MULTI-DIMENSIONAL INEQUALITY IN VIETNAM: THE ROLE OF GOVERNANCE QUALITY

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Abstract: **In the context of the increasingly growing inequality in all aspects, the question raised for localities in Vietnam is how governance quality affects multidimensional inequality. This study will answer this question by measuring multidimensional inequality through the Atkinson inequality index with four aspects: expenditure, health care, education, and housing. Using data from the Vietnam Household Living Standards Survey (VHLSS) over a span of five years (2012, 2014, 2016, 2018, and 2020), the results indicate that multidimensional inequality has a tendency to increase in Vietnam throughout the study period. Moreover, utilizing the Generalized Method of Moments (GMM) model, the research reveals an inverse relationship between governance quality and multidimensional inequality in Vietnam, whereas the characteristics of provinces and cities exhibit a direct correlation with multidimensional inequality. Building upon empirical evidence, the authors advocate for several policy recommendations, including curbing corruption, elevating public service quality, and fostering democracy to bolster governance quality and mitigate multidimensional inequality in Vietnam.**

Keywords: *Atkinson, Governance quality, GMM, Multidimensional inequality*

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1. Introduction

Multidimensional inequality, characterized by its global and diverse nature, not only diminishes the living standards of certain population groups but also restricts the development potential of society as a whole, threatening the stability and peace of many nations. In Vietnam, despite achieving impressive milestones after more than three decades of reform, the issue of multidimensional inequality remains a pressing concern, hindering sustainable development and posing significant challenges for policymakers. Furthermore, the role of governance quality in relation to multidimensional inequality has not been clearly analyzed, especially in the context of Vietnam's ongoing administrative reforms and international integration. Recognizing the urgent need for in-depth research on this issue, the authors have chosen to study "Multidimensional Inequality in Vietnam: The Role of Governance Quality" to clarify this relationship and propose appropriate solutions.

From a theoretical perspective, the research is expected to contribute to the expansion of the theoretical framework on multidimensional inequality. Specifically, the development of a multidimensional approach through the aspects of expenditure, health, education, and housing will provide a more comprehensive reflection of the level of inequality rather than being confined to individual aspects. Notably, this study has constructed and proposed an analytical framework that can be tested in similar contexts, thereby contributing to the promotion of interdisciplinary research on the relationship between governance quality and multidimensional inequality in the future.

In practical terms, the research not only provides data demonstrating that improving governance quality will mitigate multidimensional inequality but also identifies specific weaknesses existing within Vietnam's governance system. Based on the research results, the authors propose appropriate recommendations aimed at reducing the rate of multidimensional inequality in Vietnam through policies that enhance and improve governance quality. Given the role of governance quality in ensuring equitable access to healthcare (SDG 3) and education (SDG 4) for all social strata, this study is expected to contribute to achieving the goal of reducing inequality within and among countries (SDG 10), thereby promoting sustainable economic growth and creating job opportunities (SDG 8).

The authors chose to examine multidimensional inequality through the aspects of expenditure, health, education, and housing using a composite multidimensional inequality index calculated from data from the Vietnam Household Living Standards Survey (VHLSS). At the same time, the study utilizes surveys from the Vietnam Governance and Public Administration Performance Index (PAPI) to measure governance quality through various composite factors. This approach provides an objective and comprehensive assessment of the inequality situation in Vietnam, while also highlighting the role of governance quality in multidimensional inequality. The paper consists of five main sections: section 1 introduces the issue, section 2 presents an overview of the research and theoretical framework, section 3 outlines the research methods, section 4 analyzes the research results, and finally, section 5 concludes with recommendations.

2. Overview and theoretical framework

2.1. Overview

It can be seen that research on multidimensional inequality in Vietnam has extensively examined non-income factors such as expenditure, health, education, and housing. However, these studies predominantly concentrate on individual aspects and fail to deliver a holistic evaluation of multidimensional inequality through an aggregate lens (Gupta et al., 2001). Similarly, when evaluating the impact of governance quality on socio-economic issues, particularly inequality, previous studies primarily concentrated on the aspect of corruption without considering other factors such as legal policies and public services, etc. (Gallego, 2010). Therefore, it is essential to conduct a comprehensive assessment of all factors to accurately and impartially elucidate the significance of governance quality in relation to multidimensional inequality (Nguyen et al., 2017).

Inequality is one of the factors that strongly affects the economic growth and social stability goals of many countries around the world (Stewart & Samman, 2013). Most studies on inequality primarily focus on analyzing income disparities (unidimensional), as scholars consider income to be the most fundamental measure of living standards and social welfare (Dalton, 1920). However, many researchers also argue that income alone cannot reflect a comprehensive view of injustice in society, especially regarding human capital development (Atkinson & Bourguignon, 1982; Sen, 1997). Consequently, several multidimensional concepts have been proposed, specifically that inequality will be assessed through aspects such as expenditure, education, health, and housing (Sen, 1997).

In Vietnam, the situation of inequality across various aspects among population groups is is becoming more pronounced, driven by economic, political, and environmental factors. (Bui et al., 2014). For example, people in regions frequently affected by natural disasters tend to cut back on spending, leading to expenditure inequality between regions (Yusuf et al., 2014). Additionally, households that enjoy superior economic conditions are afforded greater access to healthcare services (Vu et al., 2014), educational opportunities (Tran & Pasquier-Doumer, 2017), and higher-quality housing in comparison to less advantaged households (Gough & Tran, 2018). This disparity contributes to the growing challenges associated with inequality in health, education, and housing.

Many studies indicate that multidimensional inequality is most directly affected by governance quality (Ghura, 1998; Gallego, 2010). Specifically, corruption leads to a decline in tax revenues and increases the risk of unemployment, causing people to cut back on spending, which in turn increases expenditure inequality among households (Dang, 2016). This creates pressure on government spending, restricting investments in education and health, resulting in inequalities in access to education and

healthcare services among different economic regions (Gupta et al., 2001). Governance quality is not only assessed by the level of corruption but also by the level of public investment by the government, management skills, and legal policies (Mingat & Tan, 1998; Gallego, 2010). An accurate and comprehensive evaluation of the effects of governance quality on multidimensional inequality necessitates the consideration of all facets of governance quality. Nonetheless, prior research examining the relationship between governance quality and socio-economic challenges, especially inequality, has predominantly concentrated on corruption, often overlooking other critical elements such as legal frameworks and public service provision, etc. (Gallego, 2010). Therefore, a thorough evaluation of all aspects is necessary to clearly and objectively explain the role of governance quality in multidimensional inequality (Nguyen et al., 2017).

2.2. Definition of multidimensional inequality

According to Kataeva et al. (2015), inequality is the unequal distribution of opportunities or benefits among individuals within one or more social groups. Previously, inequality was discussed as a unidimensional phenomenon, primarily measured by income (Sen, 1973). However, subsequent studies have shown that individuals can also face inequalities in employment conditions, access to land, healthcare utilization, education, and social services (Sen, 1997). Since then, various multidimensional aspects of inequality have gained the attention of many researchers, such as Atkinson & Bourguignon (1982) and Muller & Trannoy (2012).

In Vietnam, the Mekong Development Research Institute (MDRI) and Oxfam (2020) state that multidimensional inequality is the situation where individuals feel concerned about increasing inequality across various dimensions. The new approach proposed by MDRI and Oxfam (2020) seeks to reduce the scrutiny of individuals who, while not differing in income, may experience disparities in other dimensions. The authors contend that, in addition to focusing exclusively on income inequality, it is essential to recognize individuals who lack access to quality education, healthcare services, or land as also facing inequality. The authors selected the methodology and analysis of multidimensional inequality as defined by MDRI and Oxfam (2020) due to its comprehensive nature, which encompasses various dimensions of inequality beyond mere income disparities. This choice aligns perfectly with the aims and context of the research conducted in Vietnam. In this study, the authors explore the influence of governance quality on multidimensional inequality, focusing on factors such as expenditure, education, healthcare, and housing, as suggested by Decancq & Lugo (2009) and Bui & Erreygers (2020).

2.3. Concept of governance quality

The World Bank (1992) defines governance as "the manner in which power is exercised in the management of a country's economic and social resources for development." More specifically, UNDP (1997) states that governance quality involves efforts towards the rule of law, transparency, fairness, effectiveness/efficiency, accountability, and strategic vision in the exercise of political, economic, and administrative power. Additionally, IGI Global (2020) affirms that governance quality is measured by the performance level of an organization in governance aspects, including: control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality and rule of law, voice and accountability.

In this paper, the authors use the definition provided by IGI Global (2020) because this definition not only measures the level of governance quality in a comprehensive manner but also fully addresses various aspects of governance. This aligns perfectly with the research objective of the group, which is to examine the impact of governance quality on multidimensional inequality in Vietnam.

2.4. The role of governance quality in multidimensional inequality

Rather than examining the impact of governance quality on multidimensional inequality from a broad perspective, the majority of research tends to concentrate on the analysis of individual dimensions of inequality, such as expenditure (Bahmani-Oskooee & Xi, 2011), education (Gupta et al., 2001), healthcare, and housing (Brenner & Theodore, 2002).

In terms of expenditure, governance quality plays an indirect role in shaping the spending decisions of individuals and households. Improving governance quality encourages businesses to expand investments, thereby creating stable employment opportunities for unemployed individuals and low-income workers (Dang, 2016). Evidently, low-income workers experience reduced economic difficulties, enabling them to increase expenditures on consumer goods and other areas such as education and healthcare (Bahmani-Oskooee & Maki-Nayeri, 2019). Therefore, enhancing governance quality not only stimulates investment but also improves income levels, contributing to a reduction in expenditure inequality.

From a healthcare perspective, poor governance quality undermines effective corruption control, leading to resource inefficiencies and reduced investments in healthcare systems (Stepurko et al., 2010). This results

in unreasonably high healthcare costs, placing undue financial strain on individuals and households (Azfar & Gurgur, 2008). Furthermore, weak governance is a major contributor to the lack of transparency in healthcare policies and services (Ghimire et al., 2013). Studies consistently indicate that insufficient accountability in information provision exacerbates public distrust in national healthcare systems, reducing the utilization of medical services. Consequently, the healthcare sector struggles to detect and address emerging diseases, posing significant challenges to national health standards (Evans, 2015).

In terms of education, governance quality is a crucial factor influencing educational inequality. Enhancing governance quality can help reduce corruption, increase funding for educational initiatives such as improving school infrastructure and waiving tuition fees for disadvantaged students (Gupta et al., 2001). Moreover, advancing democratic processes through improved governance quality contributes to greater investment in public education systems (Ansell, 2008). This progress is instrumental in expanding access to quality education for impoverished children, thereby reducing illiteracy and dropout rates (Gupta et al., 2001) and mitigating educational inequality.

From the perspective of housing, weak governance quality exacerbates housing inequality. First, poor governance quality, characterized by lax corruption control, results in most land and housing benefits being concentrated among the upper class and high-income groups (Brenner & Theodore, 2002). Second, improving governance through enhanced democratic practices and better public services can alleviate housing inequality; for instance, enforcing housing regulations, effectively controlling investment, and providing subsidized loans positively impact the ability of low-income workers to own homes (Aluko, 2011). Thus, improved governance directly contributes to narrowing the housing inequality gap, particularly in urban areas (Lee & Zhu, 2006).

In summary, most prior studies highlight an inverse correlation between governance quality and multidimensional inequality. This relationship aligns with the socio-economic context in Vietnam. Consequently, the authors propose the hypothesis:

Governance quality has an inverse impact on multidimensional inequality in Vietnam.

3. Research Method

3.1. Data

This study draws on data from the following primary sources:

First, the Vietnam Household Living Standards Survey (VHLSS) conducted by the General Statistics Office over five years (2012, 2014, 2016, 2018, and 2020) to calculate multidimensional inequality. The selected period is particularly meaningful for assessing long-term trends in multidimensional inequality and for evaluating its changes in response to shocks such as COVID-19. Consequently, the 2012–2020 dataset provides a timely reference point for comparisons with current conditions. As the VHLSS employs a highly representative two-stage stratified sampling method, it offers reliable data for research and policy formulation in areas such as living standards, poverty, healthcare, and education in Vietnam. This study utilizes VHLSS data collected from approximately 35,000 individuals in 9,000 households across 63 provinces to compute multidimensional inequality.

Second, the Provincial Governance and Public Administration Performance Index (PAPI), conducted annually by the United Nations Development Programme (UNDP), the Vietnam Fatherland Front, and the Centre for Community Support Development Studies (CECODES), is used to measure provincial governance quality in Vietnam.

3.2. Measurement

3.2.1. Measuring multidimensional inequality

The study evaluates multidimensional inequality across four key dimensions: expenditure, healthcare, education, and housing, as outlined by Decancq & Lugo (2009) and Bui & Erreygers (2020).

In terms of expenditure, individual expenditure (c_i) is determined using real per capita expenditure, excluding healthcare-related costs, following the methodology of Bui & Erreygers (2020).

In terms of healthcare, a health index (h_i) is constructed to indirectly represent healthcare inequality. This index compares an individual's healthcare spending to their total expenditures, incorporating both average expenditure and healthcare costs, as proposed by Bui & Erreygers (2020).

From the perspective of education, previous studies often use average years of schooling (e.g., Yang et al., 2014; Varughese & Bairagya, 2020) or actual years of schooling (e.g., Lam & Levison, 1991) to measure educational inequality. However, these methods may overestimate inequality and lack accuracy in reflecting the completion of educational levels (Bui & Erreygers, 2020). Therefore, this study adopts Bui & Erreygers' (2020) approach, measuring education (e_i) through nine levels of academic attainment (1, 2, ..., 9), corresponding to the highest level of education completed, starting from primary school. These levels correspond to ranges of completed years of schooling: [0,1], [2,3], [4,5], [6,7], [8,9], [10,12], [13,15], [16,17], and [18,22].

From the perspective of housing, the housing index (d_i) is calculated by estimating the expected housing value through a regression model that incorporates factors such as per capita living space, housing type, sanitation conditions, and durable assets, in line with Decancq & Lugo's (2012) approach.

To ensure comparability across these dimensions, all measures are normalized to a standardized scale (0, +∞) by dividing each dimension's values by their respective 2012 mean, as recommended by Decancq & Lugo (2009). Finally, the composite multidimensional inequality index is calculated, following the steps outlined in the subsequent sections.

Composite Multidimensional Inequality Index: The measurement of multidimensional inequality can employ various indices, such as the generalized multidimensional Gini index, Theil index, Robin Hood index, Alkire-Foster index, Bourguignon index, and Atkinson index. Among these, the Atkinson index stands out for its clear consideration of distributional aspects, making it both a measure of inequality and a tool for assessing potential welfare benefits from redistribution (Sun et al., 2015). According to Schlör (2013), the epsilon parameter (ε) in the Atkinson index determines its sensitivity to inequality, which is particularly crucial in the context of sustainable development. Other indices lack this distinctive feature. Moreover, Schlör highlights the natural connection between Є\epsilonЄ and social theories embedded in the Atkinson index. Additionally, the Atkinson index incorporates societal responses to inequality, making it a valuable tool for assessing social welfare and guiding public policy improvements (Duc et al., 2018). Given these advantages and recommendations from prior studies, this research adopts the Atkinson index to measure multidimensional inequality in Vietnam

The research measures multidimensional inequality by employing the the methodology proposed by Tsui (1995, 1999) through the Atkinson index to assess four distinct dimensions of inequality: expenditure, healthcare, education, and housing. This framework is based on the contributions of Decancq and Lugo (2009) as well as Bui and Erreygers (2020). Specifically:

Step one, measure each dimension of multidimensional inequality based on the level of well-being achieved by each individual in society. According to the proposal by Decancq et al. (2009), the formula for the composite welfare function of an individual across *g* dimensions is presented in the following equation (1):

$$W_\beta(x_i) = [\sum_{j=1}^{g} w_j x_{ij}^{\beta}]^{\frac{1}{\beta}} \qquad (1)$$

In which,

x_{ij} represents the welfare achieved by individual *i* in dimension *j*;

β is a parameter indicating the marginal rate of substitution between dimensions;

w_j is the weight of dimension *j* (with the sum of all weights w_j equal to 1).

Step two, calculate the weights w_j between the dimensions of multidimensional inequality. According to the proposal by Bui & Erreygers (2020), the study assumes that all dimensions of inequality are equally important, and therefore, in equation (3), the study sets $w_j = 1/g = ¼$ (where g represents the number of dimensions in the welfare function).

Step three, measure multidimensional inequality through the Atkinson index, as proposed by Tsui (1995, 1999). First, the study presents how to calculate the one-dimensional Atkinson index to measure the degree of inequality in the distribution *x* across *n* individuals, using the following equation (2):

$$I = 1 - [\frac{1}{n}\sum_{i=1}^{n} (\frac{x_i}{\mu(x)})^{1-\epsilon}]^{\frac{1}{1-\epsilon}} \qquad (2)$$

Where x_i is the welfare level achieved by individual i, μ(x) is the average welfare level achieved by individuals, and ϵ\epsilonϵ is a parameter representing society's sensitivity to inequality. Next, the study constructs the multidimensional Atkinson inequality index, similar to the one-dimensional Atkinson index (equation (2), $W_\beta(x_i)$, the composite individual welfare function. The formula is presented as follows:

$$I = 1 - [\frac{1}{n}\sum_{i=1}^{n} (\frac{W_\beta(x_i)}{W_\beta(\mu)})^{1-\epsilon}]^{\frac{1}{1-\epsilon}} \qquad (3)$$

$$\mu = [\mu(x_{(1)}), \mu(x_{(2)}), \ldots, \mu(x_{(g)})] \text{ and } \mu(x_{(j)})$$

and $\mu(x_{(j)})$ represents the average welfare level achieved by individuals in dimension *j*. $W_\beta(\mu)$ denotes the average welfare level achieved by individuals across all dimensions. Furthermore, the multidimensional Atkinson inequality index can be expressed as follows:

$$I = 1 - [\frac{1}{n}\sum_{i=1}^{n} (\frac{\sum_{j=1}^{g} w_j x_{ij}^{\beta}}{\sum_{j=1}^{g} w_j (x_{(i)})^{\beta}})^{\frac{1-\epsilon}{\beta}}]^{\frac{1}{1-\epsilon}} \qquad (4)$$

According to Bui & Erreygers (2020), when conducting the study, for each different criterion, the values of the parameters β and ϵ need to be chosen appropriately. When selecting β and ϵ, it is important to observe the condition ϵ > 0 and β < 1 (Kolm, 1977). The condition ϵ > 0 ensures that society has an

aversion to inequality, while the condition $\beta < 1$ ensures that different dimensions are not perfect substitutes for each other. To align with the context of the study on multidimensional inequality in Vietnam, the study uses ϵ - 2 and β - 0 to calculate the Atkinson index, as proposed by Decancq & Lugo (2009) and Bui & Erreygers (2020).

3.2.2. Measuring governance quality

The study utilizes the Provincial Governance and Public Administration Performance Index (PAPI) in Vietnam, as proposed by Giang et al. (2020). After two years of testing, PAPI was rolled out nationwide in 2011 with six domain indicators, which include:

(1) Public participation at the grassroots level
(2) Transparency
(3) Accountability
(4) Control of corruption in the public sector
(5) Public administrative procedures
(6) Public service delivery

By 2018, the dataset was expanded to include two additional domain indicators: Environmental governance and E-governance. However, since the study was conducted in the years 2012, 2014, 2016, 2018, and 2020, the authors only used the six domain indicators to maintain consistency across the years. In 2020, Giang and colleagues argued that the six domain indicators were closely correlated, which could lead to multicollinearity in regression analysis. Therefore, the study divided the six indicators into three aspects, as proposed by Giang et al. (2020), and then standardized the aspects to a 10-point scale (with equal weights assigned to each indicator within the aspects). Specifically, the three aspects are:

Democracy (Public participation at the grassroots level; transparency and openness; and accountability to the public)

Control of corruption in the public sector

Public services (Public administrative procedures and public service delivery)

3.3. *Method*

In order to avoid potential endogeneity issues in the model, simple methods such as OLS, FEM, or REM cannot meet the research requirements. Therefore, the study uses GMM as an appropriate method to estimate the dynamic model. This method eliminates endogeneity issues and also provides robust estimates in the presence of heteroscedasticity and autocorrelation.

The study follows the specific steps outlined as follows:

First, as presented in section 3.2.2, governance quality is measured through three aspects: Democracy, Corruption, and Public Services. The authors assess the impact of governance quality on inequality in each dimension and multidimensional inequality across 63 provinces in Vietnam during the period from 2012 to 2020, using the regression equations (5) and (6):

$$DI_{gjt} = \beta_0 + \beta_1 * DE_{jt} + \beta_2 * CO_{jt} + \beta_3 * PS_{jt} + \beta_4 X_{jt} + u_{jt} \quad (5)$$

$$MI_{jt} = \beta_0 + \beta_1 * DE_{jt} + \beta_2 * CO_{jt} + \beta_3 * PS_{jt} + \beta_4 X_{jt} + u_{jt} \quad (6)$$

In which:

DI_{gjt} is the index measuring the level of inequality in dimension *g* for province *j* in year *t*, where *g* refers to expenditures, healthcare, education, and housing;

MI_{jt} is the index measuring the level of aggregated multidimensional inequality for province *j* in year *t*;

DE_{jt} is the index measuring the governance quality of province *j* in year *t* through the dimension of democracy;

CO_{jt} is the index measuring the governance quality of province *j* in year *t* through the dimension of corruption;

PS_{jt} is the index measuring the governance quality of province *j* in year *t* through the dimension of public services;

X_{jt} are the control variables, including: population density, the urban-rural population ratio, crude birth rate, poverty rate, per capita GDP growth, and economic region.

u_{jt} are the unobserved variables.

Second, to estimate the regression equations, the study uses the Generalized Method of Moments (GMM). Previous studies examining the relationship between various factors and inequality have pointed out typical endogeneity issues, such as those identified by Baloch et al. (2017) and Sağlam (2021). Therefore, to avoid endogeneity in the model, the study applies the GMM method to address this issue, as proposed by Hansen (1982).

To test the appropriateness of the GMM method, the study conducts the Durbin-Wu Hausman endogeneity test. The model exhibits endogeneity if the P-value is less than 0.05, and vice versa. The results in **Table 3** show that the models all have a P-value less than 0.05, indicating the presence of endogeneity in the model.

Additionally, the Hansen test, also known as the Sargan test, is employed to assess the validity of the instrumental variables within the GMM model. The results presented in Table 3, with a P-value of 0.1 or higher, suggest that all instrumental variables utilized in the model are indeed valid.

Furthermore, the research employs the Arellano-Bond (AR) test to assess autocorrelation within the error terms of the GMM model presented in second-differenced form (AR(2)). The condition of P-value exceeding 0.05 indicates the absence of second-order autocorrelation in the residuals. The findings presented

in Tables 3 and 4 demonstrate a P-value greater than 0.05, signifying that there is no second-order autocorrelation present in the residuals of the estimation model.

4. Study results

4.1. Descriptive statistics

4.1.1. The current state of multidimensional inequality in Vietnam

Table 1. The Atkinson one-dimensional inequality index in the provinces and cities of Vietnam during the period 2012-2020.

	Average value	Standard deviation	Variance	Kurtosis coefficient	Skewness coefficient	Variation range	Minimum	Maximum
Spending inequality	0.4246	0.0734	0.0054	4.1471	0.9916	0.4444	0.2745	0.7189
Health inequality	0.0256	0.0274	0.0008	70.0379	6.4446	0.3529	0.0013	0.3542
Educational inequality	0.2520	0.0755	0.0057	2.7195	0.3261	0.3617	0.0967	0.4584
Housing inequality	0.7294	0.1247	0.0155	5.9769	-1.6362	0.6419	0.3202	0.9621

Source: Calculations by the authors

Table 1 illustrates the Atkinson inequality index across four dimensions: expenditure, health, education, and housing for 63 provinces and cities in Vietnam from 2012 to 2020. Notably, the level of inequality shows a gradual decline, ranked in the following order: housing, expenditure, education, and health. The distribution data for these four aspects from 2012 to 2020 shows a peaked distribution (Kurtosis > 0). Additionally, the aspects of expenditure, health, and education during this period exhibit a positive skewness (Skewness > 0), whereas the housing aspect shows a negative skewness (Skewness < 0). Furthermore, the range of variation among these aspects is relatively large, indicating significant disparities in inequality across provinces and cities in Vietnam during the study period. The factors contributing to this situation arise from disparities in income among different population groups across various regions, coupled with unequal distribution of resources and opportunities. This has resulted in significant inequality between provinces and cities in Vietnam. Such pronounced inequality adversely affects socio-economic conditions and the overall quality of life, while also presenting a substantial obstacle to the nation's sustainable development objectives. Furthermore, the extent of inequality underscores the urgent need for effective supportive policies from the government, particularly aimed at rural areas that often encounter economic, social, and environmental difficulties.

Table 2. The multidimensional Atkinson inequality index in the provinces and cities of Vietnam during the period 2012-2020.

	Number of observations (household)	Average value	Standard deviation	Variance	Kurtosis coefficient	Skewness coefficient	Variation range	Minimum	Maximum
2012	9399	0.1098	0.1035	0.0107	53.7028	7.0220	0.8442	0.0487	0.8929
2014	9399	0.1106	0.0496	0.0025	25.1326	4.0757	0.3591	0.0605	0.4196
2016	9399	0.1227	0.0550	0.0030	29.6679	4.5049	0.4077	0.0729	0.4805
2018	9296	0.1264	0.0331	0.0011	2.7324	0.5128	0.1383	0.0713	0.2096
2020	9389	0.1378	0.0402	0.0016	10.8702	2.0936	0.2603	0.0751	0.3354

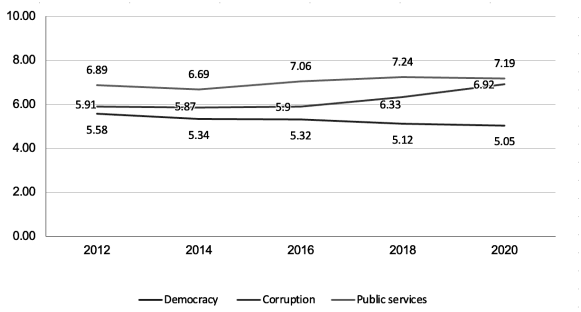
Source: Calculations by the authors

Table 2 indicates that multidimensional inequality across the 63 provinces and cities of Vietnam has consistently risen from 0.1098 points in 2012 to 0.1378 points in 2020, reflecting an increase of 0.028 points. This suggests that multidimensional inequality is on the rise in the provinces and cities of Vietnam. Additionally, the distribution data throughout the period from 2012 to 2020 exhibits a peaked and positively skewed distribution (Kurtosis > 0; Skewness > 0). Moreover, the range of variation of the Atkinson index at the beginning of the period is relatively large, indicating significant disparities in inequality among the provinces and cities. However, this range tends to decrease during the period from 2012 to 2020, reflecting an improvement in inequality disparities among the provinces. This trend can be attributed to the disparities in socio-economic development across provinces, where significant urban centers exhibit a higher concentration of economic resources, thereby generating greater opportunities for access

and advancement in comparison to other areas. Additionally, inadequate budget allocation and public investment have played a role in exacerbating regional inequalities. The movement of individuals towards major cities in pursuit of new opportunities further contributes to the escalating levels of inequality.

4.1.2. The current state of governance quality in Vietnam.

Figure 1. Governance quality metrics averaged across the nation for the years 2012 to 2020



Source: Calculations by the authors

The scores of Democracy, Corruption Control, and Public Services demonstrated varying trends from 2012 to 2020. In particular, the Democracy aspect, as illustrated in figure 1, revealed a decline in the average score across the 63 provinces and cities, with a reduction of 0.53 points during this timeframe. This decline signifies a deterioration in the quality of democratic engagement, particularly in terms of citizen participation at the grassroots level and the transparency and accountability owed to the public. Conversely, the indices for Corruption Control and Public Services, as shown in figure 1, experienced increases of 1.01 and 0.3 points, respectively, over the same period. This indicates that the provinces and cities have made notable progress in effectively managing corruption and enhancing the delivery of local public services.

4.2. The role of governance quality in multidimensional inequality in Vietnam

Table 3. The estimated impact of governance quality on the aspects of multidimensional inequality in Vietnam

Independent variable		**Spending inequality**	**Health inequality**	**Educational inequality**	**Housing inequality**	**Multidimensional inequality**
Lagged inequality		0.2686***	-0.1498***	0.5855***	-0.4744***	-0.1699***
Democracy		-0.0079***	-0.0047***	-0.0049***	-0.0702***	-0.0042**
Control of corruption		-0.0107***	-0.0010*	-0.0034***	-0.0614***	-0.0096***
Public services		-0.0119*	-0.0071***	-0.0268***	-0.0980***	-0.0186**
Control variable						
Population density		-0.00001**	-0.0164***	-0.0099**	0.0001***	0.00002***
Urban-rural ratio *(Reference: rural)*	Urban	0.0005***	-0.0002***	0.0002***	-0.0015***	0.0007***
Crude birth rate		0.00211***	-0.0130***	0.0142***	0.0309***	0.0132***
Poverty rate		0.0032***	0.0010***	0.0028***	0.0029***	0.0018***
Per capita GDP growth		-0.0051*	0.00007***	-0.00001***	-0.0001**	0.0029***
Economic region *(Reference: Northern midland and mountainous)*	Red River Delta	-0.0216**	-0.0056*	0.0039**	-0.0535***	0.0052
	North Central and Central Coast	-0.0191**	-0.0191***	0.0147***	0.0310**	-0.0099*
	Central Highlands	0.0264**	-0.0099**	-0.0031	0.0903***	0.0228***
	Southeast	0.0048	-0.0190***	0.0345***	-0.0061	0.0208**
	Mekong Delta	-0.0178**	-0.0140***	0.0327***	0.0195*	0.0116*
Constant		0.1133**	0.1046***	0.1876***	1.8286***	0.1960***
Wald chi2(14)		393740.17	286193.34	3263.73	1101.36	18132.78
Prob>chi2		0.000	0.000	0.000	0.000	0.000
Wu-Hausman F(1,24)		0.0001	0.0241	0.0017	0.0038	0.0001
AR(2) (P-value)		0.295	0.296	0.681	0.923	0.173
Hansen J. (P-value)		0.344	0.320	0.306	0.146	0.115
Number of observations		250	250	250	250	250
Number of instrumental variables		62	61	60	62	52
Statistical significance levels: * p<0.1; ** p<0.05; ***p<0.01						

Source: Calculations by the authors

Table 3 illustrates that the quality of governance exerts a negative influence on various dimensions of multidimensional inequality. In particular, with respect to the democracy dimension, improvements in democratic governance are associated with a reduction in inequality. At a significance level of 1%, an increase of 1 point in the democracy index corresponds to decreases in inequality of 0.0079 in expenditure, 0.0047 in health, 0.0049 in education, and 0.0702 in housing. Notably, the most pronounced effect of democracy is observed in the housing dimension. For the *corruption aspect, e*ffective management of corruption is associated with a decrease in inequality, particularly in areas such as expenditure and housing. Specifically, an increase of 1 point in the corruption index corresponds to reductions in inequality of 0.0107, 0.0010, 0.0034, and 0.0614 points in expenditure, health, education, and housing, respectively, at the 1% and 10% significance levels. In terms of public services, enhancing their quality can significantly mitigate inequality, particularly within the housing sector. At significant thresholds of 1% and 10%, disparities in expenditure, health, education, and housing diminished by 0.0119, 0.0071, 0.0268, and 0.0980 points, respectively, when the index assessing the public service dimension rose by 1 point.

Table 3 shows that, alongside various dimensions of multidimensional inequality, the quality of governance exerts an inverse influence on the overall multidimensional inequality index in Vietnam throughout the study period. Notably, the dimension of democracy adversely affects multidimensional inequality; an increase of 1 point in the democracy index corresponds to a reduction of 0.0042 points in the multidimensional inequality index, significant at the 5% level. Likewise, the dimension of corruption demonstrates a negative correlation with multidimensional inequality. At the 1% significance level, an improvement in corruption (indicated by a 1-point increase in the corruption index) results in a decrease of 0.0096 points in the multidimensional inequality index. Among the three dimensions, the public services aspect has the most pronounced negative effect on multidimensional inequality. Specifically, a 1-point increase in the public services index leads to a decrease of 0.0186 points in the multidimensional inequality index, significant at the 5% level.

This finding aligns with numerous prior studies, including those conducted by Ferrara et al. (2019) and Danish et al. (2022). The rationale is as follows: Firstly, high-quality governance fosters an environment that motivates businesses to increase their investments, thereby generating employment opportunities for workers, especially those from low-income backgrounds (Dang, 2016). This, in turn, enables these individuals to allocate more resources towards consumer goods, education, healthcare, and housing (Bahmani-Oskooee & Maki-Nayeri, 2019). Secondly, effective governance coupled with minimal corruption levels can boost public investment and improve the efficiency of public service delivery in areas such as health and education. This focus particularly benefits low-income and vulnerable segments of society, contributing to a reduction in multidimensional inequality (Rajkumar & Swaroop, 2008).

Table 3 further presents that the attributes of the provinces and cities influence multidimensional inequality. In particular:

Population density, the urban-rural ratio (with rural as the reference), the crude birth rate, the poverty rate, and the growth of per capita GDP all exert a positive influence on the multidimensional inequality within the province. At a significance level of 1%, an increase of 1 person/km^2 in population density and a 1% rise in the urbanization rate correspond to increases in the multidimensional inequality index of 0.00002 and 0.0007 points, respectively; however, the impacts of both population density and urbanization rate are not statistically significant. Conversely, an increase of 1‰ in the crude birth rate, a 1% rise in the poverty rate, and a 1% growth in per capita GDP lead to increases in the multidimensional inequality index of 0.0132, 0.0018, and 0.0029 points, respectively. Regarding economic regions, multidimensional inequality exhibits variation across different economic regions. In the North Central and Central Coast areas, inequality has shown a decline, whereas it has been on the rise in the Central Highlands, Southeast region, and Mekong River Delta. The effectiveness of government poverty alleviation initiatives is evident in the improvements seen in the North Central and Central Coast regions. Conversely, challenges such as the rugged mountainous terrain and isolation in the Central Highlands, along with significant saltwater intrusion in the Mekong River Delta, hinder residents' access to essential services like healthcare and education. Furthermore, the pronounced income disparity in the economically vibrant Southeast Vietnam contributes to the escalating multidimensional inequality in that region.

5. Conclusion

With data from 63 provinces and cities over five years (2012, 2014, 2016, 2018, and 2020), the study assessed the situation of multidimensional inequality in Vietnam through the Multidimensional Inequality Index. At the same time, the research also

explained the role of governance quality in reducing multidimensional inequality in Vietnam. The results indicate that governance quality has an inverse relationship with multidimensional inequality, meaning that as governance quality improves, multidimensional inequality in the provinces and cities of Vietnam is also alleviated.

The authors, drawing on the findings of their research, aim to offer several pertinent recommendations aimed at enhancing governance quality and narrow the gap of multidimensional inequality in Vietnam. It is essential for the government to intensify its efforts in combating corruption, as this issue adversely impacts economic activities and investment, thereby complicating the lives of citizens, particularly those facing difficult circumstances. Moreover, the State should prioritize the establishment of efficient public services that create opportunities for employment, education, and development within a supportive environment, with assistance from local authorities. Additionally, there is a need to revise and simplify administrative procedures, elevate the status and voice of the populace, and continuously address matters related to political institutions, all in pursuit of narrowing the multidimensional inequality gap and achieving comprehensive and sustainable development.

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