Senior Research

Determinants of Poverty in Thailand: A Panel Data Analysis at the Provincial Level

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Abstract

This study takes a close look at what drives poverty in Thailand's 77 provinces, using data gathered from 2012 to 2019. By applying a fixed-effects regression model, the research pinpoints the most important factors shaping poverty levels and considers how these findings can guide practical policymaking. Key elements examined include the region's overall economic health (measured by GDP per capita), how well residents are educated, how many people are out of work, how many children and seniors rely on working adults, and the portion of the economy dedicated to industry.

The results clearly show that when a province's economy is stronger and people have better educational opportunities, poverty tends to decline. In other words, thriving local economies paired with access to quality education help lift communities out of hardship. Interestingly, just having more jobs or a larger industrial sector doesn't automatically reduce poverty—what matters more is making sure that the jobs available genuinely help people improve their circumstances. A heavy burden of dependents (like children and the elderly) also makes it harder for families to escape poverty, since working adults must stretch their resources further.

Overall, this research offers valuable insights into why some places in Thailand struggle more with poverty than others. It suggests that policies should focus on fostering inclusive economic growth, improving educational access, and easing the financial load on families with many dependents. By shining a light on the factors that matter most, this study helps leaders craft strategies to reduce poverty in a way that truly improves people's lives.

Acknowledgement

I would like to express my deepest gratitude to Asst. Prof. Katikar Tipayalai, Ph.D., for her invaluable guidance, expertise, and unwavering support throughout every stage of this research. Her constructive feedback, insightful suggestions, and encouragement were instrumental in shaping both the direction and quality of this study. I am truly fortunate to have had the opportunity to work under her mentorship, as her dedication and profound knowledge in the field have been a source of inspiration throughout this journey. Her patient guidance and commitment to excellence have left a lasting impact on my academic growth, and for this, I am sincerely grateful. I would also like to extend my heartfelt thanks to the National Economic and Social Development Council (NESDC) and the National Statistical Office (NSO) for their support in providing the critical data that made this study possible. Their collaboration and meticulous efforts in data management have been invaluable, ensuring access to reliable and comprehensive datasets necessary for conducting this research.

Wasu Chotboriboon

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Chapter 1

Introduction

Introduction of Poverty

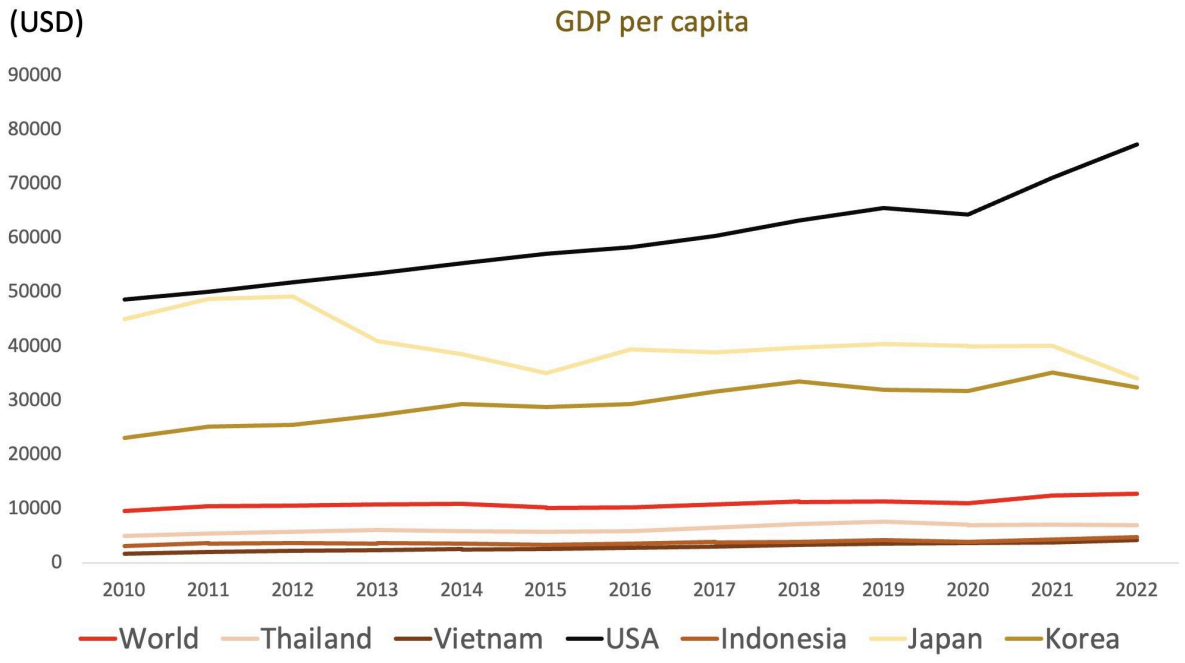
On a global scale, poverty represents one of the most pressing and persistent development challenges, influencing not only individual livelihoods but also the stability and growth of entire regions. Traditionally understood as a lack of sufficient income, contemporary perspectives now recognize poverty as a deeply multidimensional phenomenon. This expanded view encompasses not merely the absence of financial resources, but also limited access to essential services such as quality education, affordable healthcare, adequate housing, and clean water. Nutrition, sanitation, and reliable infrastructure similarly shape the contours of poverty, creating interdependent barriers that hinder individuals and communities from achieving a decent standard of living.

Moreover, poverty extends beyond material deprivation to affect the social and political dimensions of life. Individuals living in poverty often experience reduced political participation, social marginalization, and fewer opportunities to engage fully in the economic activities that could lift them out of hardship. These constraints not only curb personal development but also stifle broader societal advancement, as talent, innovation, and productivity remain underdeveloped. Intergenerational cycles of poverty emerge when children are denied access to schooling due to financial constraints, trapping them in a pattern of limited skills, low earning potential, and persistent vulnerability. This cyclical nature underscores the complexity of poverty, as overcoming it requires more than isolated interventions—it demands integrated, evidence-based strategies that address its various dimensions simultaneously. Understanding these diverse factors is essential for formulating sustainable solutions that promote long-term economic growth, inclusive social policies, and equitable resource distribution on an international scale.

In this context, global efforts to combat poverty have been framed by international targets such as the United Nations Sustainable Development Goal (SDG) No. 1, which aspires to eradicate extreme poverty and reduce its broader dimensions by 2030. SDG No. 1 underscores the importance of comprehensive policies and multisectoral strategies that prioritize both immediate relief and longer-term structural changes, including investment in social protection systems, improved health and education infrastructures, equitable economic growth, and governance reforms. By addressing the interconnected drivers of poverty—ranging from income instability and lack of employment opportunities to inadequate

services and sociopolitical exclusion—these initiatives seek to strengthen resilience, enhance human capabilities, and ensure that communities are not simply lifted above a financial threshold but empowered to achieve lasting well-being. Aligning research, policy interventions, and resource allocation with the objectives of SDG No. 1 is therefore crucial, as it guides global, national, and local stakeholders in crafting coherent strategies that foster meaningful, enduring reductions in poverty worldwide.

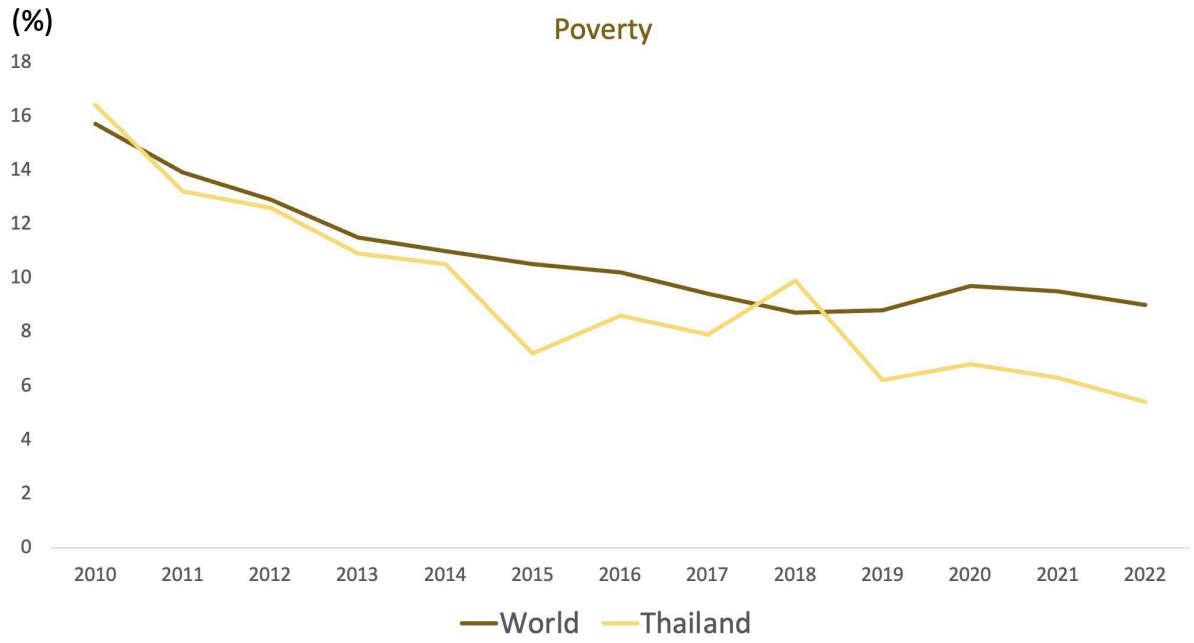
In Thailand, despite decades of impressive economic growth and significant strides in poverty reduction, poverty remains a persistent issue, particularly when analyzed at a regional level. The country has experienced substantial increases in GDP per capita, industrialization, and urbanization. However, these achievements have not been distributed equally across the nation. Regional disparities are stark: urban centers like Bangkok and surrounding provinces have benefited disproportionately from economic development, while rural areas, particularly in the Northeast and South, continue to face significant challenges in alleviating poverty. These disparities highlight the uneven impact of Thailand's economic growth and underscore the need for targeted, region-specific policy interventions.



Source: Data.worldbank

This graph illustrates the GDP per capita (in USD) trends from 2010 to 2022 across several countries, including Thailand, Vietnam, Indonesia, the USA, Japan, Korea, and the global average. The USA leads with the highest GDP per capita, showing a steady increase over the years and reflecting consistent economic growth. Japan and Korea follow with relatively high GDP per capita, though Japan shows a slight decline during certain periods. In contrast,

Thailand, Vietnam, and Indonesia have much lower GDP per capita compared to developed countries but exhibit gradual growth over time, indicating ongoing economic development. The global average remains steady with minimal fluctuations, while the gap between developed nations (e.g., the USA) and developing nations (e.g., Vietnam and Indonesia) underscores persistent economic disparities. Thailand's GDP per capita shows moderate growth, maintaining a position above Vietnam and Indonesia but significantly trailing behind the USA, Japan, and Korea.

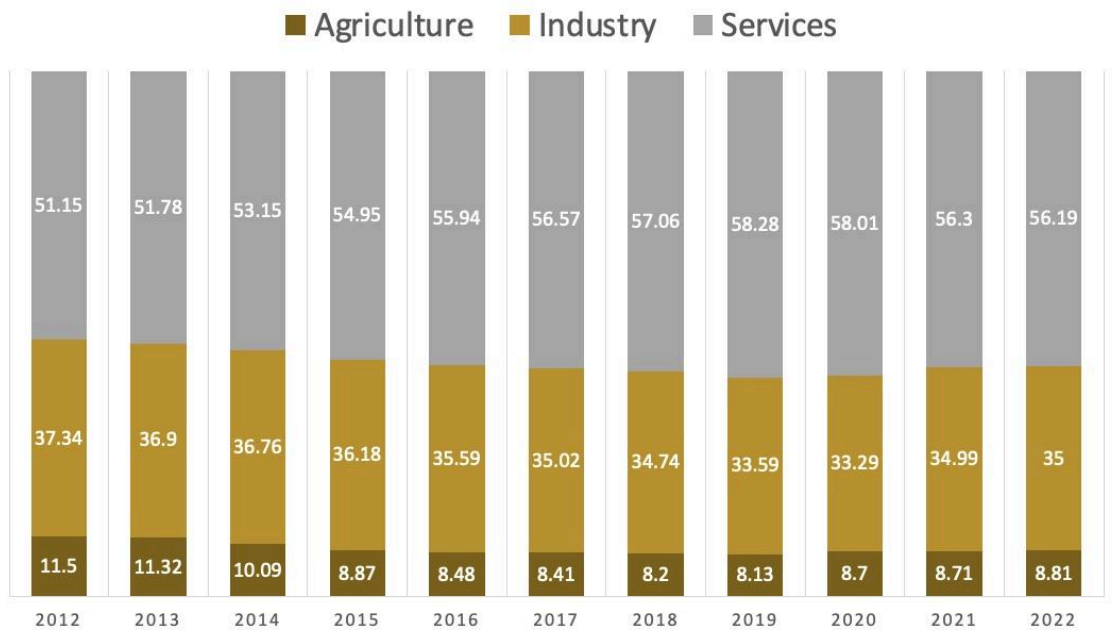


Source: Data.worldbank

This economic development is closely linked to poverty trends in Thailand, as highlighted in the second graph, which shows poverty rates (in percentage) from 2010 to 2022. Globally, the poverty rate steadily declines, reflecting gradual improvements in reducing extreme poverty. However, Thailand demonstrates a sharper reduction in poverty, particularly between 2012 and 2018, where its poverty rate falls faster than the global average. Although fluctuations are evident around 2018–2019, with a slight increase in poverty levels, the downward trend resumes, and by 2022, Thailand's poverty rate is significantly lower than the global average. This suggests that Thailand's moderate economic growth, reflected in its rising GDP per capita, combined with targeted policies, has effectively accelerated poverty reduction, outpacing global trends and emphasizing the connection between economic progress and social improvement.

The international poverty line is set at 26 THB per day or 780 THB per month, a global benchmark for extreme poverty. However, Thailand’s national poverty line is much higher at

90 THB per day or 2700 THB per month, reflecting the country's higher cost of living and the realities of everyday life for its people. This difference shows that Thailand recognizes the global standard may not fully reflect what it takes to meet basic needs within the country. By setting a higher poverty line, Thailand acknowledges that its people need more to cover essentials like food, housing, and healthcare, ensuring that the measure of poverty aligns better with the challenges faced by its population.



Source: Statista

The agriculture sector, though historically significant, now plays a smaller role in the economy, providing essential food supply and raw materials but contributing less to GDP. The industrial sector, encompassing manufacturing and production, serves as a key driver of economic growth and exports but has faced challenges in maintaining its share over the years. Meanwhile, the service sector, which includes tourism, finance, and retail, has emerged as the backbone of Thailand's economy, reflecting its transition to a more diversified and modern economic structure.

Over the observed period, the service sector consistently dominates, growing from 51.15% in 2012 to 56.19% in 2022, highlighting its expanding role. The industrial sector, while remaining the second-largest contributor, has seen a gradual decline from 37.34% in 2012 to 35% in 2022. The agriculture sector, representing the smallest share, declined significantly from 11.5% in 2012 to 8.41% in 2017, before slightly recovering to 8.81% by 2022. These trends reflect a structural shift in Thailand's economy, emphasizing the increasing importance of services while the roles of agriculture and industry evolve.

Research Objectives

This research aims to examine the determinants of poverty in Thailand at a provincial level, focusing on the period between 2012 and 2019. The study adopts a panel data analysis approach, which allows for the examination of temporal and regional variations in poverty across 77 provinces. This methodology is particularly useful in capturing the effects of both province-specific characteristics (e.g., industrial composition, educational attainment, dependency ratios) and time-varying factors (e.g., economic growth, policy interventions). By addressing these variations, the research provides a more comprehensive understanding of the complex factors that drive poverty in Thailand.

Research Questions

The study seeks to answer a question: What factors drive poverty across Thai provinces, and how can policies address these determinants? This question is critical for designing targeted, evidence-based strategies to reduce poverty effectively. For example, understanding the role of GDP per capita, education, and dependency ratios in influencing poverty levels can help policymakers prioritize investments in human capital development, infrastructure, and social safety nets. Simultaneously, identifying the limited impact of factors like unemployment or industrial composition in this context can direct future research toward more nuanced aspects of labor market dynamics and economic diversification.

By exploring these determinants, this research aims to bridge the gap between macroeconomic development and local realities, offering actionable insights for reducing poverty and fostering inclusive growth in Thailand. It is not only a call for deeper analysis but also a reminder of the ongoing need to address poverty in all its dimensions to ensure sustainable and equitable development for all regions in the country.

Contributions

This study contributes to the literature by providing a provincial-level analysis of poverty in Thailand, utilizing panel data to account for both time and regional variations. It offers evidence-based insights into how factors like GDP per capita, education, and dependency ratios impact poverty, highlighting regional disparities and the effectiveness of current policies. Additionally, the research provides practical recommendations for targeted interventions to promote inclusive growth, reduce regional inequalities, and improve living standards across Thailand.

Chapter 2

Literature Review

Conceptual Understanding and Measurement

The conceptualization and measurement of poverty have evolved significantly over time. Martin Ravallion (2010) underscores the complexity inherent in defining poverty, noting that national poverty lines often emerge from both absolute consumption needs and relative standards of social inclusion. He argues that poverty definitions adapt to economic progress, blending fundamental material requirements with the need for social participation. This perspective highlights the dynamic nature of poverty, showing its sensitivity to economic and social change.

Amartya Sen's capability approach adds another dimension to understanding poverty, framing it as the deprivation of essential capabilities rather than merely a lack of income. This perspective emphasizes the importance of enabling individuals to live with dignity and to realize their potential, recognizing that poverty involves both material scarcity and constraints on freedom and opportunity. For instance, inadequate access to healthcare, education, and social networks can perpetuate cycles of poverty, impeding individuals from escaping economic hardship. These conceptual frameworks reinforce the multidimensional nature of poverty, challenging policymakers to go beyond monetary metrics and to consider broader indicators of well-being.

Impact of Economic Growth

Economic growth has long been viewed as a cornerstone of poverty alleviation, yet its effectiveness hinges on its inclusivity and equity. Studies in Asia, such as those edited by Pernia and Deolalikar (2003), demonstrate that while growth can significantly contribute to poverty reduction, its benefits do not necessarily trickle down evenly. Institutional reforms, improved governance, and targeted social programs are necessary to ensure that economic gains translate into tangible improvements for marginalized populations. Thailand's rapid economic expansion in the 1990s, for example, substantially lowered poverty incidence. However, Warr (2001) observed that the benefits were unevenly shared, with rural areas and vulnerable groups receiving a disproportionately small share of the prosperity. These examples underscore the importance of complementing economic growth with policies that address inequality and ensure equitable access to resources.

Poverty and Aging

Poverty and aging intersect in complex ways, influencing individuals across various life stages—from dependent childhood to retirement—and presenting evolving challenges over time. Measurement further complicates this relationship due to differing definitions of poverty. Absolute thresholds, such as the U.S. poverty line, define a fixed income level deemed sufficient to meet basic needs. In contrast, relative measures, like the OECD's income-based poverty metric, assess poverty in relation to median societal incomes, thereby revealing disparities within a population (Marchand & Smeeding, 2016). These differing frameworks shape not only how poverty is understood but also how it is addressed, each offering distinct insights into the lived experiences of impoverished individuals.

Trends indicate a significant decline in elderly poverty in developed countries, largely due to robust social expenditures, retirement policies, and comprehensive safety nets that provide older adults with financial security. Social pensions, healthcare subsidies, and housing assistance have played critical roles in bolstering economic stability among the elderly. Nonetheless, child and working-age poverty remain persistent issues, and the United States in particular exhibits stark disparities compared to OECD averages. This reality highlights the need for targeted interventions supporting younger and working-age groups, many of whom face challenges such as stagnant wages, high childcare costs, and inadequate social protection.

Gender differences further complicate the picture, disproportionately affecting older women who often outlive their financial resources. Reduced access to stable employment, wage gaps, and caregiving responsibilities frequently limit women's lifetime asset accumulation, resulting in fewer savings and weaker pension coverage. These gendered dimensions underscore the necessity of policies tailored to address the vulnerabilities of women as they age.

Labor market engagement is crucial for alleviating poverty among older adults, as it provides income, social interaction, and a sense of purpose. However, structural barriers—such as age discrimination, limited job openings, and inadequate workplace accommodations—hinder older individuals' ability to remain economically active. Compounding these challenges are systemic inequities, including unequal access to training programs and healthcare services, which further restrict older adults' participation in the labor force.

Policy interventions aimed at mitigating poverty across the life course have produced mixed results. Refundable tax credits offer financial relief to low-income households, while adjustments to minimum wage laws help ensure that working adults can meet their basic needs. Targeted social programs, such as housing subsidies, food assistance, and expanded healthcare coverage, address critical dimensions of poverty and support vulnerable populations. Yet these measures often fall short in addressing the multifaceted, deeply rooted nature of poverty, underscoring the need for comprehensive strategies that integrate economic, social, and institutional reforms.

Marchand and Smeeding (2016) advocate a life-course approach to poverty alleviation, tailoring interventions to individuals' distinct needs at various life stages. Such an approach requires ensuring adequate resources for children, supporting employment and social protections for working-age adults, and safeguarding the well-being of older adults through sustainable retirement systems and accessible healthcare. By acknowledging the intricate connections between poverty and aging, policymakers can design interventions that promote economic security, social inclusion, and dignity for individuals at every stage of their lives.

Role of Education

Education stands as a transformative force in breaking cycles of poverty and fostering improved living standards and economic opportunities. Rose and Dyer (2008) extensively examine the role of education in addressing chronic poverty, underscoring that while access to schooling is a fundamental first step, it alone is insufficient. Systemic barriers—such as gender inequality, inadequate infrastructure, and scarce resources—limit both the reach and the quality of education, especially in marginalized communities. For example, cultural norms, early marriage, and domestic responsibilities often hinder girls' access to schooling. Moreover, underfunded schools, untrained teachers, and insufficient learning materials compound the challenges faced by children from low-income families, entrenching cycles of poverty.

Targeted investments in education, particularly those aimed at girls and disadvantaged groups, yield substantial benefits across numerous domains. Educated girls are more likely to enjoy better health outcomes, have fewer children, and contribute to enhanced economic productivity. Universal access to primary and secondary education equips individuals with essential skills and fosters societal development by cultivating a skilled, innovative, and empowered workforce. Beyond economics, education bolsters social cohesion, strengthens political engagement, and enhances community resilience.

Policy Frameworks and Strategies

Globally, the design and implementation of comprehensive poverty reduction frameworks have played a central role in tackling poverty. Poverty Reduction Strategy Papers (PRSPs), as analyzed by Craig and Porter (2003), reflect a convergence of neoliberal and inclusive approaches by prioritizing economic growth, governance, and social safety nets. Although PRSPs have provided valuable guidance for international development efforts, they face challenges in navigating local power dynamics and ensuring meaningful community participation. Uganda's experience illustrates that decentralized governance and participatory methods hold promise but also highlight the limitations of top-down frameworks in addressing grassroots issues.

In Indonesia, community-driven initiatives—such as microfinance programs and social empowerment schemes—have shown remarkable potential in reducing poverty and fostering sustainable development. Rooted in local contexts, these programs empower communities by providing access to financial resources, skill training, and entrepreneurship opportunities. Syech and Rosida (2020) emphasize that while localized efforts effectively address immediate challenges faced by vulnerable groups, their full potential is realized when integrated into broader national policy frameworks. When aligned with national development objectives, these initiatives can be scaled up to achieve systemic change, bridging gaps in resource access and service delivery across regions. Such strategies underscore the necessity of adopting a multidimensional approach that transcends mere economic growth and includes social empowerment and institutional reforms. By tackling structural inequities, enhancing community engagement, and strengthening governance, integrated efforts can contribute to enduring poverty alleviation and promote inclusive, sustainable development in Indonesia.

Sectoral Contributions to Poverty Alleviation

Agriculture and Poverty

Agriculture remains a cornerstone of economic livelihoods in many developing regions, playing a pivotal role in poverty alleviation. For households that depend heavily on cultivating the land, the barriers to escaping poverty are often formidable. Reyes et al. (2012) present a detailed analysis of poverty dynamics within the Philippine agricultural sector, underscoring its persistently high poverty incidence. Their work reveals that low agricultural productivity, compounded by limited access to essential inputs such as quality seeds, fertilizers, irrigation, and credit, contributes significantly to the economic vulnerability of farming households. Furthermore, market volatility and unpredictable climate conditions exacerbate these

challenges, trapping many rural families in cycles of hardship. Households engaged in subsistence farming, in particular, often struggle to generate adequate surplus income or invest in productivity-enhancing technologies. Larger family sizes, coupled with limited access to education and training, further intensify these economic pressures by restricting opportunities for upward mobility.

To break these entrenched cycles of rural poverty, policy interventions must address both structural and social dimensions. Land reforms, for instance, can secure farmers' property rights and incentivize long-term investments in their farms. Targeted subsidies for inputs and training can enhance productivity, while rural extension programs can build farmers' technical and managerial capabilities. Equally important are educational initiatives aimed at rural populations, which can expand skill sets, improve decision-making, and foster entrepreneurship. By strengthening the agricultural sector through thoughtful, multidimensional policies, governments and development agencies can foster inclusive economic growth, reduce poverty rates, and improve the overall quality of life in rural communities.

Industrialization and Poverty

Alongside improvements in agriculture, industrialization—particularly the expansion of manufacturing—has long been studied as a powerful driver of economic transformation and poverty reduction. Lavopa and Szirmai (2012) provide a comprehensive review of the critical role that manufacturing plays in lifting populations out of poverty, identifying three primary mechanisms at work. First, the manufacturing sector directly generates employment opportunities, offering jobs that tend to pay higher wages and provide better working conditions than those found in the agricultural or informal sectors. Second, the development of manufacturing strengthens supply chain linkages, thereby stimulating indirect employment growth in supporting industries such as transport, logistics, retail, and services. Third, the growth of manufacturing often induces broader economic expansion, with rising incomes and consumption fueling demand for a wide range of goods and services throughout the economy.

However, the extent to which industrialization translates into meaningful poverty reduction depends on factors such as labor intensity, productivity growth, and the technological sophistication of local industries. In low-income countries, labor-intensive manufacturing industries can absorb large numbers of workers, including low-skilled laborers migrating from rural areas. As countries progress along the development ladder, investing in higher-value manufacturing and technological upgrading can sustain growth and continue driving poverty alleviation. Policymakers must therefore design targeted strategies that match the stage of

industrial development with the local skills base, while also investing in education, infrastructure, and innovation. By nurturing a dynamic manufacturing sector aligned with the workforce's capabilities, countries can capitalize on industrialization's potential to reduce poverty substantially.

Tourism and Poverty

Beyond agriculture and industry, the tourism sector has gained recognition as an increasingly important catalyst for poverty reduction, especially in regions with rich cultural heritage or natural beauty. Suardana and Sudiarta (2016) examine the impact of tourism in Bali, Indonesia, through the lens of pro-poor tourism (PPT), an approach that aims to ensure that the sector's growth benefits local communities and marginalized groups. The tourism industry's capacity to create a wide array of employment opportunities, both directly and indirectly, makes it a potent tool for combating poverty. Jobs in guest services, hospitality, food and beverage outlets, guided tours, and transportation often provide local residents with new streams of income. At the same time, the sale of handicrafts, locally produced foodstuffs, and other goods and services associated with tourism development can diversify livelihoods, reduce vulnerability, and encourage entrepreneurship in rural and coastal areas.

Yet tourism's poverty-reducing potential is far from guaranteed. Structural barriers, including limited access to skills training, capital, land, and decision-making platforms, frequently marginalize local communities, preventing them from reaping the full benefits of the tourism boom. To address these inequalities, policy frameworks and development initiatives must prioritize capacity-building, ensuring that local residents acquire the knowledge and competencies necessary to participate meaningfully in the tourism value chain. Financial services tailored to rural entrepreneurs, equitable distribution of tourism revenues, and inclusive community engagement in tourism planning are all critical elements of this effort. By embedding these principles into policy design, governments, NGOs, and industry stakeholders can create an environment in which tourism not only drives economic growth but also bolsters social equity and reduces poverty in a sustainable, community-driven manner.

Integrating the Three Sectors for Sustainable Poverty Reduction

Taken together, the roles of agriculture, industry, and tourism in poverty alleviation underscore the importance of a multifaceted, integrated strategy. Agriculture-focused interventions can increase rural incomes, stabilize food supplies, and strengthen the economic fabric of communities. Concurrently, a robust manufacturing sector can offer stable employment, higher wages, and opportunities for technological progress, thereby propelling economic transformation at the national level. In parallel, tourism development, if managed

inclusively and with a pro-poor focus, can create livelihood diversification and promote cultural exchange, further enhancing the resilience and well-being of vulnerable populations.

To fully harness these sectors' poverty-reducing potential, policymakers must adopt a holistic approach that considers the unique characteristics of their economies and societies. Investments in education, healthcare, infrastructure, and social protection programs can complement sector-specific initiatives. Strengthening governance, ensuring equitable access to resources, and fostering participatory decision-making processes will help ensure that growth in agriculture, industry, and tourism translates into tangible, sustainable improvements in people's lives. By weaving these policy threads together, countries can create a more inclusive and resilient development narrative, one that offers a realistic pathway out of poverty for millions of citizens.

International Perspective on Poverty Determinants

On a global scale, numerous studies have identified the factors that exacerbate or mitigate poverty, revealing that its drivers are deeply rooted in structural, contextual, and geographical conditions that vary by region and demographic group. In Turkey, Saatci and Akpinar (2007) highlight key contributors to poverty, including unemployment, low education levels, lack of social insurance, and geographic disparities. Rural areas suffer higher poverty rates, and certain vulnerable groups—such as women and agricultural workers—face compounded challenges due to economic and social inequities.

Tsai (2011) underscores the importance of economic growth and education in poverty reduction, noting that higher GDP per capita and improved educational access can substantially uplift living standards. Economic growth enhances employment opportunities, elevates wages, and encourages social mobility, while education equips individuals with the skills and knowledge necessary to secure better livelihoods. However, geographic disadvantages, such as landlocked regions and harsh climates, can limit access to global markets, exacerbate isolation, and intensify poverty in rural communities.

In Sub-Saharan Africa, Adeyemi et al. (2012) identify rapid population growth, high inflation, and inadequate healthcare access as major contributors to persistent poverty. While population growth can enlarge the workforce, it also strains resources, infrastructure, and public services. High inflation undermines purchasing power, making basic goods and services unaffordable. Limited healthcare access reduces productivity, raises out-of-pocket medical costs, and entrenches poverty over generations. These findings highlight the need

for comprehensive solutions that encompass inflation control, improved healthcare systems, and education-based family planning initiatives.

De Silva (2014) demonstrates the transformative power of education and salaried employment in reducing poverty in Sri Lanka. Individuals with access to higher education and stable, salaried jobs are significantly less likely to experience poverty. Education enhances employability, earning potential, and economic participation, while stable employment fosters financial security. Larger households with more dependents often face greater financial strain, underscoring the importance of policies that expand educational opportunities and create stable employment prospects for vulnerable groups.

Liu et al. (2017) reinforce the critical role of education in reducing poverty, particularly in developing economies. Beyond boosting individual earning potential, education drives economic growth and promotes social development. Educated populations experience better health outcomes, lower fertility rates, and stronger social cohesion, producing far-reaching benefits that extend to entire communities. Thus, education serves as both an individual empowerment tool and a catalyst for regional economic advancement, making it a cornerstone of effective poverty reduction strategies.

Similarly, Singh and Chudasama (2020) emphasize that alleviating poverty requires addressing capability deprivation, strengthening social security systems, and enhancing governance. They argue that poverty is inherently multidimensional, rooted in systemic inequities and structural inefficiencies. Remedying these issues involves integrating economic, social, and political solutions. For example, policies must simultaneously improve access to quality education and healthcare, reform social protection mechanisms, and promote good governance practices to ensure fairness and accountability. Their findings underscore the necessity of coordinated, inclusive approaches that tackle the root causes of poverty while creating sustainable pathways for communities to achieve long-term economic stability and improved quality of life.

In sum, poverty is driven by structural, contextual, and geographical factors that vary considerably across regions and populations. Key drivers include unemployment, limited education, inadequate social insurance, and geographic disadvantages. In Turkey, rural areas and vulnerable groups, including women and agricultural workers, bear a disproportionate burden (Saatci and Akpinar, 2007). Economic growth and education emerge as central instruments for poverty reduction, with the former fostering employment and social mobility and the latter equipping individuals with skills for better livelihoods (Tsai, 2011). Nonetheless, geographic isolation and harsh environmental conditions exacerbate

rural poverty. In Sub-Saharan Africa, rapid population growth, inflation, and poor healthcare access amplify poverty, warranting strategies such as controlling inflation, strengthening healthcare systems, and implementing education-driven family planning (Adeyemi et al., 2012). Education consistently stands out as a transformative resource that empowers individuals, improves societal well-being, and fosters broad-based economic development (De Silva, 2014; Liu et al., 2017). Larger households confront greater financial strain, signaling the importance of policies that expand educational opportunities and stable employment. Ultimately, comprehensive, multidimensional strategies addressing capability deprivation, structural inequities, and governance failures are essential for sustainable poverty alleviation (Singh and Chudasama, 2020).

Income Inequality and Poverty in Thailand

Income inequality in Thailand has long been influenced by a diverse array of socio-economic, demographic, and structural factors. Paweenawat and McNown (2014), for example, explored the interplay between education, household characteristics, and income distribution. They found that educational disparities played a particularly prominent role in shaping income inequality, especially in urban areas. Individuals with secondary or tertiary education tended to earn substantially more than those with only primary education or none at all. In rural regions, however, the number of children and earners within households exerted a stronger influence on income differences, reflecting the distinctive impact of demographic factors and labor market dynamics across different contexts. Their study also supported the Kuznets hypothesis, observing an inverted-U relationship between income levels and inequality. This pattern suggests that inequality typically rises during the early stages of economic development, then gradually declines as growth becomes more inclusive and reaches broader segments of the population.

Building on this perspective, Meemon et al. (2022) introduced a comparative dimension by examining Thailand's income inequality and relative poverty rates alongside those of OECD countries. Their analysis revealed that Thailand's relative poverty rate is nearly twice the OECD average, disproportionately affecting vulnerable groups such as children and older adults. They attributed this disparity in part to structural challenges, including a limited social welfare system that struggles to support the large informal workforce. Current policies—such as child allowances and old-age pensions—were found to be inadequate, failing to keep pace with the actual cost of living. Meemon et al. argued that expanding and enhancing these social safety nets could alleviate the financial burden on at-risk populations, ultimately helping reduce both income inequality and relative poverty.

Agriculture remains central to Thailand's economy and livelihoods, yet it simultaneously serves as a locus of persistent poverty. In their logistic regression analysis, Mattayaphutron and Mahamat (2021) identified several crucial factors affecting agricultural households' risk of poverty. High dependency ratios—where non-working household members outnumber earners—intensify financial strains and limit the ability to invest in improved farming techniques. Education, particularly at the diploma or bachelor's degree level, emerged as a powerful tool for breaking poverty cycles. Better-educated household heads were more inclined to diversify income sources and adopt more efficient farming practices, thereby enhancing resilience against economic shocks. Farm size also proved influential; larger farms benefited from economies of scale, resource optimization, and higher productivity. Yet the agricultural sector's vulnerability to climate variability, market volatility, and insecure land tenure impedes sustainable income growth. The study recommended expanding educational opportunities, providing technical training in agriculture, and implementing measures—such as subsidies or insurance schemes—to stabilize farm incomes and mitigate risk.

Taken together, these studies underscore profound regional and demographic disparities in Thailand's poverty and inequality landscape. Rural areas, notably in the Northeast, consistently exhibit higher poverty rates than urban centers like Bangkok. This urban-rural divide stems in part from historical imbalances in resource allocation, infrastructure development, and economic opportunities. Rural households often rely heavily on agriculture, rendering them susceptible to environmental shocks and market fluctuations. As of 2011, over 21% of agricultural households were classified as poor, compared to just 10.73% of non-agricultural households, illustrating the entrenched structural disadvantages rural populations face. Additionally, demographic factors amplify these disparities. Households with numerous dependents, including children and elderly members, endure heightened financial pressures compounded by limited income sources. Older adults in rural areas often lack adequate social protection, depending on informal labor and family support that may not ensure sufficient economic security.

In light of these findings, policymakers should consider a holistic approach that simultaneously addresses regional inequities and demographic vulnerabilities. Targeted social welfare reforms, improved educational access, measures to stabilize agricultural incomes, and stronger protections for informal sector workers can all contribute to narrowing income gaps. By focusing on both structural and demographic factors, Thailand can move closer to building a more equitable and inclusive society.

Summary of Empirical Studies on the Determinants of Poverty

In-Text Citation (Year)	Full Topic	Data	Methodology
Shirazi (1995)	Determinants of Poverty in Pakistan	Logit regression (Household Income & Expenditure Survey)	- Education and multiple earners reduce poverty risk. - Larger households face greater poverty vulnerability. - Punjab region most affected by poverty.
Warr (2001)	Economic Expansion and Poverty Reduction in Thailand	Macroeconomic analysis	- Rapid economic expansion reduces poverty incidence. - Benefits not evenly distributed; rural and vulnerable groups gain less. - Highlights need for structural reforms.
Craig & Porter (2003)	Poverty Reduction Strategy Papers (PRSPs)	Policy analysis	- PRSPs emphasize economic growth, governance, and security. - High compliance costs may limit effectiveness. - Local empowerment efforts show mixed results.
Pernia & Deolalikar (2003)	Poverty, Growth, and Institutions in Developing Asia	Quantitative country case studies	- Institutions and governance are key to sustained poverty reduction. - Inclusive growth reduces poverty. - Regional disparities require targeted strategies.
Saatci & Akpinar (2007)	Poverty and Related Factors in Turkey	Statistical analysis of national data	- Agricultural workers and rural residents were most affected. - Low education and large households exacerbate poverty. - Persistent regional disparities.
Oluoko-Odingo (2008)	Determinants of Poverty in Kenya	Multi-sectoral fieldwork (Nyando District, Kenya)	- Poverty strongly correlates with food insecurity. - Climate change worsens poverty and food insecurity. - Regional and intra-household variations influence poverty.
Rose & Dyer	Chronic Poverty and	Literature review	- Education breaks

(2008)	Education	and case studies	intergenerational poverty cycles. - Gender-specific interventions improve outcomes. - Cash transfers enhance access to education.
Ravallion (2010)	Poverty Lines Across the World	Analysis of national poverty lines & consumption data	- Poverty lines vary with absolute needs & relative inclusion. - Definitions evolve with economic progress. - Integrates nutritional & social requirements.
Tsai (2011)	Economic & Education Determinants of Poverty	Ridge regression (cross-national data)	- Higher GDP per capita & better education access reduce poverty. - Geographical disadvantages hinder poverty reduction. - Political/social spending show limited effects.
Adeyemi et al. (2012)	Determinants of Poverty in Sub-Saharan Africa	Multiple regression	- High population growth, inflation increase poverty. - Gender discrimination & poor healthcare access worsen poverty. - Calls for governance reforms & inflation control.
Lavopa & Szirmai (2012)	Industrialization, Employment, and Poverty	Analytical review of literature & empirical data	- Manufacturing drives poverty reduction via job creation. - Strong backward/forward linkages amplify impact. - Labor-intensive manufacturing reduces poverty in low-income countries.
Reyes et al. (2012)	Poverty and Agriculture in the Philippines	Quantitative analysis of poverty trends	- Agriculture is central to rural poverty. - Access to education & assets reduces poverty risk. - Regional disparities reflect structural inequalities.
De Silva (2014)	Micro-level Determinants of Poverty in Sri Lanka (further study)	Logistic/quantile regression (survey data)	- Education & salaried employment lower poverty risks. - Rural & female-headed households remain vulnerable. - Household size & regional factors matter.
Paweenawat & McNown (2014)	Income Inequality in Thailand	Synthetic cohort analysis	- Educational disparities drive inequality. - Urban-rural divides shape inequality dynamics.

			- Inverted-U relationship between income growth & inequality.
Akanbi (2015)	Structural & Institutional Determinants of Poverty in SSA	Two-stage least squares (1990–2010 data)	- Governance & infrastructure investments reduce poverty. - Growth alone is insufficient without structural reforms. - Addressing inequality & improving institutions is essential.
Marchand & Smeeding (2016)	Poverty and Aging Trends	Comparative analysis across OECD countries	- Elderly poverty declined due to robust social policies. - Child poverty remains high in many nations. - Gender disparities persist in old-age poverty.
Suardana & Sudiarta (2016)	Tourism and Poverty in Bali	Descriptive analysis (purposive sampling)	- Tourism creates new jobs in rural, coastal areas. - Lack of skills excludes many locals from tourism benefits. - Community-based, pro-poor tourism can empower locals.
Liu et al. (2017)	Education and Poverty Reduction	Econometric analysis (developing economies)	- Education improves earnings & reduces poverty. - Higher education yields better health outcomes & social cohesion. - Education is a key factor for long-term poverty alleviation.
Vásquez (2018)	Poverty Alleviation Policies for the Elderly	Comparative analysis (Asia & Latin America)	- Aging populations pose financial/structural challenges. - Pensions & targeted social spending improve elder welfare. - Health & pension reforms needed.
Aktas & Sevinç (2020)	Determinants of Poverty in Developing Countries	System GMM (1995–2015 data)	- High unemployment & population growth raise poverty. - Internet use & trade openness reduce poverty. - Larger industrial GDP share lowers poverty.
Singh & Chudasama (2020)	Evaluating Poverty Alleviation Strategies	Fuzzy cognitive mapping & simulations	- Multidimensional strategies are vital. - Community-driven approaches are effective. - Good governance enhances poverty reduction.
Syech & Rosida (2020)	Poverty in Indonesia	Critical review	- High rural poverty from agricultural reliance.

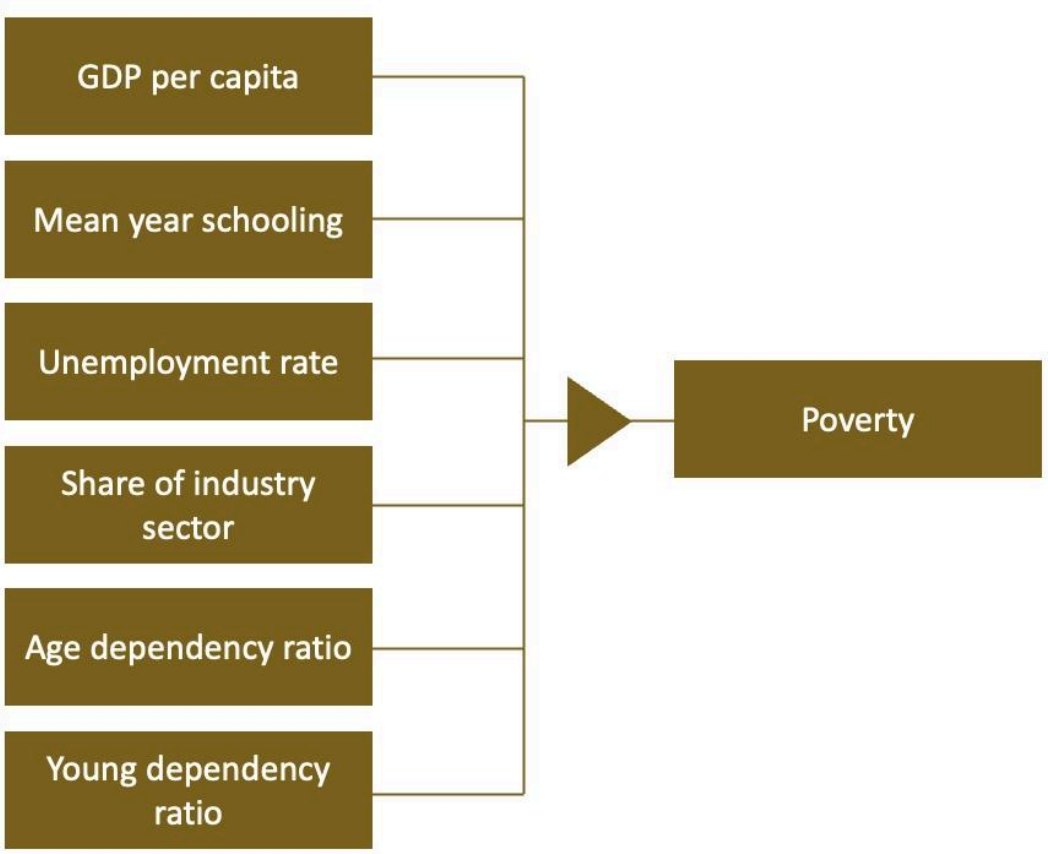
			- Decentralization yields mixed outcomes. - Targeted education & healthcare policies recommended.
Liu et al. (2021)	Role of Education in Poverty Reduction	Time-series econometric analysis (1980–2018)	- Education reduces poverty & spurs economic growth. - Higher education improves income & productivity. - Education enhances health, social outcomes, reducing multidimensional poverty.
Mattayaphutron & Mahamat (2021)	Poverty Determinants in Thailand (Provincial-level)	Panel data analysis (77 provinces)	- High dependency ratios & low education levels increase poverty. - Structural issues require family support & expanded educational access. - Calls for targeted provincial policies.
Meemon et al. (2022)	Income Inequality in Thailand	Relative poverty analysis	- Rural households face higher poverty due to limited resources. - Child & elder poverty prevalent. - Robust social welfare reforms needed for vulnerable groups.

Chapter 3

Methodology

This study employs a panel data regression model with fixed effects to investigate the determinants of poverty across 77 provinces in Thailand over the period from 2012 to 2019. The dependent variable in the analysis is the percentage of the population living below the poverty line, while the independent variables include key economic, human capital, and demographic factors. These variables comprise the log of GDP per capita , mean years of schooling, unemployment rate, the share of the industrial sector, age dependency ratio , and youth dependency ratio. Descriptive statistics were used to summarize the data, and fixed-effects regression analysis was conducted to identify the most significant predictors of poverty.

3.1 Conceptual Framework



The conceptual framework for analyzing the determinants of poverty highlights six key independent variables that influence poverty levels: GDP per capita, mean years of schooling, unemployment rate, share of the industrial sector, age dependency ratio, and

youth dependency ratio. These factors represent economic, educational, and demographic dimensions that collectively impact poverty. The framework suggests that higher GDP per capita and mean years of schooling are likely to reduce poverty, while factors such as unemployment, high dependency ratios, and industrial sector composition may either exacerbate or mitigate poverty levels depending on their dynamics. All these variables feed into the central outcome of interest, which is the level of poverty, providing a structured approach to understanding and addressing poverty determinants.

3.2 scope

Period: annual statistics since 2012-2019

This study focuses on understanding the determinants of poverty across 77 provinces in Thailand over the period 2012 to 2019, providing a comprehensive analysis of poverty trends and influencing factors. The dependent variable, poverty rate, is analyzed against key independent variables, including economic, educational, and demographic factors. These include the log of GDP per capita, mean years of schooling, unemployment rate, industrial sector share, age dependency ratio, and youth dependency ratio.

3.3 Data collection

The table below outlines the selected variables used in the analysis, including their abbreviated names, detailed definitions, expected relationships with the dependent variable, and the sources from which the data were obtained.

Abbreviation	Descriptions	Relationship with poverty	Data sources
POVR	Percentage of the total population living under the poverty line		NESDC
lnGDPPC	the total economic output (GDP) of a province divided by its population	-	NESDC
MYS	Average number of completed years of education of working age population	-	Labor Force Survey, NSO
UNEMP	Percentage of unemployed persons in each province	+	Labor Force Survey, NSO
INDUS	Total GDP of industrial sector divided by the GDP at the province level	-	NESDC
ADP	proportion of dependents (people aged 60+) relative to the working-age population (15-60)	+	NSO
YDP	proportion of dependents (people aged 0-14) relative to the working-age population (15-60)	+	NSO

To highlight significant results, an indicator is crucial for assessing the impact of each factor on poverty levels. In this study, the poverty rate is selected as the sole dependent variable,

representing the percentage of the population living below the poverty line. This measure captures the economic, educational, and demographic dimensions that influence poverty.

The independent variables integrated into the analysis include GDP per capita, mean years of schooling, unemployment rate, industrial sector share, age dependency ratio, and youth dependency ratio. These variables are presumed to have specific relationships with poverty, either positive or negative, as indicated in the table.

Variables that are negatively related to poverty are denoted with the symbol "-," indicating that an increase in these variables is associated with a decrease in poverty levels. In this study, negatively related variables include GDP per capita (lnGDPPC), mean years of schooling (MYS), and industrial sector share (INDUS), suggesting that economic growth, improved education, and industrial development contribute to reducing poverty.

Conversely, variables that are positively related to poverty are represented by the symbol "+," signifying that an increase in these variables is associated with an increase in poverty levels. These positively related variables include the unemployment rate (UNEMP), age dependency ratio (ADP), and youth dependency ratio (YDP), indicating that higher unemployment and greater dependency burdens exacerbate poverty.

Data for these variables were sourced from reliable national agencies, including the National Economic and Social Development Council (NESDC) and the National Statistical Office (NSO), ensuring the robustness and accuracy of the analysis.

3.4 Econometrics model

The magnitude of the determinants of poverty is estimated using panel data regression with fixed effects, employing the Stata program. The equation is structured to include independent variables that reflect key economic, educational, and demographic factors influencing poverty at the provincial level in Thailand. The results are presented as coefficients, showing the degree of influence each variable has on poverty levels. These coefficients range in value, with positive coefficients indicating variables that increase poverty and negative coefficients indicating variables that reduce poverty.

This study identifies significant relationships between the dependent variable and independent variables, based on a 95% confidence interval at a 5% significance level. The regression analysis incorporates data from 77 Thai provinces over the period 2012–2019.

The OLS regression:

$$POV_{it}=\beta_0+\beta_1 lnGDPC_{it}+\beta_2 MYS_{it}+\beta_3 UNEMP_{it}+\beta_4 INDUS_{it}+\beta_5 ADP_{it}+\beta_6 YDP_{it}+\varepsilon_{it}$$

Where βn denotes the coefficient which reflect the impact of each variable on Poverty in Thailand. Moreover, i refers to each sample province. Also, t represents the time series of the focused data. Lastly, εit is the error term for this equation.

However, challenges such as multicollinearity, temporal autoregressive issues, and spatial heterogeneity may arise during the OLS regression analysis. To address these challenges, the random effects (RE) model is utilized as an effective solution.

The random effects model:

$$POV_{it}=\beta_0+\beta_1 lnGDPC_{it}+\beta_2 MYS_{it}+\beta_3 UNEMP_{it}+\beta_4 INDUS_{it}+\beta_5 ADP_{it}+\beta_6 YDP_{it}+\mu_{it}+\varepsilon_{it}$$

Where μit is additionally included into the equation as the cross-sectional error terms, maintaining the consistency across times.

The Breusch and Pagan Lagrange Multiplier (LM) test is used to determine whether the results from the OLS regression or the random effects (RE) model are more appropriate. The null hypothesis assumes that the variances are zero, indicating no significant differences across units. The decision is based on the comparison between the probability value and the chi-squared distribution. If the difference is below 0.05, the null hypothesis is rejected, and the random effects model is considered more suitable; otherwise, the OLS regression results are preferred.

Moreover, the term μit plays a crucial role in selecting the model. If μit is not correlated with the independent variables, it is treated as a random error term, favoring the random effects model. However, if μit shows correlation with the independent variables, the OLS regression may lose reliability, and μit must be incorporated into further estimations.

The fixed effects (FE) model is applied to estimate the influence of the independent variables while accounting for unobserved heterogeneity. This is achieved by introducing dummy variables in the equation to control for unit-specific effects that might otherwise bias the results.

The fixed effects model:

$$POV_{it}=\beta_0+\beta_1 lnGDPC_{it}+\beta_2 MYS_{it}+\beta_3 UNEMP_{it}+\beta_4 INDUS_{it}+\beta_5 ADP_{it}+\beta_6 YDP_{it}+\alpha_i d_{it}+\varepsilon_{it}$$

Here, $d$it represent the dummy variable for country i , taking the value of either 1 or 0, while αi act as the coefficient for country i.

The fixed effects (FE) model is appropriate when individual effects or characteristics are correlated with the independent variables or when unobserved heterogeneity is present. In contrast, the random effects (RE) model is more suitable if individual-specific effects have no correlation with the regressors.

To determine whether to use the FE or RE model, the Hausman test is conducted. This test evaluates whether individual error terms are correlated with the regressors, with the null hypothesis favoring the RE model, assuming no correlation between the terms and the regressors. If the test indicates a significant difference between the two estimators at a 5% significance level, the null hypothesis is rejected, and the FE model is deemed more appropriate for the analysis.

Chapter 4

Result

This section presents the results of the analysis, focusing on the key determinants of poverty across Thailand's 77 provinces from 2012 to 2019. Using fixed-effects regression, the study examines the impact of economic, educational, and demographic factors on poverty levels. The analysis aims to identify significant predictors and their influence on poverty, providing valuable insights for policymakers. Descriptive statistics for all variables are first presented to give an overview of the dataset, followed by a detailed discussion of the regression results. These findings highlight the factors that play a crucial role in shaping poverty outcomes at the provincial level.

Table 1: Descriptive statistics of the variables in all provinces

Variables	Mean	Max	Min	Std. Dev.	Observations
POVR	10.64739	65.16271	0	9.166502	616
lnGDPPC	11.21873	13.21251	10.17845	0.7025298	616
MYS	9.087927	18.0292	6.46	0.9937684	616
UNEMP	1.004743	6.987618	0.0668566	0.7171719	616
SHR_INDUS	25.73747	87.23647	2.865233	20.29071	616
ADP	18.55049	28.69491	7.959323	4.255914	616
YDP	22.50894	42.21546	10.21022	6.058729	616

The descriptive statistics provide an overview of the variables used in the analysis, highlighting notable variations across Thai provinces. Poverty levels vary significantly, reflecting diverse socio-economic conditions in different regions. Economic factors, such as GDP per capita, show considerable differences, indicating disparities in economic development. Educational attainment, measured by mean years of schooling, also varies, suggesting inequalities in access to education. Unemployment rates remain relatively low overall, but some provinces experience higher levels, pointing to regional economic challenges. The industrial sector's contribution to GDP demonstrates substantial variation, highlighting the uneven distribution of industrial activities across provinces. Demographic factors, including age and youth dependency ratios, reveal differences in population structure, which can impact poverty levels. These variations underscore the complexity of

poverty and its determinants, emphasizing the need for targeted policies to address regional disparities.

The analysis in this study uses three models for estimation: the pooled OLS regression, random effects (RE) model, and fixed effects (FE) model. The RE and FE models address issues such as temporal autoregressive patterns, multicollinearity, and spatial heterogeneity, which may arise in the pooled OLS regression. The results presented in the table show the impact of each observed factor on poverty rates across Thai provinces. The findings from the three models are presented together for comparative analysis.

Overall, the fixed effects model results provide a deeper insight into how economic, educational, and demographic factors shape poverty outcomes at the provincial level in Thailand. The analysis highlights the critical roles of GDP per capita and education in alleviating poverty, while demographic pressures such as dependency ratios remain significant challenges.

Table 2: The magnitude of impact from variables on poverty in 77 provinces, 2012-2019

Dependent variable: Poverty rate in every province			
	Pool OLS	Random effects	Fixed effects
lnGDPpc	-8.161192	-8.161192	-7.58272
	[-1.160967]***	[-1.279656]***	[-2.874551]***
MYS	-0.8050346	-0.8050346	-0.8213843
	[-0.2867699]***	[-0.2602899]***	[0.2986921]***
UNEMP	0.5887463	0.5887463	0.0416746
	[0.3553429]***	[0.4700748]	[0.3824071]
INDUS	0.0173718	0.0173718	0.0461529
	[0.0397801]	[0.0364468]	[0.1048919]
ADP	-0.515768	-0.515768	-0.4136305
	[0.0688581]***	[0.1075533]***	[0.0988103]***
YDP	0.0096083	0.0096083	-0.2035192
	[0.0713585]	[0.0815356]	[0.1009858]
Constant	117.8345	117.8345	114.2049
	[12.5357]***	[15.46137]***	[32.68299]***
R-square	0.4090	0.4090	0.3047
Observations	616	616	616
Provinces	77	77	77
Breusch-Pagan LM test[a]		$X^2(01) =$ 830.87***	
Hausman test[b]			$X^2(6) = 22.44$***

*, **, *** indicate significant at 10%, 5%, and 1% level of significance, respectively.

[a] Random effects versus pooled-OLS estimations test.

[b] Fixed versus random effects model test

The results from the analysis reveal clear insights into the factors that influence poverty across Thai provinces. GDP per capita shows the strongest impact in reducing poverty—when GDP per capita increases by 10%, poverty levels drop significantly, by about 7.6% to 8.2%. Education also plays a critical role, as a 10% increase in the average years of schooling leads to a noticeable decrease in poverty, by around 0.8%. On the other hand, the age dependency ratio highlights the burden of supporting non-working populations; for every 10% increase in dependents, poverty rises by 4.1% to 5.2%.

Interestingly, unemployment rates and the proportion of young dependents show little to no impact on poverty in this analysis, suggesting that these factors might not be key drivers of poverty at the provincial level. The findings emphasize the importance of economic growth and education in reducing poverty while highlighting the challenges posed by a high number of dependents.

To ensure the most accurate results, a comparison was made between the random effects and fixed effects models using the Hausman test. The test strongly favored the fixed effects model, showing that it is the better approach for understanding the relationship between poverty and its determinants in this context. These findings provide valuable guidance for shaping targeted policies to address poverty in Thailand.

In summary, the findings highlight the different ways economic, educational, and demographic factors impact poverty in Thailand. GDP per capita stands out as the most important factor in reducing poverty, showing that economic growth plays a key role in improving people's lives. Education, measured by mean years of schooling, also proves to be a crucial factor, emphasizing the value of investing in human capital. On the other hand, a high age dependency ratio increases poverty levels, reflecting the financial strain of supporting a large non-working population.

Interestingly, unemployment rates and the youth dependency ratio have little to no noticeable impact on poverty in this analysis. Similarly, the share of the industrial sector in provincial economies has limited influence, suggesting that economic growth alone is not enough unless it directly benefits the population.

The fixed effects model, confirmed to be the most appropriate through the Hausman test, provides valuable insights into these relationships. Overall, the results highlight the importance of policies that promote economic development, expand access to quality education, and address the challenges posed by dependency burdens. While some factors may have less influence, this study underscores the need for comprehensive strategies to effectively reduce poverty and improve living standards across Thailand.

Chapter 5

Conclusion

This study emphasizes the important role that economic development and education play in reducing poverty at the provincial level in Thailand. Economic development, as measured by GDP per capita, shows that provinces with higher income levels generally experience lower poverty rates. This means that when provinces grow economically, they are better able to provide services, create jobs, and improve the overall quality of life for their residents. However, it is important to ensure that this growth benefits everyone, especially those living in rural and less developed areas where poverty is more severe.

Education is another key factor in reducing poverty. Higher education levels among working-age people significantly lower poverty rates. Education gives individuals the skills they need to secure better jobs, earn higher wages, and achieve stable incomes. It also contributes to the growth of local economies by improving productivity and innovation. Policies that aim to improve access to education, particularly in rural areas, are critical for reducing poverty. For example, increasing years of free education or offering job-focused training programs can help give more people opportunities to escape poverty.

The study also highlights the impact of dependency ratios on poverty. A high dependency ratio means that there are many children or elderly people relying on a smaller group of working-age adults. This creates financial strain on households, as working individuals need to support both themselves and their dependents. To address this issue, policies like providing affordable childcare, eldercare, or family support programs can ease the burden on working people. Encouraging participation in the workforce among younger and older groups where possible can also help reduce this strain.

However, the study finds that unemployment rates and the size of the industrial sector in a province do not have a significant effect on poverty levels. This raises questions about the quality of jobs available and whether industrial growth is creating enough opportunities for people to improve their lives. It suggests that while unemployment may be low, many workers could be underemployed or working in informal, low-paying jobs that do not lift them out of poverty. Similarly, industrial growth may not always lead to benefits for poorer households, particularly if the jobs created are not accessible to them.

In conclusion, the study shows that reducing poverty in Thailand requires a focus on economic development and education, while also addressing the challenges of high dependency ratios. At the same time, it highlights the need for more research into the labor

market and how industrial growth can better help reduce poverty. Policymakers should aim to create inclusive growth that benefits all regions and invest in education and family support programs to ensure long-term poverty reduction.

5.1 Limitations

1. Inconsistent data across provinces and certain years (2012–2019) may reduce the robustness of the analysis. Missing data for key indicators like education or GDP limits the number of observations and could bias the results, affecting the accuracy of findings.
2. The absence of data on important factors like household size and access to social services may lead to omitted variable bias. These unmeasured factors could influence poverty and the included variables, potentially skewing the results and limiting policy insights.

5.2 Policy Implication

Investing in education and promoting inclusive economic development are crucial strategies for reducing poverty. Increasing funding for education and expanding free educational programs can improve access and quality, while extending compulsory education from 9 to 12 years helps build stronger human capital. To complement this, strengthening rural infrastructure, such as roads and digital connectivity, can better link remote areas to economic hubs, creating more opportunities. Additionally, providing financial support to SMEs, especially in agriculture and local crafts, can stimulate local economies, generate employment, and empower communities to achieve sustainable growth.

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Appendix

The OLS regression

```
. xtreg pov lnGDPpc mys_working_age unemp shr_indus Age_Depen Young_Depen

Random-effects GLS regression                   Number of obs     =       616
Group variable: ID_province                     Number of groups  =        77

R-sq:                                           Obs per group:
     within  = 0.1637                                         min =         8
     between = 0.4696                                         avg =       8.0
     overall = 0.4090                                         max =         8

                                                Wald chi2(6)      =    175.50
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

pov	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lnGDPpc	-8.161192	1.160967	-7.03	0.000	-10.43664	-5.885739
mys_working_age	-.8050346	.2867699	-2.81	0.005	-1.367093	-.242976
unemp	.5887463	.3553429	1.66	0.098	-.1077129	1.285206
shr_indus	.0173718	.0397801	0.44	0.662	-.0605958	.0953393
Age_Depen	-.515768	.0688581	-7.49	0.000	-.6507275	-.3808086
Young_Depen	.0096083	.0713585	0.13	0.893	-.1302518	.1494684
_cons	117.8345	12.5357	9.40	0.000	93.26499	142.404
sigma_u	5.4994389					
sigma_e	3.9581503					
rho	.65875219	(fraction of variance due to u_i)				

The Robust effects regression

```
. xtreg pov lnGDPpc mys_working_age unemp shr_indus Age_Depen Young_Depen, re robust

Random-effects GLS regression                   Number of obs     =       616
Group variable: ID_province                     Number of groups  =        77

R-sq:                                           Obs per group:
     within  = 0.1637                                         min =         8
     between = 0.4696                                         avg =       8.0
     overall = 0.4090                                         max =         8

                                                Wald chi2(6)      =     79.55
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000

                              (Std. Err. adjusted for 77 clusters in ID_province)
------------------------------------------------------------------------------
             |               Robust
         pov |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lnGDPpc |  -8.161192   1.279656    -6.38   0.000    -10.66927   -5.653113
mys_working_age |  -.8050346   .2602899    -3.09   0.002    -1.315193   -.2948758
        unemp |   .5887463   .4700748     1.25   0.210    -.3325833    1.510076
    shr_indus |   .0173718   .0364468     0.48   0.634    -.0540627    .0888062
    Age_Depen |   -.515768   .1075533    -4.80   0.000    -.7265686   -.3049675
  Young_Depen |   .0096083   .0815356     0.12   0.906    -.1501986    .1694152
        _cons |   117.8345   15.46137     7.62   0.000     87.53079    148.1382
-------------+----------------------------------------------------------------
      sigma_u |  5.4994389
      sigma_e |  3.9581503
          rho |  .65875219   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

The Breusch-Pagan LM test

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        pov[ID_province,t] = Xb + u[ID_province] + e[ID_province,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 pov |    84.02476       9.166502
                   e |    15.66695        3.95815
                   u |    30.24383       5.499439

        Test:   Var(u) = 0
                             chibar2(01) =   830.87
                          Prob > chibar2 =   0.0000
```

The fixed effect regression

```
. xtreg pov lnGDPpc mys_working_age unemp shr_indus Age_Depen Young_Depen, fe

Fixed-effects (within) regression               Number of obs      =       616
Group variable: ID_province                     Number of groups   =        77

R-sq:                                           Obs per group:
     within  = 0.1738                                         min =         8
     between = 0.3374                                         avg =       8.0
     overall = 0.3047                                         max =         8

                                                F(6,533)           =     18.69
corr(u_i, Xb)  = 0.0896                         Prob > F           =    0.0000

------------------------------------------------------------------------------
         pov |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lnGDPpc |   -7.58272   2.874551    -2.64   0.009    -13.22956   -1.935881
mys_working_age |  -.8213843   .2986921    -2.75   0.006    -1.408143   -.2346261
       unemp |   .0416746   .3824071     0.11   0.913    -.7095354    .7928846
   shr_indus |   .0461529   .1048919     0.44   0.660    -.1598993     .252205
   Age_Depen |  -.4136305   .0988103    -4.19   0.000    -.6077359   -.2195252
Young_Depen |  -.2035192   .1009858    -2.02   0.044    -.4018982   -.0051402
       _cons |   114.2049   32.68299     3.49   0.001     50.0016    178.4081
-------------+----------------------------------------------------------------
     sigma_u |  6.7624128
     sigma_e |  3.9581503
         rho |  .74482617   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(76, 533) = 16.55                     Prob > F = 0.0000
```

The hausman test

```
. hausman fixed random, sigmamore
```

	Coefficients (b) fixed	(B) random	(b−B) Difference	sqrt(diag(V_b−V_B)) S.E.
lnGDPpc	**−7.58272**	**−8.161192**	**.5784716**	**2.673339**
mys_workin~e	**−.8213843**	**−.8050346**	**−.0163497**	**.0973653**
unemp	**.0416746**	**.5887463**	**−.5470717**	**.1551268**
shr_indus	**.0461529**	**.0173718**	**.0287811**	**.0986314**
Age_Depen	**−.4136305**	**−.515768**	**.1021375**	**.072771**
Young_Depen	**−.2035192**	**.0096083**	**−.2131275**	**.0734293**

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(**6**) = (b−B)'[(V_b−V_B)^(−1)](b−B)
= **22.44**
Prob>chi2 = **0.0010**