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**CORRUPTION AND POVERTY IMPACT ON  
HEALTH SECTOR IN VIETNAM**

A Research Paper Proposal/Design

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## **Abstract**

This study investigates how corruption and multidimensional poverty interact to affect provincial health outcomes in Viet Nam. Using panel data from 54 provinces over the period 2016–2023, under-five mortality is employed as dependent variable. Two corruption indicators are used varied perspective: corruption control perceived by firms and corruption control perceived by citizens. To estimate the data, the study applies OLS, FE model, and two step System GMM estimators to correct for reverse causality between health expenditure and mortality. Results show that poverty and corruption have a negative influence on child mortality. Moreover, corruption significantly amplifies the moderate effect of poverty, especially from the firm viewpoint. In addition, when endogeneity is addressed, health expenditure no longer impacts the outcome. This suggests that government spending is a responsive phenomenon. The findings imply that in order to improve healthcare performance in Viet Nam, it required higher level of accountability and poverty reduction in all dimensions.

## **Keywords**

Corruption; Poverty; Vietnam; health; interaction.

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# Corruption and Poverty impact on Health sector in Vietnam

## 1. Introduction

Corruption is an inevitable existence in any political and economic systems throughout history. It can be found in both public and private sector. The most common definition for the term is the act of abusing the user's own power for private gain (Jha et al., 2023). Corruption is manifested in different forms. The most exposed one is bribe, informal charges, then driven by information asymmetry, it can level up to administrative corruption. At the highest level, political officials by allocating governance resources for private gain, results in political corruption (Jain, 2011). The impact of it does not always harmful. Corruption can play the role as "grease in the wheel" for more efficient operation (Aidt, 2003). However, there is no boundary of when to stop, the more benefits an individual gains from unlawful act, the more demanding he become (Kaufmann, 1998). Therefore, when discussing about the influence of corruption, the major of research focus on the negative side of corruption. The behaviour has severe consequences such as reducing investment, increasing unpredictability and uncertainty, distorting public expenditure, reducing policy efficiency, etc (Azfar et al., 2001). Especially, for developing countries, the problem is even more concerned than developed ones (Olken & Pande, 2011). Corruption is borned based on 3 conditions: (1) the existence of rents, (2) administrative independence and (3) weak governance structures (Jain, 2011). These issues root deep inside every system making it impossible to fully eliminate corruption. In order to reduce the severity, many anti – corruption campaigns rely on higher transparency, accountability and pressure from the public (Fang et al., 2025).

While corruption results in negative outcome, the level of severity is not the same for everyone. In order words, the burden is disproportionately regressive, with the poor and the vulnerable groups face harder time (Azfar et al., 2001; Jain, 2011). Compared to wealthier households, poorer ones are more dependent on public funds and with less information, the bargaining power to fight back corruption is low. As a result, when the resources are diverted from the central government, they are the first one to suffer (Reinikka & Svensson, 2004). For the poor, when the system fails, they face reduction in access to public goods, mistreat due to inequal income distribution and increase in financial burden because of the higher cost (Abdallah et al., 2015). The hardship is even more pronounced in the health sector. There are many evidences that points out governance is a key determinant influencing population well – being. When the system plays its role, the overall health outcome is improved (Kim & Wang, 2019). However, at high rate, corruption decreases funds for human capital, resulting in lower investment in education and healthcare provision (Gupta et al., 2002). Moreover, it also lowers the efficiency of the system. Even when the central government continue to increase expenditure, the medical outcome remains modest (Rajkumar & Swaroop, 2008).

In the context of Vietnam, the matter requires deep investigation. As a developing country with a long history drowning in war, the nation only started to economically grow after the normalizing the relationship with the United States and participating in ASEAN in 1995. Since then, from 6 to 8 % increase in average GDP growth from 1991 to 2010, the country entered an era of sustained economic development (Báo Bình Phước, 2016). Statistically, Vietnam become one of the nations that has the fastest growth rate in the South East Asia after 20 years of advancement. Moreover, the improvements are also reflected in substantial transformation in poverty and inequality reduction. In details, poverty reduce from 30% in 1995 to 10% in 2010. With the number of under 5 mortality rates drop down from 81% in 1990 to about 28% in 2010, and adult literacy increase from 84% in the late 1980s to 90,3% in 2007, it can be concluded that there has been great improvement in health and education (Thảo & Lan, 2013). However, even when the government focused on equality, there is still high disparity within different areas across countries, especially in Northern Midlands and mountain areas. Due to geographic reasons, the level of health care, education and information access remains low compare to order regions, such as Red River delta or Mekong River delta.

As the institutional system was relatively young, the legal structure is weak, resulting widespread corruption. For instance, in the year of 2013, there were 371 corruption cases involving 847 defendants investigated, with estimated losses up to over 9,260 billion VND (Ban Nội Chính Trung Ương, 2013). Therefore, corruption elimination is regarded as national priority. In 2013, the biggest anti-corruption campaign in Vietnam - “Dot lo” was led by General Secretary Nguyen Phu Trong (Vinh, 2024; Đào, 2022). With the principle of “No exemption”, during the period from 2012 to 2022, there were more than 7390 individual was disciplined for corrupted acts (VOV, 2024). However, there is no solution to permanently eliminate corruption. It remains an institutional challenge for a developing country like Vietnam.

Across many researches, the number of evidences point out that, when corruption is harmful, it creates greater burden for the poor than others, is substantial. Therefore, in this research, the main requestion is in the situation of Vietnam, where socioeconomic conditions are different across regions, whether the interaction between corruption and poverty can amplify the negative effect they have on health outcome. In the study, a provincial panel data from 54 provinces and cities across Vietnam from 2016 to 2023 is utilized. Focusing on the FE (Fixed Effects) model estimation, the relationship between the interaction is examined. Corruption is measured based on 2 different viewpoints, level of corruption control from citizen perspective from firm perspective. The finding suggests that while corruption and poverty both have negative influence on the dependent variable, the interaction intensifies the impact. In other words, poverty tend to magnify how damaging corruption becomes for health outcome.

The study is constructed in the following order: after the Introduction, the second part is Literature review which provides the scope of current research with the same topic. Next is Methodology part where the structure of the research is clearly explained in details. Afterward is the Result for regression and Discussion. Finally, the Conclusion part ends the whole study.

## 2. Literature review

### 2.1. *Corruption impact on health sector*

The idea of corruption leads to negative health outcome has been long experimented. Using an unbalanced panel of 185 countries between 2005 and 2017, Achim et al. (2019) look into the matter by using an unbalanced panel data of 185 countries between 2005 and 2017, controlling 6 cultural dimensions. The results show the negative association between corruption with physical and mental health. Additionally, another global evidence by Li et al (2017) proves the impact. Doing research from 150 countries from 1995 to 2012 with 3 corruption indicators: are CPI (Corruption Perception Index) from Transparency International, freedom from corruption from the Heritage Foundation and control of corruption from the World Bank's Worldwide Governance Indicators, the author suggests that corruption worsen the health outcome. In details, after estimating using OLS (Ordinary Least Square), FE (Fixed Effects) model and 2SLS (Two Stage Least Square), the regression results provide insight that when there is an increase in corruption, the mortality increase while immunization decrease.

Another view of corruption having negative impact on the system is by affecting the funds. In the research in Côte d'Ivoire, the dynamic relationship between corruption and health expenditure is examined. In the long term, with 1% increase in corruption results in 0,9% short term and 0,5% long term public spending (Diarrassouba et al., 2025). In the 1998, Mauro supports the pattern by providing more insight through the study employing two different cross – country panel data from 64 countries. It is reported that corruption leads to reduction in public spending on human capital, which including health sector. These findings are consolidated by Akçay (2006), who provides insight for the topic by indicating that corruption reduces human development by lowering social sector spending, with one point increase in corruption decreases 0.013 to 0.051 points of human development. In another cross-national analysis, Delavallade (2006) finds that corruption shifts public spending away from health, education, and social protection and towards sectors where rents are easier to extract, for example, military, fuel and energy, etc. Rajkumar and Swaroop (2008) provide additional findings using data from over 100 countries, showing that corruption weakens the marginal efficiency of health expenditure. Overall, these global studies provide empirical evidences indicating that corruption reduces public expenditure for health sector, which leads to severe consequences such as increase in mortality.

Even though there have been numerous studies for the topic, there is no core theory to guide for the relationship between corruption and health care system (Factor & Kang, 2015). Summarizing many researches, there are 3 main channels where corruption impact the sector: (1) Leakage; (2) Misallocation; (3) Inequality distortion.

First on all, in the health systems, the delivery of services is exposed through doctors, nurses, physicians, managers, etc. As a human, they are attracted to financial interest, which can possibly create chance for corruption. Therefore, the term “leakage” refers to the case when resources are utilized for service, there are individuals take advantage of the opportunity for private gain, which make the fund unable to translate into result sine it is leaked during the

process. Vian (2012) demonstrates that informal payment, theft of public property, procurement bribery and undelivered treatment as the most direct way corruption present itself in the health system. The reason why this type of corruption thrive is because the health sector is characterized by severe information asymmetry, uncertainty, and complicating principal–agent relationships, which weaken monitoring and accountability (Transparency International, 2006). Another study confirms that corrupted acts occur because the structure is fragile which leads to failed management for monitoring illegal behaviours within the delivery chain (Ensor & Durán-Moreno, 2002). In this environment, frontline providers take advantage of the situation by extracting private rents in exchange for access, speed, or quality, access to public resources (Vian, 2012). The empirical evidence from Bangladesh demonstrates this mechanism clearly. The research employs national survey data and finds out that 41 percent of doctor consultations involved illegal fees. These informal charges make up to approximately 16 percent of total medical illegal spending. Physicians also discriminate patients based on distance and ability – to – pay. This shows how corruption adapts to missing information and user inequality (Naher et al., 2020). This type of leakage reduces the effective supply of health services.

Secondly, corruption can lead to change in distribution of public expenditure by redirecting resources away from social sectors to other provision that generate more benefits. Health and education are the core of human capital accumulation, with limited rent extraction. Therefore, when the accountability of government decrease, these sectors are most likely to be reduced in fund (Delavallade, 2006). Moreover, the overall of public expenditure remains unaffected of corruption, only the part for the community is more likely to be reduced (Mauro, 1997). In 1998, Mauro research supports this theory empirically using cross-country fiscal data. Corruption significantly reduces the share of government spending allocated to education, with tentative but directionally consistent evidence indicating a similar relationship for health. The changing in fund represents a structural mechanism. In details, corruption weakens accountability of the state and reduces investment in the sectors that contribute most to the population well-being. The report by Transparency International in 2006 also emphasizes that, corruption shifts priorities away from social welfare toward private gain. These evidences reinforce the argument that misallocation of public spending is a channel through which corruption negatively impact the healthcare system performance.

In the last channel, corruption operates through political capture and access distortion. In other words, public policy and institutional rules are shaped in ways supporting individual interests rather than the whole community. An example for this pattern is most recognized from the pharmaceutical industry. Political finance by firms in the pharmacy system reshape and set their priorities on preferable sector, while ignoring community welfare. As a result, this raises the price of medicine and weakening the link between public resources and population health (Jorgensen, 2013). Similar pattern of the channel but in the front-line is observed in the Transparency International’s review of Bangladesh in 2015. The findings suggest that more than 40% of health service users encounter corruption, ranging from informal payments and politically influenced recruitment and contract. In consequences, the system is created to serve political favor (McDevitt, 2015). This corresponds to a systemic form of corruption that does

not necessarily require direct theft at the point of service like channel 1, but instead taking use of the structure governing how health systems are regulated, financed, and price. Moreover, corruption creates hardship for human capital segments such as in health access. This is because the poor are disproportionately harmed when regulation is weak and private rent extraction becomes institutionalized, inequality rises, and service accessibility and efficiency declines among lower-income groups (Tiongson et al., 2000). Hence, political capture generates a third mechanism linking corruption to negative influence on healthcare performance.

In low- and middle-income countries (LMICs), due to low accountability, corruption in the health sector frequently intensifies the structural vulnerabilities. These weaknesses are generated by limited fiscal resources, weak law enforcement, and high dependence on decentralization (Naher et al., 2020). Evidence from the development economics literature consistently indicates that corruption not only increase the cost and accessibility, it also amplifies underlying inequalities. The reason for that is poorer households have less ability to pay for informal charges, bribes, and additional transaction costs required (Tiongson et al., 2000). This dynamic is consistent with the case observed in Bangladesh. On the frontline, illegal consultation fees represented a substantial share of medical spending. Additionally, providers strategically adjust the range of informal charges based on patients' observed characteristics such as ability – to – pay, distance from the hospital, etc. The findings demonstrate endogenous in rent extraction responding under weak institutional control (Abdallah et al., 2015). These mechanisms are emblematic of the broader LMIC governance pattern in which corruption reproduces exclusion, reinforces segmentation of health access, and reduces the effective return on public expenditures (Transparency International, 2006).

Within low – middle income countries list, Vietnam displays similar structural vulnerabilities in the health system. Vian (2012) demonstrates how informal payments, pharmaceutical price distortions, and procurement related to rent extraction form a multi-layered corrupted environment that affects both efficiency and accessibility sides of the service delivery. Informal payment plays a key role for patients with greater willingness and ability to pay to gain faster or more preferable access to services. On the other hand, poorer and more vulnerable groups experience delayed treatment or limited service. Using individual-level survey data, Matsushima and Yamada (2016) find that bribery in the provision of health services is significantly associated with lower health satisfaction and reduces trust in delivering fair treatment. Moreover, it also discourages citizens joining the national healthcare system. Beyond physical care outcomes, corruption also imposes mental health burdens. Another research shows that individuals which are exposed to corruption report significantly higher levels of psychological distress. The findings suggest that corruption in Vietnam does not only impact resource misallocation channels, but also influence people's mental health (Sharma et al., 2021). In summary, existing Vietnam-based research provides evidence that corruption occurs due to hole in the healthcare system and have severe health outcomes. It lowers service quality, limits resource access, undermines trust, and affects both physical and mental health dimensions. These findings evidence align with global and LMIC finding. It also reinforces that

Vietnam's corruption problem within the health sector is not by chance, but structurally embedded, with severe negative consequences on people welfare.

## 2.2. *Poverty impact on health sector*

Poverty has long been recognized as one of the core determinants of population health with evidence from old studies (Rowntree, 1908). In development economics, poverty is not simply a lack of income but a society structure. When a child is poor, it reduces the capability to turn resources into health. The poor face greater exposure to health shocks, weaker resilience to surprise events, and suffer more severe consequences when get sick (Starfield, 1992). Empirical and theoretical scholarship consistently shows that poverty produces cumulative biological, behavioural, and institutional disadvantage that ultimately translates into higher mortality (Lleras-Muney et al., 2025). This means poverty is not just correlated with health outcomes, it actively shapes them through multiple structure. In addition, poverty does not one – sided impact health. It has a mutual effect. A study points out that it is a cycle. The author argues that when a person is sick, he loses working capacity, which mean lower income. This leads to him becomes poor and has higher risk of getting ill. Then he gets ill and the process repeat (Nelson, 1979). This concept is relevant because it highlights that poverty cannot be interpreted as a single-dimensional or short-term condition, but rather as an accumulative disadvantage in the society.

Poverty is a structural disadvantage, which influence a person at the beginning of their life. Another research by Starfield (1992) argues that poverty creates burden not only because of lower income but also because poverty affects many overlapping determinants at the same time. These issues can be housing conditions, environmental safety, food quality, maternal education, psychosocial stress, information access, and neighbourhood infrastructure. When a child grows up in poverty, they are more exposed to pathogens, persistent chronic stress and unbalanced nutritional. Each component is individually harmful, but when the harm is come together, they amplify each other. The research shows that this multi-factor disadvantage is especially powerful for child health outcomes. This is because a child survival depends heavily on access to preventive care, adequate nutrition, and stable caregiving. In poor families where all areas are lacking, the impact is most damaging. A large-scale empirical evidence confirms this pattern. Fritzell et al. (2014) investigate 30 countries between 1978 and 2010 for cross country research. The result points out that relative poverty strongly predicts child mortality. It remains harmful even when the economic developed. Moreover, the study shows that relative poverty, which mean the poverty line compared to the medium, not only absolute poverty, fixed poverty line leads to more child deaths. In other words, poverty is not a sign of low income only, it is the low gap in the community. De Vogli (2004) examines this theory based on a mental perspective. The study shows that the way deprivation impact health is at the status. When a person has low control, low power and low social standing, they face high stress hormone which can turn into chronic biological responses. If the behaviour continues, it increases chance of cardiovascular and long-term mortality. Hence, health problems under poverty is not only due to lack of material but also related to psychosocial problems.

Most evidence in low middle countries shows that poverty amplifies health loss. This is because the poor face the highest effective prices for illness.

Households with low income have weaker liquidity, lower savings, and weaker access to insurance. In consequence, when illness shocks occur, they are forced to delay treatment or ignore it or substitute toward lower-quality services (Nelson, 1979). Research also indicates that the poor face discriminatory access barriers through distance, waiting cost, informal payments, ability to pay, and information asymmetry in medical markets (Abdallah et al., 2015). Under this structure, poverty both increases exposure to health risk and reduces probability of successful treatment. Therefore, the cycle creates a poverty trap. The consequences are more severe for conditions that require early detection and continuous management such as infectious disease, respiratory illness, etc. These conditions are the one that can drive child mortality.

In a study about cancer, one of the world most terrible disease shows how much burden it becomes to the poor. In Viet Nam, Hoang et al. (2017) show that cancer treatment imposes catastrophic expenditure on households. Especially for poor ones and people who are independent of insurance coverage. 37% of affected patients became impoverished due to treatment cost, and catastrophic expenditure rates reached as high as 83% under certain thresholds. In this case, the illness itself transforms into a poverty shock. This confirms that the poverty-health association is not merely cross-sectional correlation but is an active dynamic trap: poor  $\rightarrow$  illness  $\rightarrow$  high treatment cost  $\rightarrow$  deeper poverty  $\rightarrow$  worse illness  $\rightarrow$  reduced survival. This shows that poverty has both anticipatory harm (preventing investment in prevention) and reactive harm (reducing ability to treat once sick) (Haines et al., 2000). Development health economists classify this as endogenous element in health capital. Over time, this generates persistent mortality pattern because the effect produces a long-term depreciation of biological resilience. Another literature also implies that poverty produces persistent effects that do not dissipate quickly. When deprivation leads to health disadvantage, it is cumulative and repetitive. The harm experienced in one period influences future survival even after income changes. This is why poverty shows strong long-term association with mortality across cohort studies (Lleras-Muney et al., 2025). Poverty is a dynamic disadvantage process, not a short-term shock. Multidimensional poverty framework sharpens this interpretation. Poverty is not only defined in monetary terms but also deprivation in education, sanitation, healthcare access, housing, information, and drinking water (Diem & Van Hoang, 2018). When multiple deprivations cluster within the same household or community, mortality risk increases more than normal state. This is consistent with capability-based development theory, where deprivation reduces both freedoms to choose healthy behaviours and ability to translate expenditure into effective health outcomes (Walker, 2006). In this sense, poverty functions as an underlying structural determinant. It simultaneously shapes life opportunity, exposure, resilience, and treatment probability. Therefore, poverty's impact on health is persistent and accumulative rather than immediate and reversible. Global public health literature also confirms that poverty affects the way health behaviours respond to environmental hardship. De Vogli (2004) shows that stress resulting from insecure social positioning increases compulsive risk behaviours such as smoking. This behaviour further increases disease vulnerability. The evidence demonstrates that poverty affects health not only through financial constraint but through psychosocial mechanism that eventually produce biological deterioration. Poverty therefore embeds risk pathways at both behavioural

and physiological levels. Taken together, the evidence consistently points to poverty as a central determinant in population health, particularly for child mortality indicators. Under-five mortality is highly sensitive to nutrition, maternal health, vaccination access, sanitation, and environmental exposure. All of these components are greatly associated with the social status. Therefore, it is theoretically and empirically justified to treat poverty not only as a socio-economic characteristic but as a fundamental causal mechanism shaping health outcomes in low and middle countries.

For the purposes of this thesis, these existed research provides the theoretical justification for including poverty as a key determinant of provincial mortality variation and as a moderator interacting with corruption. Poverty is a structural conditioning factor that shapes the magnitude of the health penalty imposed by institutional failure. It amplifies the consequences of governance breakdown because poor households cannot bear, substitute, or purchase alternatives pathway when health systems deteriorate. Therefore, poverty must be treated as an active mechanism that intensifies the harmful effect of institutional inefficiency in the health sector.

### *2.3. Interaction between corruption and poverty*

While poverty and corruption have long been examined as separate determinants of poor health outcomes, recent research highlights their interactive nature. It is believed that deprivation and corruption can also amplify the harmful effects of each other on service delivery and health capability. Corruption determines who accesses resources, while poverty determines who can afford to navigate the distorted system. Together, they form a reinforcing trap. In governance terms, corruption reduces the efficiency of health resource allocation, and poverty reduces the ability of individuals to substitute or compensate for that inefficiency. The result is a dynamic inequality in health outcomes, where those already most deprived suffer the greatest losses in life expectancy and well-being.

Empirical research supports this joint mechanism. Mauro (1998) and Delavallade (2006) both demonstrated that corruption shifts public expenditure away from ill – rented sectors like human capital such as health and education. The shift is toward capital-intensive projects with higher potential for rent extraction. When governments spend less effectively on social services, the poor, who rely more on public provision, bear the immediate burden. Gupta, Davoodi, and Tiongson (2000) research through this channel on a global context. The evidence shows that higher corruption levels are associated with higher infant and child mortality and lower immunization rates. The results remain consistent even after controlling for income and expenditure. These results imply that corruption worsens the poverty–mortality gradient by undermining the capacity of public systems to deliver the health treatment to the poor.

At the micro level, corruption affects the poor through multiple mechanisms: informal fees, absence, and preferential access to care for those able to pay bribes. The World Bank and Transparency International (2006) reports describe how these distortions lead to ineffective health system. With informal charges raising the private cost of “free” services, it damages trust in state institutions. In Vietnam and other developing countries, poor households have already spent a higher share of income on basic health. When corruption further

increases transaction costs, the poor delay or give up treatment. As a result, they lose their chance for survival. Vian (2012) and Hoang et al. (2017) research illustrated this mechanism. The citizens reported that informal payments is a routine procedure in hospital care, and huge medical costs eventually push low-income families back into poverty. These patterns confirm that corruption magnifies poverty's harm. It does not only impact by draining fiscal resources but also by influencing the responses and accessibility among the poor.

The interaction between poverty and corruption also operates temporally. Poor populations experience cumulative disadvantage: each episode of corruption deepens future vulnerability by depleting assets, reducing trust, and discouraging demand for formal care. Lleras-Muney, Schwandt, and Wherry (2025) demonstrate that poverty's health effects accumulate dynamically over time, a finding that helps explain why the corruption–poverty interaction in this study becomes stronger when lagged variables are used. De Vogli (2004) adds a psychosocial dimension: poverty produces chronic stress and powerlessness, while corruption reinforces those same psychosocial stressors by signalling that rules are unfair and power determines access. Thus, the poor suffer both material and psychological health burdens from systemic corruption. These theoretical insights clarify why, in fixed-effects and dynamic models, the interactive harm of corruption and poverty persists long after short-term fiscal responses fade.

Empirical cross-national evidence further supports the effect. Akçay (2006) finds that corruption weakens the link between economic growth and human development. In other words, even rising income does not automatically translate into improved social outcomes where institutions are weak. When corruption diminishes the efficiency of income translate into well-being, poverty's harm is amplified. Sundmacher (2012) demonstrates that even in Germany, a high-income country with universal insurance coverage, poverty still predicts higher mortality. It implies that institutional inefficiency and inequality interact beyond lack of recourse. In summary, these findings show that the corruption–poverty interaction is not limited to low-income countries. On the other hand, it is a universal structural mechanism that determines how health outcomes respond to governance quality.

In the Vietnamese context, this interaction is also highlighted. Studies such as Vian (2012) and Nguyen et al. (2021) document that informal payments, favouritism in recruitment, and weak transparency persist at the provincial level despite continuous increase in health spending. Transparency International's (2006) Global Corruption Report: Health Sector notes that corruption erodes equity in access even where coverage expansion occurs. When combined with the persistence of multidimensional poverty, deprivation in education, sanitation, and housing, these governance failures ensure that national spending gains are unevenly translated into survival gains (Tran et al., 2025). Poor provinces, often with weaker administrative capacity, face both resource disadvantage and institutional disadvantage, creating a double trap. This explains why the economic evidence from this research finds that child mortality is highest where both poverty rates are high and corruption control is weak. The poor cannot protect themselves from institutional failure, and institutions fail the poor first.

Conceptually, the corruption–poverty interaction reveals that health inequality is not only a question of how much a country spends on health, but how

fairly those resources are governed and distributed. Corruption functions as an inequality multiplier: it reallocates the benefits of public spending upward, away from those with the greatest need. Poverty functions as a vulnerability amplifier: it limits resilience against governance failure. When combined, they create an institutional poverty trap that locks entire regions into persistent mortality disadvantage. This study's findings confirm that improving governance integrity is inseparable from poverty reduction if Viet Nam aims to achieve equitable health outcomes.

#### 2.4. *The gap*

Although existing research has documented separately the adverse effects of corruption and poverty on health outcomes, very few studies have used one research to fully investigate the interaction between these issues. Especially at provincial level, where corruption is small, and hard to measure. The majority of prior literature, such as Gupta et al. (2002), Mauro (1998), and Delavallade (2006), focus on analysing corruption mainly on health expenditure efficiency or national mortality. Similarly, studies in the scope of poverty impact health, including Fritzell et al. (2014) and Lleras-Muney et al. (2025), primarily explore deprivation's direct effects. However, these variables are intersected empirically enough to show their dynamic impact. In the Vietnamese context, the two determinants have been discussed qualitatively. Vian (2012) and Hoang et al. (2017) highlight corruption in healthcare access, while Tran et al. (2025) explain multidimensional poverty's structural persistence. However, no quantitative study has explicitly tested how corruption modifies the poverty–health relationship across provinces and over time. This absence leaves an empirical gap for this study.

This study contributes by filling that gap through a development economic framework that includes the interaction between corruption from both citizen and firm perspectives with multidimensional poverty. The study employs under-five mortality at the provincial level in Viet Nam as a primary health outcome. Using panel data from 2016–2023, by combining PAPI, PCI, and GSO data, the estimation results reveal the importance of governance accountability and the effectiveness of poverty reduction in improving health outcomes. The findings strengthen the theoretical understanding of how institutional quality and socioeconomic inequality jointly determine health capability. Moreover, it offers evidence that governance management and poverty alleviation must be proceeded together to achieve meaningful improvements in healthcare performance improvement.

### 3. Methodology

#### 3.1. *Research design*

This study applies a balanced provincial panel research design to examine how corruption and poverty influence the healthcare system in Vietnam. Moreover, the research emphasizes on whether corruption intensifies the harmful impact of poverty on the outcome. Panel data is suitable because after a period of development, Vietnam still has disparities, uneven economic strength, institutional capacity, and socioeconomic conditions across regions. In addition, due to geographic and cultural reasons, these provinces also possess persistent institutional characteristics that cannot be captured using cross-sectional data. The

dataset is constructed from the Socio-Economic Statistical Data of 63 Provinces and Cities reports published by the General Statistics Office (GSO). The data source includes the combination of the 2015–2021 and 2019–2024 provincial editions to obtain consistent annual provincial indicators. For corruption variables, the research extract data from 2 different sources: PAPI (Public Administration Performance Index) and PCI (Provincial Competitiveness Index). After excluding nine provinces with incomplete corruption measurements in PAPI, the final dataset is a balanced panel of 54 provinces observed annually from 2016 to 2023.

Under-five mortality is selected as the primary dependent variable because it reflects overall health system performance and effective access to essential care. This index is a core global health indicator aligned with SDG goal number 3 “Ensure healthy lives and promote well-being for all at all ages” (United Nations, 2015). The study examines the independent effects of corruption and poverty on health outcome. After that, it extends the baseline specification by including interaction terms to test whether corruption worsens the effect of poverty on the mortality. This interaction dimension remains unexplored within the current Vietnam empirical literature.

The research follows these steps of estimation. First, pooled OLS provides initial benchmark for comparison. Second, fixed effects (FE) model is used to remove unobserved time-invariant provincial heterogeneity. Finally, to further address reverse causality occurred between the relationship of health expenditure and outcome, System GMM is employed as an additional robustness strategy. This multi-stage modelling framework improves internal validity and ensures that empirical results remain consistent across specifications and identification assumptions.

### 3.2. *Data*

In this research, there are 4 main data sources: PAPI, PCI and GSO. These datasets collectively provide annual information on provincial governance quality, corruption perceptions, socioeconomic structure, expenditure allocation, and population health outcomes. The combination of perception-based corruption indicators (PAPI and PCI) with official administrative statistical data (GSO) allows for a multidimensional approach to capture corruption and poverty influence at the provincial level.

#### 3.2.1. *PAPI - Public Administration Performance Index*

The Viet Nam Provincial Governance and Public Administration Performance Index (PAPI) is a governance program, launched by the cooperation between Centre for Community Support and Development Studies (CECODES) and the United Nations Development Programme (UNDP). With the support from central and local Vietnam Fatherland Committees, the program provides annual time – series data set on citizen evaluation on governance and public administration. From this information, the system is reinforced through policy making, policy implementation and public service monitor to meet the citizen’s standard. Since its establishment, PAPI has progressively expanded coverage all around the country. Between 2009 and 2024, more than 216,000 citizens have participated in the survey. The survey typically takes be-

tween 45 to 60 minutes per respondent, collecting detailed opinions on governance performance and service delivery across multiple domains. Since 2015, using Real – Time Analytics (RTA) platforms, real – time data is collected and the system is better monitored, keeping the quality consistent across regions with real-time validation of survey input.

During the program’s journey, it receives received financial and technical support from multiple international partners at various stages of its development: the Government of Spain (2009 – 2010), the Swiss Agency for Development and Cooperation (2011 – 2017), Australia’s Department of Foreign Affairs and Trade (2017), the Embassy of Ireland (2018 – 2025) and UNDP Viet Nam (since 2009) (About PAPI, 2020). Overall, the PAPI dataset offers a reliable and independent governance dataset that reflects citizen experiences, thereby providing valuable insights.

In PAPI, there are 8 main dimensions, which are (1) Participation at local levels; (2) Transparency in local decision – making; (3) Vertical accountability towards citizens; (4) Control of Corruption in the public sector; (5) Public administrative procedures; (6) Public service delivery; (7) Environmental Governance; (8) E – Governance. For this study, in order to capture the citizen’s perspective of corruption level, especially in the health sector, the index “Control of Corruption in Public sector” is used. Because this study focuses on health outcomes, citizen perceptions of corruption in the public sector provide a meaningful insight for corruption exposure at the frontline such as through leakage channel. It also reflects how everyday users experience and interpret institutional conditions affecting access to services in the public sector, including health services.

### ***3.2.2. PCI – Provincial Competitiveness Index***

PCI was first introduced in 2005 by the Vietnam Chamber of Commerce and Industry (VCCI) and partners to investigate and rank the economic power across 63 provinces in Viet Nam. While PAPI provides governance quality measurement from the perspective of citizens, PCI primarily assesses the business environment, economic governance, and institutional performance from the viewpoint of private firms. This dual-source corruption framework is particularly important because firms and households experience corruption differently. Using both sources helps reduce the bias from listening from one side while capturing political and economic dimensions of corruption that influence investment, procurement, and service contracting. It helps to observe whether corruption is influencing from the second and third channel.

The PCI methodology collects information by 3 steps: (1) collecting business survey data and secondary data; (2) based on the answer from sub – indexes into a 10 – point scale; (3) calculate the total point of the province (maximum 100 points). In the survey, firms are randomly selected every year. For instance, in 2014, PCI was able to captured information from more than 10,000 domestic companies and 1,500 foreign ones (About PCI, n.d.).

In this study, the corruption variable, the sub-index used to represent corruption is “Informal payment” to represent the control corruption level based on firm perspective. Even though this is not a health – related variable,

this measure is still relevant to the corruption-health relationship because informal payments to public officials also reflect distortions in budget allocation, rent-seeking in procurement, and unseen transactions affecting medicine supply chains, equipment pricing, and hospital management.

### ***3.2.3. GSO – General Statistics Office***

GSO is the principal national statistics agency under the Ministry of Planning and Investment of Viet Nam. At the beginning, the agency was first established in 1946 by Decree No. 61/SL signed by President Ho Chi Minh. Along with the growth of the nation, GSO has evolved significantly, updating framework to catch up with international standards. Today, GSO data are recognized as official national statistics. The number are widely used by the government, line ministries, international organizations, and academic researchers for monitoring development trends, forecasting, and policy formulation. (About the National Statistics Office (NSO) of Viet Nam, n.d.).

For this paper, the data is taken from the reports from Socio – Economic Statistical Data of 63 provinces and cities and online statistics on GSO. It includes: under – 5 mortality rate; expenditure on health population and family planning; GRDP (Gross Regional Domestic Products); poverty rate according to Multi-dimensional poverty rate and the provinces’ total population. These indicators allow construction of dependent, independent and control variables used in the empirical estimation.

In summary, these three data sources (PAPI, PCI, and GSO) provide a comprehensive dataset that enables investigation of corruption, poverty, and health relationship at the provincial level in Vietnam.

### ***3.3. Variables***

This study uses provincial panel data covering 63 provinces and cities of Viet Nam from 2015 to 2023. The variables are:

#### ***3.3.1. U5: Under – 5 mortality rates***

Under-five mortality rate (U5) is used as the principal outcome variable in this study. It is defined as the number of deaths of children below five years old per 1,000 live births. Under-five mortality is one of the most widely used and internationally comparable indicators of population health performance. In research related to health economics and development, it is commonly used to capture the effectiveness of service delivery and overall health system. Around the world, U5 is also an official Sustainable Development Goal (SDG 3.2) target indicator established by the United Nations. It plays the role as a benchmark for evaluating community well-being and health system success. Because under-five mortality reflects both preventive cares, such as vaccination, resource accessibility, etc. and service deliver effectiveness, it is highly sensitive to institutional performance and corruption distortions within the health system. Previous empirical research has consistently used child mortality as a dependent variable to examine at macro-level health outcomes under different governance context (Achim et al., 2019; Li et al., 2017). In this study,  $\ln(U5)$  works as the dependent variable to represent the health outcome across regions in Vietnam.

#### ***3.3.2. HEXP: Share of provincial health expenditure***

Provincial health expenditure (HEXP) is used in this study to reflect how much money provincial institutions willing to spend and how important is the health sector. It shows the attitude of public governments toward the system. The variable is constructed as the ratio between provincial public expenditure on health, population, and family planning programs divided by provincial GRDP at constant 2010 prices. This ratio allows for comparison across provinces with different economic power. It prevents larger and richer provinces from appearing to have more care on the provision just because of larger budgets. The data for this measurement is extracted from the Socio-Economic Statistical Data of 63 Provinces and Cities (GSO), using both the 2015–2021 and the 2019–2024 report series. In empirical estimation, the variable is transformed into log form ( $\ln(\text{HEXP})$ ).

$$\text{HEXP}_{it} = \frac{\text{health expenditure of provinces } i \text{ in year } t \text{ (billion dong)}}{\text{GRDP of provinces } i \text{ in year } t \text{ (billion dong)}}$$

Health expenditure is included as a control variable because it captures government effort to invest in health infrastructure, services, quality, etc. Higher public investment is generally expected to improve population well – being. However, huge budgets alone do not guarantee health improvement if governance misallocate the funds, or in case there is leakage, thereby lowering the efficiency (Rajkumar & Swaroop, 2007). The variable is essential in the corruption – health literature. This is because corruption can distort procurement, increase input costs, and negatively impact the quality of investment. Therefore,  $\ln(\text{HEXP})$  plays two central roles in this study: (1) as a substantive explanatory variable capturing fiscal effort, and (2) as a variable used to test whether corruption moderates the efficiency of health spending in improving health outcomes. For this reason,  $\ln(\text{HEXP})$  also appears in the interaction model specifications.

### ***3.3.3. Cor – citi: Citizen-based corruption perception***

Citizen-based corruption perception (Cor–citi) is used in this study to capture how does ordinary citizens perceive corruption within the public sector. This includes health industries and services. The variable is extracted from the PAPI dimension “Control of Corruption in the Public Sector.” This indicator is based on micro level household surveys. The process is conducted every year, in which express the experience of citizens’ direct exposure and perceptions regarding corrupted act, such as bribery, favouritism, informal payments, abuse of public authority, discriminatory treatment, etc. The index ranges from 1 to 10, where higher values represent stronger control and cleaner system.

This variable is included as one of the primary independent variables in the model for two reasons. First of all, citizen-perceived corruption reflects not just the barriers faced by households but also the level of trust when accessing public healthcare services. The expectation that bribes are required or that service access depends on informal networks can discourage patients from seeking timely treatment. In consequences, the action possibly leads to delays and increased risk of mortality among children. Second, the variable captures small and hidden informal exchanges. On the frontline, the amount of informal payment or relatively modest. Therefore, they are often unobservable and untraceable. Citizen perception offers a unique bottom-up insight into institutional credibility

and accountability across provinces. Therefore, Cor–citi not only measures public sector cleanliness levels but also represents a mechanism of which corruption can undermine the health system functioning. This indicator is also included in interaction terms to examine whether corruption amplifies the negative effect of poverty on child mortality.

#### ***3.3.4. Cor – fir: Firm-based corruption perception***

Firm-based corruption perception (Cor–fir) is derived from the PCI using the sub-indicator “Informal Charges”. The measurement evaluates the extent to which enterprises are forced to make unofficial payments to public officials and whether the action resulted in expected outcome. In order to access services, secure approvals, or facilitate routine transactions, private firms have great tendency of having to pay for bribe, informal payment, present, etc. Therefore, this indicator captures bribery pressure, rent extraction, favouritism in business regulation, and governance distortions faced by private firms in each province. The scores are ranged from 1 to 10, where higher values indicate better control of corruption and lower case of corrupted act. Because enterprises routinely interact with regulatory authorities in licensing, taxation, procurement, and infrastructure access, they observe corruption dynamics embedded in formal procedure that citizens may not often see. Thus, firm-based corruption perception complements citizen-based perception by capturing an institutional dimension of corruption relevant to economic governance, resource allocation, and law enforcement integrity.

This variable functions as a primary independent variable and appears in both baseline and interaction model specifications. The justification for including Cor–fir is that corruption does not only affect firms but also indirectly influences health system performance. The influence occurs through supply-side channels that can lead to leakage, misallocation in resources. Distorted procurement processes, inflated pharmaceutical pricing, and preferential allocation of medical contracts reflects governance failures. In other words, that can translate to lower availability of essential inputs, lower resource efficiency, and improvement in human capital sector, such as health and education (Delavallade, 2006). Firms tend to detect corruption linked to rent extraction through procurement and contracting chains more accurately than households. Therefore, Cor–fir captures the proportionate and structural aspects of provincial corruption that determine how effectively public budgets is being invested. Including both Cor–fir and Cor–citi enables different viewpoints of corruption effects, improving construct validity. It also allows the empirical model to detect whether corruption rooted at institutional structures or occurred at service access points is more harmful for population health outcomes.

#### ***3.3.5. GRDP: Gross Regional Domestic Product per capita***

Gross Regional Domestic Product (GRDP) per capita is included as a control variable for socioeconomic elements in the model. It is calculated by dividing provincial GRDP at constant 2010 prices (billion dong) by provincial population (measured in thousand persons). Therefore, the measurement ‘s unit is million VND of economic output per person.

$$GRDP_{it} = \frac{GRDP \text{ (billion dong) of the province } i \text{ in year } t}{\text{population of the province (thousand people) } i \text{ in year } t}$$

This variable functions as a representation for overall economic development level, productive capacity, and income potential of the provinces. Because GRDP is a measure reflecting structural economic, industrialization, labour productivity, and capital accumulation, higher GRDP generally implies that provinces possess stronger development, higher general tax base, and more ability to maintain a well – performed public service system. This includes health facilities, medical workforce, and infrastructure. For this reason, GRDP also indirectly captures macro-level resource availability that can influence both the demand and supply sides of the health services.

At the same time, GRDP per capita can also be interpreted as a variable for the economic well-being of households. This is because provincial growth tends to generate higher consumption possibilities, thereby improves living conditions and reduces inequality. Regions with low GRDP are associated with more fragile households, lower nutrition status, weaker financial state, higher exposure to health shocks, and lower ability to afford healthcare even when services are technically available. Therefore, controlling for GRDP is critical to avoid confounding effects where poor health outcomes might reflect underlying economic deprivation instead of governance-related distortions. The variable is common practice in development economics research where economic and institutional characteristics must be separately isolated to estimate true governance effects. In estimation, GRDP is transformed into log form ( $\ln(\text{GRDP})$ ) to better interpret the coefficient.

### ***3.3.6. POV: Multi-dimensional poverty rate***

Poverty is measured in this study using the multidimensional poverty rate reported annually by the General Statistics Office (GSO). Unlike traditional poverty measures relies solely on income, the multidimensional poverty rate reflects deprivation across 5 basic dimensions. They are the level of deprivation in education, healthcare, housing, access to safe water and sanitation, and information accessibility (MOLISA et al., 2018). This broader approach aligns with development economics literature that emphasizes poverty as a multidimensional phenomenon rather than a purely monetary constraint. This idea is strongly agreed by the government in Vietnam. Since 2015, Viet Nam transitioned from a purely income-based poverty measure toward a multidimensional measurement system. They acknowledge that poverty also occurs when households lack access to basic social services despite having income above the poverty line. Since poverty emerges from many structural reasons, it limits households' ability to transform resources into higher well – being life (Chipunza & Ntsalaze, 2025). The index framework is constructed at the provincial level and reports the share of households experiencing multidimensional deprivation in each province. Therefore, this indicator is particularly suitable for provincial-level comparative analysis. The variable is in percentage.

The multidimensional poverty literature consistently demonstrates that low income has direct consequences for health vulnerability. In particular, where low and middle-income contexts, households' capacity to deal with shock is thin

and institutional resilience remains uneven. Recent empirical work also reinforces that multidimensional poverty contributes to health disadvantage through structural pathways such as reduced service utilization, limited financial protection, lower baseline nutrition, and weaker ability to bargain within public service chains. Thus, the multidimensional poverty rate captures structural disadvantage beyond monetary scale. It is an essential control variable in this research. It enables the empirical model to isolate how deprived socioeconomic conditions affect the health outcome variable, and also how the interaction with corruption intensifies the impact.

**Table 1:** Variable description

	Label	Obs	Mean	Std. Dev.	Min	Max
U5	Under-5 child mortality rate	432	22.6142	10.4638	10.9	64.6
Cor_citi	Corruption index (citizen perspective)	432	6.5846	0.5661	4.36	8.19
Cor_fir	Corruption index (firm perspective)	432	6.3011	0.9329	3.34	8.39
HEXP	Share of provincial health expenditure	432	0.0229	0.0167	0.0016	0.11
GRDP	Gross Regional Domestic Product per capita	432	40.5037	28.5828	14.0046	226.1475
POV	Multidimensional poverty rate	432	8.9369	9.8825	0	53.93

### 3.4. Model

#### 3.4.1. Baseline model

This study examines the impact of corruption and poverty on under-five mortality rate in Viet Nam by estimating 2 models specification. The analysis begins with a baseline model that excludes interaction terms to identify the direct effect of corruption and poverty on child mortality. The baseline empirical specification is written as:

$$\ln(U5_{it}) = \beta_0 + \beta_1 \ln(GRDP_{it}) + \beta_2 \ln(HEXP_{it}) + \beta_3 POV_{it} + \beta_4 Cor\_fir_{it} + \beta_5 Cor\_citi_{it} + \gamma_t + \varepsilon_{it}$$

Where:

- $\ln(U5_{it})$ : log of under-5 mortality rate in province i and year t
- $\ln(GRDP_{it})$ : log of GRDP per capita in province i and year t
- $\ln(HEXP_{it})$ : log of the share of provincial health expenditure in GRDP in province i and year t
- $POV_{it}$ : Multi – dimensional poverty rate in province i and year t
- $Cor\_fir_{it}$ : The level of corruption control from firm perspective in province i and year t
- $Cor\_citi_{it}$ : The level of corruption control from citizen perspective in province i and year t
- $\gamma_t$ : year fixed effects
- $\varepsilon_{it}$ : error term

This baseline model allows a naïve comparison of the relationship of poverty and corruption with under-five mortality, in control of the provincial economic development level and government spending level on healthcare provision.

### 3.4.2. Interaction model

After estimating the baseline specification, the analysis includes interaction terms between corruption and multidimensional poverty to test whether corruption magnifies the magnitude of the poverty effect on child mortality. This is rooted from evidences that show corruption generates more burden for poorer households, who lack financial flexibility and alternative plan for health shock. The interaction model is specified as:

$$\ln(U5_{it}) = \beta_0 + \beta_1 \ln(GRDP_{it}) + \beta_2 \ln(HEXP_{it}) + \beta_3 POV_{it} + \beta_4 Cor\_fir_{it} + \beta_5 Cor\_citi_{it} + \beta_6 (Cor\_citi_{it} \times POV_{it}) + \beta_7 (Cor\_fir_{it} \times POV_{it}) + \gamma_t + \varepsilon_{it}$$

Where:

- $Cor\_citi_{it} \times POV_{it}$ : Interaction term between the level of corruption control from the citizen perspective and the multi – dimensional poverty rate in province i and year t
- $Cor\_fir_{it} \times POV_{it}$ : Interaction term between the level of corruption control from the firm perspective and the multi – dimensional poverty rate in province i and year t

Since higher values of  $Cor\_citi$  and  $Cor\_fir$  represent stronger control of corruption, a negative interaction term implies that stronger system reduces the influence poverty has on child mortality. On the other hand, a positive interaction term would suggest the opposite.

It is necessary to estimate two model. While the first model is linear and easy to explain, the second model is more complicated. The interaction term dynamic can undermine the direct impact of other variable in the model when going along with. Therefore, in this research, the baseline model is first estimate, then the interaction model to better captured the full picture.

### 3.4.3. System GMM (*Generalized Method of moments*)

The first two models are estimated using pooled OLS and fixed effects (FE). Fixed effects estimation is preferred for causal interpretation because it controls for unobserved, time-invariant provincial characteristics such as geographic constraints, baseline institutional quality, etc. Year fixed effects capture national shocks occur across all provinces, such as policy reforms, health financing changes or widespread disease like Covid - 19. However, an issue between the correlation between the health expenditure and health outcome is found out. The magnitude implies reverse causality, which is a potential concern for the study. To address this, the research employs a two-step System GMM estimator as a robustness check. System GMM combines equations in levels and uses internal instruments taken from lagged values of endogenous variable. In this study,  $\ln(HEXP)$  is treated as endogenous, with of 2 and 3 years are used as instruments. Two specifications are estimated under System GMM: one without interaction terms (basic model) and one with interaction terms (main model).

$$Z_{it} = \{ \ln(HEXP_{i,t-2}) ; \ln(HEXP_{i,t-3}) \}$$

### 3.5. Empirical strategy

This study proceeds in the following orders. First, pooled OLS is estimated to establish baseline associations between corruption, poverty and under-five – mortality, in control of economic and government allocation sides. Then the interaction term is added to investigate the impact of corruption on the moderate effect of poverty on outcome. Second, FE model serves as the main estimation, controlling for time-invariant across provinces and shocks event across Vietnam. Standard errors are clustered at the provincial level to allow for province serial correlation. For both OLS and FE, the baseline model and the interaction model are each estimated 2 time: first 2 models at the current time for  $\ln(HEXP)$ . Then re-estimated using the variable with 2 years lagged. This examination is to test whether the relationships remain stable when health expenditure is lagged two years. Normally, after a change from policies, increase in resources, the mortality outcome does not come right after that. It requires an amount of time for the effort to born fruits. Moreover, this is an attempt to deal with reverse causality problem between  $\ln(HEXP)$  and  $\ln(U5)$ .

Finally, two-step System GMM is employed as an additional verification step to fix for endogeneity matters. In this GMM setting,  $\ln(HEXP)$  is treated as endogenous, and its 2–3 year lagged values are used as instruments values. The remaining regressors are treated as exogenous. Two specifications are estimated under System GMM: without interaction terms and with interaction terms.

Model diagnostics include:

- Multicollinearity check: Variance Inflation Factor (VIF). All of the VIF number is below 5 with the average is at 3.30. Only  $\ln(\text{HEXP})$  and  $\ln(\text{GRDP})$  is 7.63 and 5.02 respectively. However, the number remains at the acceptable level, since these two variables are correlated with each other based on structure.
- Heteroskedasticity: robust clustered standard errors applied in all final OLS and FE regressions
- Hausman specification test to justify preference for FE over RE. FE is proved to be more suitable for the model
- GMM diagnostic tests

In this research, ChatGPT is utilized in many steps. First, the tool provides a clear structure for the research. Secondly, it gives support when investigating existed literature. At last, after constructing sentence, if the line is not fluent enough, ChatGPT helps in smoothen the sentence.

## 4. Results

### 4.1. OLS estimation

Table 1 contains the OLS results with baseline and interaction model and  $\ln(\text{HEXP})$  in  $t$  and  $t-2$  year

#### 4.1.1. Baseline model – $\ln(\text{HEXP})$ in $t$ year

The baseline OLS model (Column 1) examines the direct association between corruption, multidimensional poverty, GRDP, health expenditure and provincial under-five mortality. Among the controls,  $\ln(\text{HEXP})$  is positive and highly statistically significant ( $\beta=0.2276$ ,  $p<0.01$ ). Because the dependent variable is log transformed, a 1% increase in the health expenditure share means 0.23% higher under-five mortality rate.  $\ln(\text{GRDP})$  is not statistically significant, suggesting that provincial economic power does not directly influence number of child death in this model, where public allocation and poverty distribution are included. The multidimensional poverty rate (POV) is strongly significant ( $\beta=0.0173$ ,  $p<0.01$ ). A 1-point increase in the multidimensional poverty rate is associated with approximately 1.73% higher in under-five mortality. Both corruption control indicators are negative and statistically significant. A one-point improvement in corruption control from the citizen perspective decreases under-five mortality by approximately 8.07% ( $p<0.01$ ). From the firm perspective, a one-point rise in corruption control decreases the independent variable by 7.95% ( $p<0.01$ ). Because both corruption scores are constructed from 1 to 10 with higher scores represent better corruption control. In other word, the system is cleaner, less corruption. These results indicates that stronger institutional accountability are associated with lower child mortality.

From a development economics perspective, these results align with the fundamental poverty – mortality pattern: poverty increases infant and child mortality (Fritzell et al., 2014). This is the same for corruption. Even though the *Cor\_fir* and *Cor\_citi* do not measure the level of corruption, it measures the effort of keeping the system clean, in which limiting corruption. Therefore, the baseline comparison of both corruption and poverty is aligned with existed research.

The positive effect of  $\ln(\text{HEXP})$  does not suit basic logic at first glance. It signals reverse causality. In normal case, people expect the more they spend money on the provision, the better the outcome. However, this is not unusual in public health research in LMIC context. These countries have low level of response in healthcare even after increase the expenditure. It means that when the institution is poor or corrupted, even though the investment increase, the outcome in healthcare performance has no improvement (Farag et al., 2012). Another reason for the phenomenon is that place with higher mortality tend to increase spending as a response to break out of the current situation. A negative relationship is not logically translated to spending increasing mortality. This can be the result of low response from the sector and continue fund input. Simultaneously, corruption introduces leakage, procurement distortions, and inefficient allocation. In such case, higher health spending can reflect higher treatment prices, low service efficiency, and waste. In consequences, this leads to no improvement in the health system. The outcomes can be worse when rent is extracted for private gain. Therefore, the positive coefficient on  $\ln(\text{HEXP})$  is surprising, but not unexplainable in this context. This situation emphasizes the necessity to test lagged  $\text{HEXP}$  and to pursue GMM as a follow-up identification strategy.

#### ***4.1.2. Interaction model – $\ln(\text{HEXP})$ in $t$ year***

In the interaction specification (Column 2), the main results remain directionally similar for  $\ln(\text{GRDP})$ ,  $\ln(\text{HEXP})$ , *POV*, and both corruption indicators. In addition, the interaction coefficient between citizen-based corruption control and poverty is negative and statistically significant (-0.0048,  $p < 0.05$ ). In other words, this indicates that when corruption control from the citizen perspective improves, the harmful effect of poverty on child mortality weakens. In contrast, the *Cor\_fir*  $\times$  *POV* interaction is positive and significant (0.0038,  $p < 0.01$ ). This suggests that from the firm perspective, improvements in corruption control do not systematically reduce how strongly poverty shapes child mortality. On the other hand, corruption in the private sector environment moderates the poverty effect on the opposite side. While citizen – based corruption control is closer to direct service access such as bribery at hospitals, frontline desks, etc. When institution fails in management, the poor have to face the outcome more severe than other groups in the community. On the other hand, based on the firm perspective, corruption is linked to policies, rents, collusion, high mark-ups, etc.

Even though it is harmful, it possibly works as grease, making the procedures become more efficient, alleviate the negative impact poverty have on mortality rate.

In the OLS model, the baseline comparison shows that there is different viewpoint on whether corruption amplify the moderate effect of poverty on health outcome.

#### **4.1.3. Baseline model - $\ln(\text{HEXP})$ in $t - 2$ years**

When HEXP is lagged two years (Column 3) as an attempt to solve reverse causality matter. While the core result pattern remains consistent,  $\ln(\text{HEXP})$   $t-2$  remains positive and significant ( $\beta=0.1917$ ,  $p<0.01$ ), though with lower magnitude compare to the variable at  $t$  year. This decline in coefficient magnitude strengthens the interpretation that part of the positive effect in the baseline model is short-run response. It points out that in the short time the mortality is not able to reduce even when provinces increase spending. When the healthcare performance remains low, as a response, resources continue being pour in. POV remains strongly significant ( $\beta=0.0201$ ,  $p<0.01$ ) which slightly larger than baseline at  $t$  year. It implies that poverty is the key determinants of mortality even after controlling for lagged expenditure effects. Both corruption variables retain negative signs and remain statistically significant. The magnitudes remain economically meaningful. A one-point increase in  $\text{Cor\_citi}$  reduces mortality by approximately 6.42%, a one-point increase in  $\text{Cor\_fir}$  reduces mortality by 7.65%.

#### **4.1.4. Interaction model - $\ln(\text{HEXP})$ in $t - 2$ year**

In Column 4, when interaction terms are estimated with lagged HEXP, signs remain consistent on the  $\ln(\text{HEXP})$  side. However, most of other variables become insignificant. This includes the interaction term. In details,  $\text{Cor\_citi} \times \text{POV}$  remains negative (-0.0047) but loses statistical significance. It is the same for  $\text{Cor\_fir} \times \text{POV}$ . This suggests that the interaction mechanism is more sensitive to short-run dynamics than when control for 2 year in resources allocation. This is consistent with the theory that corruption's amplification poverty is more common at the point of service access, not through long – term channel.

Comparing the result of current year ( $t$ ) and lagged ( $t-2$ ) specifications, the patterns of coefficient direction remain stable. The core corruption effects based on firm perspective persist. It indicates that the relationships are not driven by the same year dynamics. However, the magnitude of  $\ln(\text{HEXP})$  declines when lagged. The result can be due to change in sample size or short-run institution fund input reaction. In other words, provinces spend more in periods when mortality is worsening. This reactive behaviour inflates the coefficient in  $t$  year to be positive. When health expenditure is shifted two years back, the coefficient becomes smaller. Meanwhile, the interaction effects weaken when lagged HEXP is used, implying that the moderating role of corruption over the poverty–mortality pattern operates most strongly through short term period only, not long – term budget plan.

In summary, the OLS estimation results deliver relationship at the baseline, which are:

- Multidimensional poverty is a persistent and strong predictor of child mortality across provinces
- Controlling corruption reduces child mortality risk in two sides perspective, citizens and firms.
- When control level of corruption is high, the poverty impact on health outcome is low, and vice versa
- The direction of  $\ln(\text{HEXP})$  coefficient persist, indicates that fiscal allocation alone is insufficient. The institutional governance determines whether the spending becomes helpful to health sector or just for budget flow.

**Table 2:** OLS estimation results

	Baseline model (1)	Interaction model (2)	Baseline model with 2 years lagged in HEXP (3)	Interaction model with 2 years lagged in HEXP (4)
$\ln(\text{GRDP})$	0.0361 (0.0536)	0.0458 (0.0510)	0.0067 (0.0553)	0.0112 (0.0544)
$\ln(\text{HEXP})$	0.2276*** (0.0451)	0.2238*** (0.0436)	0.1917*** (0.0433)	0.1898*** (0.0426)
<i>POV</i>	0.0173*** (0.0018)	0.0269** (0.0132)	0.0201*** (0.0020)	0.0351 (0.0270)
<i>Cor_citi</i>	-0.0807*** (0.0177)	-0.1162 (0.0198)	-0.0642** (0.0205)	-0.0862 (0.0246)
<i>Cor_fir</i>	-0.0795*** (0.0241)	-0.0376*** (0.0267)	-0.0765 *** (0.0296)	-0.0397** (0.0354)
<i>Cor_citi</i> x <i>POV</i>		-0.0048** (0.0025)		-0.0047 (0.0042)
<i>Cor_fir</i> x <i>POV</i>		0.0038*** (0.0013)		0.0026 (0.0018)
Constant	4.5641*** (0.1856)	4.4533*** (0.1930)	4.5087*** (0.2458)	4.3865*** (0.2832)
R-squared	0.7229	0.7287	0.7070	0.7102

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*Notes: significant level is signed as \*\*\*, meaning  $p < 0.01$ , \*\* is  $p < 0.05$ , and \* is  $p < 0.1$*

#### 4.2. FE model estimation

This research use FE model estimation result as the main object for interpretation and further discussion. In details, Table 3 reports the regression result in 4 stages.

##### 4.2.1. Baseline model – $\ln(\text{HEXP})$ in t year

With province and year fixed effects, the poverty coefficient remains positive and significant. Based on the regression result, a 1-point increase in the multidimensional poverty rate is associated with approximately 1.06% higher under-five mortality within a province over time. In the corruption variables, while Cor\_fir continuedly has a negative impact on the U5, Cor\_citi loose its impact. However, the level of significance decrease compared to the OLS estimation at baseline. In details, a 1-point improvement in firm-side corruption control is associated with 1.45% lower under-five mortality.  $\ln(\text{GRDP})$  remains the same, with no influence on the outcome. Moreover, in this estimation,  $\ln(\text{HEXP})$  is insignificant. This implies that when control for time and provincial effects across region, the resources input in current year does not show clear change to the healthcare performance.

The FE design strips out time-invariant provincial traits. What is left are the dynamics inside the province. The unchanged result of the poverty and mortality relationship shows that the deeper multidimensional deprivation, the more child deaths occur. This is logically up to expectation. When deprivation in education, housing, sanitation, and information expands, families' ability to access health services and practice preventive behaviours deteriorates. Another variable stay consistent is the firm – based corruption control. The effect is negative suggests that when the government accountability is high by effective resources allocation, policies and strict law enforcement, the health systems may acquire inputs more efficiently. Therefore, the mortality state improves and decreases.

##### 4.2.2. Interaction model – $\ln(\text{HEXP})$ in t year

In the interaction model, the poverty main effect remains positive and significant, only at weaker level. In contrast to the baseline model, the Cor\_fir has no impact while Cor\_citi negatively influences U5 at 10% significance. The change occurs due to the dynamic brought by the interactions. In this model, the most focus is laid on the coefficient of Cor\_citi x POV and Cor\_fir x POV. With a negative coefficient – 0.021 at 5% significant level, the interaction between the firm – based corruption control and multi-dimensional poverty rate worsen the health outcome. That is to say, the stronger the management of government according to private sector companies' viewpoint, the weaker effect poverty has on the number of child deaths.

The firm – based corruption variable with poverty translates to the relevance of the governance channel. A well – managed institution with low level of corruption reduces the additional mortality associated with poverty. In the mechanism term, prior research shows that corruption in procurement and contracting make resources drain at a faster rate than small informal payments at the point of service. This is because these leakages occur before inputs reach facilities, thereby undermine service capacity (Vian, 2012; Ensor & Durán-Moreno, 2002; Delavallade, 2006). When firms are not forced to pay commissions and informal fees to operate, the provincial health system can acquire inputs closer to true efficiency cost. This creates effective public investment. Even if HEXP magnitude is unchanged, the poor households, who are vulnerable to the financial shock, will benefit first and most when this upper distortion is reduced.

The citizen side interaction being non-significant in this estimation indicates that small sum of bribery or favoritism in the frontline are not robust enough to amplify poverty’s effect in FE model. This does not mean frontline corruption is irrelevant. It suggests that once fixed provincial characteristics and national shocks are removed, the citizen experienced level of corruption is not consistent enough to impact the slope effect of poverty on health.

#### **4.2.3. Baseline model – ln(HEXP) in t – 2 year**

With health expenditure lagging two years, poverty remains strong and significant with positive coefficient, 0.0132 and  $p < 0.01$ . Therefore, a 1-point rise in POV is associated with approximately 1.32% higher in mortality, which is slightly larger than in t year. Control level based on firm perspective is again negative and significant. The number implies that with 1 point improvement in corruption control based on firm – view, the mortality lowers at about 1.92% lower mortality. Compared to Column (1), it is similar in magnitude. Citizen-side control is negative but not significant. ln(HEXP) turns positive with coefficient is 0.0257 and statistically significant at 5% significance. It means that a 1% higher in provincial share of health expenditure at two years prior associates with 0.026% higher mortality today.

The results confirm 2 matters. First, poverty persist over time and the slope is larger with lagged spending. This means the damage of poverty does not disappear quickly. It requires time and effort. When the province is poor, it does not create an instant shock but instead leads to increase in child deaths for a long term. Second, the corruption variable on firm side survives the change brought by the lag. In other words, in case a province improved the accountability in institution, which leads to less corruption from the firm view, the effect will last long in health sector. It is. Third, the positive ln(HEXP) coefficient in year t- 2 remains significant. Therefore, it strengthens the argument that the investment is used as a reactive action, not a preventive one. This is because in normal state, past expenditure should improve present outcome. However, the outcome still

worsens. It does not reflect that resources input leads to harm but instead shows sign as leakage due to corruption or, increase in spending when there is no improvement from the mortality rate.

#### 4.2.4. Interaction model – ln(HEXP) in t – 2 year

When the FE interaction model is re - estimate using HEXP from two years earlier, two variables keep their magnitude compared to year t. the poverty coefficient remains positively significant with larger impact, and the firm - based interaction consistently has a negative influence on U5 and also with higher coefficient compared to column (2). This dynamic strengthening reinforces the interpretation that institutional improvements to purge corruption has an accumulative effect on the mortality.

This lagged year in spending’s estimation is relevant in development economics. The poor do not simply die more because they are poor today. The number of deaths increase more because institutional environments fail persistently. Provincial inequality in child mortality is not just a short - term deprivation problem, rather it is a problem in allocating resources. Poverty makes the poor more exposed and vulnerable. Corruption multiplies that hardship by preventing government from translating monetary inputs into real health capacity. When corruption control improves in the business environment, the burden of poverty on health sector is alleviated. This effect strengthens in lagged spending in FE model because true efficiency requires time to materialize.

The citizen – based interaction is again non-significant in the lagged spending model. This reinforces the interpretation that frontline experience is rather short-run. Once FE model deletes persistent province culture, it loses its impact. Poverty – mortality pattern is most likely driven by structural leakage, not frontline corruption.

Across both t and t-2 year in health expenditure, the FE interaction analysis reveals a clear evidence: firm-side corruption control is the channel in which poverty has more impact on mortality. This interaction is stronger and more economically meaningful than the main effects themselves. Poverty does not solely result in death increase. It also becomes more severe when institutional quality is weak and becomes less damaged when procurement and governance are strengthened.

**Table 3:** FE estimation results

Baseline model	Interaction model	Baseline model with 2-year lag in HEXP	Interaction model with 2-year lag in HEXP
(1)	(2)	(3)	(4)

$\ln(HEXP)$	0.0166 (0.0100)	0.0113 (0.0105)	0.0257** (0.0116)	0.0245** (0.0113)
$\ln(GRDP)$	0.0206 (0.0262)	0.0016 (0.0238)	0.0256 (0.0314)	-0.0021 (0.0235)
$POV$	0.0106*** (0.0021)	0.0118** (0.0050)	0.0132*** (0.0043)	0.0262** (0.0099)
$Cor\_citi$	-0.0111 (0.0077)	-0.0144* (0.0082)	-0.0135 (0.0093)	-0.0104 (0.0092)
$Cor\_fir$	-0.0145** (0.0059)	0.0064 (0.0082)	-0.0192** (0.0082)	0.0137 (0.0082)
$Cor\_citi \times$ $POV$		0.0007 (0.0010)		0.00001 (0.0012)
$Cor\_fir \times$ $POV$		-0.0021** (0.0010)		-0.0033*** (0.0011)
Constant	3.0953*** (0.0998)	3.1101*** (0.0888)	3.1571*** (0.1723)	3.0870*** (0.1178)
R-squared	0.662	0.692	0.613	0.680
N	432	432	324	324

*Notes: significant level is signed as \*\*\* meaning  $p < 0.01$ , \*\* is  $p < 0.05$ , and \* is  $p < 0.1$*

### 4.3. GMM estimation

The motivation for employing the two-step System GMM estimator directly rooted in concern of reverse causality between health expenditure and mortality outcomes. In this research, multi – dimensional poverty and corruption is considered an institutional structural characteristic. On the other hand, health spending is more responsive to shocks. Mortality rate is a common and sensitive health variable. When the measure fluctuates, provincial governments may react by expanding health spending in bad periods. Therefore, the positive association observed under OLS and FE estimation raises a critical concern: whether this is a casual effect between spending and health outcome or it is due to governance response and corruption leakage. System GMM uses internally generated lagged instruments to eliminate endogeneity and reverse causality. Therefore, it plays an essential role in isolating the casual effect between U5 and HEXP, or an act of fiscal response under weak intuition.

The System GMM baseline results without interaction terms provide a strong diagnostic signal. In contrast to OLS and FE, the coefficient of  $\ln(\text{HEXP})$  in the baseline GMM specification turns negative (-1.6135) and statistically insignificant. This shift in magnitude and precision is not random sign. It is consistent with the interpretation that once the two-step GMM estimator with Windmeijer corrects for the problem that mortality and spending influence each other, the result shows that they does not have a clear causal effect. In other words, after controlling for endogeneity, provincial health expenditure does not predict improvements in child survival. This outcome reaffirms that the previously observed positive relationship (OLS and FE) was not purely because higher spending worsens outcomes. GMM provides evidence that provinces experiencing low mortality rate tend to increase health spending after in effort to save the situation. This reactive pattern is consistent with well-established LMIC public finance behaviour. Fiscal allocation commonly arrives late and institutions are more likely to make plan based on current crisis than create a preventive measure for future scenario (Farag et al., 2012). Hence, increase in health budgets does not damage the health sector. The result from GMM confirms that they are increased when harm is already occurred. Therefore, the disappearance of significance level of  $\ln(\text{HEXP})$  under GMM strengthens the earlier interpretation that the positive coefficients in OLS/FE were capturing leakage, inefficiency, and reactive expenditure response, rather than the casual effect of mortality.

When the interaction model is employed, the results continue confirming the prior interpretation. In this case, the coefficient for  $\ln(\text{HEXP})$  remains negative (-0.7353) and statistically insignificant. This further confirm that previous positive effect does not translate to spending harming health sector. Meanwhile, the interaction effect of  $\text{Cor\_fir} \times \text{POV}$  becomes positive (0.0045) and statistically significant at the 5% level. Even though the result seems absurd compared to FE model, it is still acceptable. Normally, GMM works as a tool to eliminate endogeneity and reverse causality, improve standard errors, etc. It is not employed for the purpose of interpreting the relationship between variables.

The interaction term for  $\text{Cor\_citi} \times \text{POV}$  is negative (-0.0020) but insignificant. The other variable also has no impact on the health outcome.

This regression across 3 steps:  $\text{OLS} \rightarrow \text{FE} \rightarrow \text{GMM}$  produces a structure for unified interpretation. In OLS, poverty shows a strong and significant positive association with under-5 mortality, while corruption

control is associated with lower mortality. This is consistent with the expectation that poverty and corruption harm the healthcare system. The positive effect on the firm–side interaction term is considered grease to smoothen the procedure. It reflects that in short term, increase in corruption does not create burden for the poor. On the other hand, it alleviates the impact poverty has on child death. In contrast, the citizen experiences differently. Leakage at the service point can push poor household to become untreated, raising the number of deaths. However, once time–invariant heterogeneity is removed under FE, this effect collapses. The interaction effects become clearer. In details, poor provinces suffer disproportionately more under weak corruption control based on private sector viewpoint. It indicates that corruption magnifies the hardship of poverty due to misallocation, distorted procurement, etc. When introducing lagged health spending, this pattern strengthens in coefficient rather than weakens. It suggests that this interaction mechanism is structural and persistent, not short–run reactive case. Finally, System GMM removes reverse causality influence and confirms that the positive influence of health spending on mortality rate is a reactive response, not a structural element. Across these steps, the core conclusion consolidates: Child mortality variation across provinces is driven primarily by how corruption and poverty interact inside the health system, not increase in health spending. It determines whether health services reach the poor or not.

**Table 4:** GMM estimation results

Variable	GMM (No Interaction)	GMM (With Interaction)
	(1)	(2)
$\ln(GRDP)$	-1.8578 (3.1937)	-0.9359 (0.7730)
$POV$	0.0726 (0.0959)	0.0331 (0.0291)
$\ln(HEXP)$	-1.6135 (3.0940)	-0.7353 (0.7341)
$Cor\_fir$	0.0208 (0.1987)	-0.0787 (0.0518)
$Cor\_citi$	-0.2443 (0.3044)	-0.1370 (0.0921)

<i>Cor_fir</i> × <i>POV</i>		0.0045**
		(0.0024)
<i>Cor_citi</i> × <i>POV</i>		-0.0020
		(0.0041)
N	432	432
Groups	54	54
Number of Z	14	16
AR(1) p – value	0.609	0.419
AR(2) p – value	0.596	0.320
Hansen p – value	0.657	0.129
Sargan p – value	-0.637	-0.049

*Notes: significant level is signed as \*\*\* meaning  $p < 0.01$ , \*\* is  $p < 0.05$ , and \* is  $p < 0.1$*

## 5. Discussion

The empirical results from this research clearly demonstrate that the fundamental drivers shaping provincial health outcome differences in Viet Nam are corruption and poverty. Moreover, the interaction between the two is the core determinants. Across all estimation specifications, OLS, FE and System GMM, the evidence consistently points toward the conclusion that institutional failure and deprivation reduce the efficiency of the health system. It limits the ability to translate resources into service in health sector. Poverty consistently shows a strong and statistically significant positive association with under-five mortality across all models. This reflects the structural burden that deprivation imposes on health capability. Corruption control maintains a negative association with mortality in most model specifications. In details, it means that better governance environments are associated with improved child survival. The most dynamic pattern emerges when these two elements interact. Weaker corruption control intensifies the harmful impact of poverty, which mean that poor provinces have to suffer more to survive. This interaction result is not only statistically meaningful but also fit with existed evidence and with the context of health structure in Viet Nam.

This pattern is not a short-term scene. When fixed effects are introduced controlling for the current year and two years prior in health spending, the noise happens in short term is eliminated, which makes the model becomes more consistent and stable. In these estimations, interaction between corruption and poverty remains negative at firm - based. This implies that corruption does not only harm health outcomes directly. It redistributes harm by making the poor provinces bear more risk, more loss, and more unequal outcomes. Poverty makes households less able to survive health shock by compensate, substitute, etc. They cannot afford to access private hospitals, pay informal payments without affecting their safe budget, or balance consumption during periods of widespread illness. Therefore, corruption becomes a condition that selectively increases mortality risk among the poor. It does not equally affect everyone across the nation. The results of this research confirm that corruption in Viet Nam's provincial health system is not only a misallocation problem, it is rooted inside the system. It is a mechanism through which inequality translates into less chance of survival.

Furthermore, when endogeneity is addressed in System GMM, corruption and poverty remain the central explanatory forces. While the health spending remains significant across estimation and model, its positive magnitude is unlogic. Therefore, the matter of reverse causality is addressed by using system GMM. The loss of significance in health expenditure after correcting endogeneity is not random. It reinforces a structural mechanism in Vietnamese health system. Increase in spending does not absolutely leads to better outcome. It can be due to governance response when seeing the report of low mortality rate. Also, the matter occurs due to leakage in the health system. Therefore, it is not important of how much money is used. What matters is whether the institutional environment is capable of ensuring that resources are transformed into real services, real access, real medicines, and real functioning infrastructure. When corruption exists, the marginal effect of additional spending is captured and extracted before it reaches patients. Even when the services reach the patients, it will be at a higher cost due to informal payment. The expenditure channel plays a supplementary role in this model. It helps reveal why spending cannot be interpreted naively. It proves that institutional quality is the actual baseline to improve the outcome.

The implications for Viet Nam are profound because the empirical findings correspond with the reality. Despite governance effort in expansion of social health insurance coverage and major public health investment over the past decade for fare treatment, poor household still suffer with severe illness, unable to access to the health services (Le et al., 2010). Evidence from cancer treatment studies shows that even insured patients fall into poverty because of treatment cost (Hoang et al., 2017). The evidence illustrate that poverty does not only impact the health outcome, it influences the whole system. In this context, corruption at the frontline and procurement combined with deprivation by raising

treatment cost, lowering efficiency, increasing delay, etc. As a result, poor households bear more harm because they face both disadvantage from their poverty and government failed management.

This research adds a critical point for discussion: the poor do not only lose more when corruption exists, they lose more compare to other groups in the society. Weak corruption control makes the elasticity of survival with to poverty impact even steeper. Therefore, in this study, increase in child mortality does not simply demonstrate a health system failure, it is a function of inequality inside the provision. Institutions determine whose child get the opportunity to receive treatment and whose child not. In development economics research, the poor has been unequal at the beginning, making the vulnerability of health risk is much higher. When corruption is added to the picture, the burden intensifies, thereby, creates more death

This is particularly relevant in Viet Nam where provincial heterogeneity in institutional performance is large and persistent. Provinces differ in their level of administrative transparency, enforcement credibility, public trust, implementation discipline, and local political capacity. Those differences translate into differences in corruption control, which shape the conversion efficiency of budget into services. When these institutional variations interact with deprivation patterns, the mortality rate rises. Poor provinces are often those with weak administrative capability, low enforcement strength, remote geography, weak discipline, and less competitive political oversight. These are also the places where supply chain integrity, procurement monitoring is weakest. In worse case, unofficial payments are normalized, and accountability to citizen feedback is low. Therefore, the interaction mechanism found in this research is not a statistically significant, it is a reflection of the political economy of provincial service delivery in Viet Nam.

The results also indicate the reason why even when the spending on health sector is increased annually, the system is unable to reach the expected outcome. In systems with high leakage risk, high informational asymmetry, and weak enforcement, additional resources do not convert into proportional health improvement. Policy response must therefore prioritize corruption mitigation at the same time with poverty reduction. Anti-poverty efforts alone may not achieve full mortality reduction if corruption blocks the transformation of resources into service. Also, Anti-corruption efforts alone may also not be sufficient because the poor remain structurally constrained in their ability to access good-quality care even under cleaner systems. The empirical evidence in this study therefore supports a dual-action priority: provincial health reform in Viet Nam must simultaneously strengthen institutional integrity and remove structural barriers for the poor. Neither alone is fully effective. It is the intersection that matters.

This finding addresses a gap in previous Viet Nam research which tended to focus on individual determinants of service delivery failure (access inequity, insurance depth, public sector efficiency) rather than the interaction between institutional distortion and socioeconomic deprivation. By empirically quantifying how institutional weakness amplifies poverty harm, this research re-frames mortality inequality in Viet Nam not as a mere resource deficit problem but as an institutional injustice problem. It demonstrates that mortality can only be prevent when there is effort in making a better system where the poor can convert resources into actual health capability. This also aligns with international evidence. While multidimensional poverty produces cumulative biological disadvantage, corruption increases the cost of reaching effective care. This research connects these separate strands and shows that the two forces do not operate in parallel, they operate together, compounding each other.

However, several directions remain open for future research. First, the present study focuses exclusively on mortality as a health outcome. Future studies could extend this framework to morbidity, maternal outcomes, or health service utilization to capture broader dimensions of health capability. Second, while the current analysis is at provincial-level, micro-level household data could further investigate inequality and reveal how corruption differentially affects poor and non-poor households within the same administrative unit. Third, longitudinal micro-surveys or experimental governance interventions could test causal mechanisms more directly, examining whether improvements in transparency, audit intensity, or citizen participation reduce the poverty–health penalty. Lastly, future studies may consider institutional interactions beyond corruption, such as bureaucratic quality, trust, and social capital. These directions can support understand of how governance condition the distribution of health outcomes. Addressing these extensions would deepen the understanding of how poverty and institutional quality shape human development in Viet Nam and beyond.

## 6. Conclusion

This thesis examined how corruption and poverty interact to shape provincial health outcomes in Viet Nam. The outcome is focus on under–five mortality rates. While both corruption and poverty individually affect health system performance, the central analytical question addressed here was whether the interaction between them amplifies the mortality burden. The analysis drew on provincial panel data from 2016–2023, combining corruption indicators from PCI and PAPI with multidimensional poverty and GSO health statistics. By applying sequential estimation using OLS, Fixed Effects, and System GMM, the study was able to detect the direction but the structural depth of these relationships. Moreover, while running system GMM as to address for reverse casualty, the reactive public expenditure behaviour from institutions is explored.

There are 3 main empirical insights emerge from the results. First, multidimensional poverty consistently increases under-five mortality rates across all specifications. Poverty is a persistent structural determinant, and its effects do not dissipate quickly over time. Second, corruption matters, but greatly depends on its channel. From the firm perspective, corruption reflects procurement distortions, pharmaceutical bidding, contracting integrity, and supply chain abuse. They play a more fundamental role in shaping mortality impacts than citizen-facing experience with corruption. This is consistent with a leakage and resource conversion inefficiency channel. Third, health expenditure itself does not causally reduce mortality once endogeneity is controlled for. The positive coefficients observed in OLS and FE were diagnostic of reactive fiscal allocation and inefficient public finance conversion, rather than true preventive investment. System GMM revealed that the amount of investment is not the core determinant improves the performance and reduce child deaths. It is the governance quality and institutional capacity that determine whether spending becomes real service. Only when the institution is well – managed, the poor can benefit from the sector and be treated equally.

Hence, there are two theoretical contributions of this study. It empirically differentiates between corruption channels, showing that it is not “corruption in general” but specifically upstream procurement and contracting corruption that most strongly conditions the poverty–mortality relationship. In addition, it demonstrates that poverty’s effect is magnified through governance conditions, not simply through insufficient resources. This strengthens the understanding of corruption as a multiplier of inequality in health systems, not just an independent constraint on service delivery. When poverty and corruption co-exist, the same nominal health budget purchases fewer effective inputs than when the system is clean, and the poor are disproportionately harmed by that pattern.

For Viet Nam, the implications are direct and policy relevant. Increasing provincial health expenditure alone is not a sufficient strategy to reduce preventable child mortality. The marginal impact of spending depends on whether the procurement system and contracting environment are shielded from corruption distortions. Reforms that focus solely on expanding fiscal space will yield limited returns. If pharmaceutical procurement remains vulnerable to leakage, if front-line processes lack transparency, and if provincial law enforcement remains soft, the investment will be in vain. Viet Nam’s ongoing digital government and anti-corruption agenda should therefore prioritize systemic transparency mechanisms such as e-procurement, mandatory tender publication, contract based on performance, corporate compliance monitoring, and sanctions at the point of procurement leakage. Strengthening accountability at this upstream interface would generate higher returns than just naively increasing budgets. At the same time, targeted support to structurally poorer provinces, especially those with high multidimensional poverty like Northern midlands and mountain areas and

the Sentral Highlands, and remains necessary. This is because the vulnerability brought by poverty is persistent and multiplies through governance failures.

Finally, this study carries important implications for future research. First, measurement of corruption remains perception-based; incorporating objective audit data or administrative procurement data would allow for sharper causal identification of leakage mechanisms. Second, future work should disaggregate health expenditure by functional category to test which components are most affected by inefficiency. Third, micro-province linkage with household health service use data would enable deeper analysis of whether corruption exacerbates inequality through differential treatment, quality, or price discrimination. Lastly, extending the analysis to other health outcomes beyond under-five mortality would broaden generalizability and test whether mortality captures the most severe manifestation of corruption-poverty interactions, or whether similar patterns hold for maternal mortality and avoidable morbidity indicators.

In conclusion, this thesis demonstrates that corruption and poverty in Viet Nam cannot be treated as independent health determinants. Their interaction is central to explaining why mortality differences persist across provinces despite rising national health expenditure. Reducing preventable child mortality therefore requires reforming the institutional conditions under which resources are translated into real services—particularly within procurement, contracting, and input conversion channels—alongside sustained poverty reduction efforts.

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