*** | -0.481** | -0.365** | -0.530** | -0.377* | -0.074 | -0.176 |
| | (0.085) | (0.059) | (0.189) | (0.169) | (0.200) | (0.191) | (0.109) | (0.111) |
| Ln (GDP pc) | 0.287 | | 1.381** | | 1.816*** | | 0.785* | |
| | (0.343) | | (0.536) | | (0.459) | | (0.403) | |
| Growth (%) | 0.039 | 0.032 | 0.043 | -0.019 | -0.0031 | -0.080 | 0.063 | 0.102** |
| | (0.042) | (0.047) | (0.073) | (0.079) | (0.079) | (0.084) | (0.041) | (0.048) |
| Gov. health expenditure (%) | -0.216** | -0.307*** | -0.285** | -0.426*** | -0.0544 | -0.186 | -0.0734 | -0.153* |
| | (0.096) | (0.102) | (0.126) | (0.118) | (0.119) | (0.114) | (0.075) | (0.080) |
| Gini coefficient | -0.287* | -0.261 | -0.375* | -0.287 | -0.495** | -0.380 | -0.424*** | -0.438** |
| | (0.151) | (0.179) | (0.214) | (0.257) | (0.227) | (0.266) | (0.153) | (0.176) |
| Equal access to public services | -0.162 | -0.524 | 0.113 | -0.365 | 0.430 | 0.011 | -0.261 | -0.611 |
| | (0.370) | (0.389) | (0.459) | (0.522) | (0.439) | (0.519) | (0.309) | (0.420) |
| Urban population (%) | 0.271 | | -0.613 | | -0.396 | | 0.611* | |
| | (0.315) | | (0.604) | | (0.624) | | (0.345) | |
| Ln (Gov. consumption pc) | | 0.117 | | -0.255 | | -0.223 | | 0.643** |
| | | (0.230) | | (0.459) | | (0.469) | | (0.311) |
| Constant | 0.838*** | 0.647*** | 0.711 | 0.539* | 1.130** | 0.592* | -0.510*** | -0.074 |
| | (0.248) | (0.179) | (0.450) | (0.293) | (0.429) | (0.319) | (0.120) | (0.165) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 178 | 155 | 178 | 155 | 178 | 155 | 106 | 94 |
| **Countries** | 58 | 50 | 58 | 50 | 58 | 50 | 35 | 33 |
| **$R^2$-within** | 0.470 | 0.445 | 0.554 | 0.506 | 0.492 | 0.431 | 0.645 | 0.628 |
| **$R^2$-between** | 0.006 | 0.191 | 0.001 | 0.000 | 0.002 | 0.021 | 0.306 | 0.049 |
| **$R^2$-overall** | 0.053 | 0.288 | 0.063 | 0.015 | 0.009 | 0.0058 | 0.209 | 0.004 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index. All variables have been standardized.

*Source*: estimated by author using STATA 17.0

**Appendix 5**

Random-Effect Estimates on The Gap between Multidimensional and $1.90 a Day Poverty by Country Income Groups

| Variable | Low income and lower middle income groups | | | | Upper middle income groups | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Control of corruption | -6.035** | -6.073** | | | -2.717 | -0.689 | | |
| | (2.881) | (2.858) | | | (4.635) | (7.377) | | |
| PCA institutional index | | | -1.487* | -1.537* | | | -1.045 | -0.757 |
| | | | (0.835) | (0.833) | | | (1.403) | (1.567) |
| Ln (GDP pc) | -3.158 | | -2.144 | | -1.758 | | -1.510 | |
| | (6.028) | | (6.014) | | (2.905) | | (2.621) | |
| Growth (%) | 0.343* | 0.315 | 0.283 | 0.297 | -0.035 | 0.084 | -0.029 | 0.090 |
| | (0.207) | (0.207) | (0.198) | (0.198) | (0.289) | (0.646) | (0.299) | (0.487) |
| Gov. health expenditure | -0.970*** | -1.023*** | -1.001*** | -1.079*** | 0.409 | 0.437 | 0.408 | 0.458 |
| | (0.312) | (0.383) | (0.279) | (0.350) | (0.349) | (0.440) | (0.332) | (0.361) |
| Gini coefficient | -0.380 | -0.319 | -0.330 | -0.283 | -0.170 | -0.224 | -0.127 | -0.161 |
| | (0.304) | (0.290) | (0.299) | (0.274) | (0.246) | (0.224) | (0.230) | (0.214) |
| Equal access to public services | -5.919* | -7.874** | -5.296 | -8.254*** | -4.915** | -5.018** | -4.663** | -4.164** |
| | (3.350) | (3.093) | (3.440) | (3.134) | (2.040) | (2.104) | (1.842) | (1.819) |
| Urban population (%) | 0.009 | | -0.064 | | -0.082 | | -0.084 | |
| | (0.237) | | (0.228) | | (0.118) | | (0.114) | |
| Ln (Gov. consumption pc) | | 0.0250 | | 0.536 | | -1.835 | | -1.209 |
| | | (2.204) | | (2.151) | | (3.669) | | (3.457) |
| Constant | 34.56 | 0 | 31.72 | 33.95** | 26.21 | 21.00 | 23.40 | 14.00 |
| | (45.22) | (.) | (45.34) | (15.53) | (24.78) | (22.75) | (22.75) | (20.65) |
| **Time fixed-effect** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Observations** | 109 | 93 | 110 | 95 | 69 | 62 | 69 | 64 |
| **Countries** | 37 | 32 | 38 | 34 | 21 | 18 | 21 | 20 |
| **$R^2$-within** | 0.662 | 0.639 | 0.654 | 0.637 | 0.365 | 0.239 | 0.373 | 0.269 |
| **$R^2$-between** | 0.165 | 0.207 | 0.180 | 0.230 | 0.547 | 0.453 | 0.563 | 0.446 |
| **$R^2$-overall** | 0.255 | 0.336 | 0.259 | 0.331 | 0.423 | 0.330 | 0.440 | 0.347 |

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. All robust standard error is reported in parentheses. The dependent variable is the gap between multidimensional and $1.90 a day headcount index.

*Source*: estimated by author using STATA 17.0.

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