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The Impact of Remittances on the Economic Growth of the
Northern Triangle Countries of Central America

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Master in Political Economy

Supervisor: João Miguel Duarte de Carvalho, Invited Principal
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CIÊNCIAS SOCIAIS
E HUMANAS

Department of Political Economy

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DEDICATION

Lucas and Stark (1985, p. 902) write: “Certainly, the most evident motivation for sending remittances is pure altruism: the care of the migrant for those left behind. In fact, this seems to be the only notion underlying much of the literature on remittances.”

I want to dedicate this thesis to Central American migrants, who left their lives behind in the hope of a better future and who, even from afar, continue to care for those who will always be waiting for them in their home countries.

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To my mother, Mirna Lissette Ayala Lemus, for teaching me so much, but above all, for the quiet, tireless struggle you have carried these past years for the only public university in Guatemala. May your fight become the fight of all, and may its awakening bring your collective dream: dignity for students and a country with more opportunities for its youth.

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Finally, I wish to thank my homeland, Guatemala, for I would not be who I am without being, above all, Guatemalan.

RESUMO

O Triângulo Norte da América Central — El Salvador, Guatemala e Honduras — caracteriza-se por partilhar várias características, incluindo elevados níveis de migração internacional para os Estados Unidos e fluxos significativos de remessas, que representam entre 15% e 25% do PIB destes países. Este estudo analisa o impacto das remessas no crescimento económico do Triângulo Norte no período de 2003 a 2024. Utilizando um modelo econométrico de dados em painel com efeitos fixos, adaptado de Meyer e Shera (2017), a análise explora a relação entre remessas e crescimento do PIB per capita, controlando variáveis-chave como investimento, consumo, educação e abertura comercial.

Os resultados revelam um panorama complexo e heterogéneo. Embora as remessas tenham um efeito ligeiramente negativo sobre o crescimento económico global da região, o consumo das famílias surge como o principal motor de crescimento. Isto indica que as remessas exercem principalmente um efeito indireto, estimulando a procura agregada através do aumento do consumo. Ao nível de cada país, o impacto das remessas varia consideravelmente: El Salvador apresenta um efeito positivo, enquanto Guatemala e Honduras mostram efeitos negativos. Esta variação evidencia a importância das estruturas económicas nacionais e dos ambientes de política na forma como as remessas influenciam o crescimento. O estudo conclui que, embora os fluxos de remessas sejam cruciais para a estabilidade e o consumo das famílias, não impulsoram diretamente o investimento produtivo nem o crescimento económico a longo prazo na região. Estes resultados sublinham a necessidade de políticas específicas por país que canalizem as remessas para investimentos produtivos e de estratégias de cooperação internacional que promovam o desenvolvimento económico estrutural para além das simples transferências financeiras.

Palavras-chave: Remessas, Crescimento Económico, Triângulo Norte da América Central, Modelo Econométrico.

ABSTRACT

The Northern Triangle of Central America—El Salvador, Guatemala, and Honduras—is characterized by shared features, including high levels of international migration to the United States and significant inflows of remittances, which account for between 15% and 25% of GDP in these countries. This study examines the impact of remittances on economic growth in the Northern Triangle from 2003 to 2024. Using a panel data econometric model with fixed effects, adapted from Meyer and Shera (2017), the analysis explores the relationship between remittances and per capita GDP growth while controlling for key variables such as investment, consumption, education, and trade openness.

The findings reveal a complex and heterogeneous picture. Although remittances have a slightly negative effect on overall economic growth in the region, household consumption emerges as the most significant driver of growth. This indicates that remittances primarily exert an indirect effect, stimulating aggregate demand through increased consumption. At the country level, the impact of remittances varies considerably: El Salvador shows a positive effect, while Guatemala and Honduras exhibit negative effects. This variation underscores the importance of national economic structures and policy environments in shaping how remittances influence growth. The study concludes that, while remittance flows are crucial for household stability and consumption, they do not directly drive productive investment or long-term growth in the region. These results emphasize the need for country-specific policies that channel remittances into productive investments and for international cooperation strategies that promote structural economic development beyond financial transfers alone.

Keywords: Remittances, Economic Growth, Northern Triangle of Central America, Econometric Model.

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1. INTRODUCTION

Historians consider that international migrations, far from being a new phenomenon, constitute a constant and essential element of human history (Roberto, 2016). However, in Central America, to the already known migration dynamics, new forms of collective mobility were introduced in 2018, such as the migrant caravan, which, according to Hernández (2019), can be defined as the irregular movement of thousands of people from the Northern Triangle of Central America—El Salvador, Guatemala, and Honduras—toward the United States, including vulnerable populations such as women and children. These caravans fragmented along the way due to the actions of authorities in each country and the decisions of the migrants themselves. As a result of this fragmentation, the risk of human rights violations increased for the migrant populations of the Northern Triangle of Central America.

The countries of the Northern Triangle of Central America have experienced a history of authoritarian governments, poverty, violence caused by organized criminal groups, and, in general, limited access to economic and social development. The peace agreements signed in the 1990s and the supposed transitions toward electoral democracy allowed for some reforms; however, structural transformations in these countries remain insufficient as of 2024 (Wolf, 2020). On the other hand, for colonial and transnational capital, the Northern Triangle of Central America has functioned within the dynamics of accumulation and centralization of capital by the great powers, based on its perpetual primary export profile and the imposition of neoliberal policies promoted by international institutional powers and administered within the countries themselves by dictatorial oligarchies, in a cycle that has multiplied social poverty and violence in the Central American countries (Márquez, 2015). In this context, it is noteworthy that the caravans of Central American migrants, which began in October 2018, were led under the slogan: *"We are not leaving*

because we want to; violence and poverty are driving us out" (Government of Mexico, 2019).

One of the main economic effects derived from migration is the remittances that emigrants send to their countries of origin. Central Americans use remittances to cover household and consumption expenses and function as insurance for families in the event of a crisis or unexpected economic hardship. Remittances represent between 15% and 25% of the GDP of the Northern Triangle countries of Central America, with the majority coming from the United States (Abuelafia, 2018). In this regard, the effects of remittances on economic growth have been widely analyzed from different perspectives. For some authors, remittances have a direct and adverse impact on economic growth, since their primary destination is household consumption rather than productive investment. Others, on the contrary, argue that remittances positively influence economic growth, thanks to their multiplier effects on aggregate demand variables (Jara-Alba, C., & López-Guzmán, T., 2015; Hines, 2019).

In this context, this thesis poses the following research question: What is the effect of remittances on economic growth in the countries of the Northern Triangle of Central America? To address this question, an empirical method will be applied to the three countries that make up the Northern Triangle of Central America. In the first part of this thesis, a theoretical and historical analysis of migration, remittances, and the impact of remittances on economic growth is carried out, which also brings us closer to the dynamics of migration and remittance flows experienced in the countries of the Northern Triangle of Central America. In the second part, an econometric panel data regression model is developed, adapted from that proposed by Meyer and Shera (2017), which considers the per capita GDP growth rate as the dependent variable and remittances as a percentage of GDP, along with other variables that will be explored later as independent variables.

The results allow us to conclude that, in the Northern Triangle of Central America, remittances have no significant effect on economic growth, and if they do, it would be negative. This suggests a potentially harmful rather than beneficial relationship between remittances and economic growth. However, other variables—particularly household consumption—show a positive and statistically significant impact on economic growth. Furthermore, the dynamics of remittances vary considerably among the countries of the region when analyzed individually. In each country of the Northern Triangle of Central America, it is observed that for Guatemala and Honduras the effect of remittances could be negative, while for El Salvador it could be positive and contribute to economic growth. This result highlights a substantial heterogeneity that is masked in the joint analysis. It underscores the importance of considering the specific economic structures and policy environments of each country when assessing the macroeconomic role of remittances.

2. LITERATURE REVIEW

This chapter provides a systematic review of the impacts of remittances on economic growth, especially in the countries of the Northern Triangle of Central America. The literature on remittances can be divided into two main strands. One adopts a microeconomic approach and examines the causes and uses of remittances. This literature tends to address both the motivations behind remittances and how they are used. The other strand of the literature focuses on the effects of remittances and uses macroeconomic models to estimate their impact. Neither branch makes extensive use of formal theoretical analysis; therefore, empirical research on remittances has produced more stylized facts than hypothesis testing that compares different theories (Chami, Fullenkamp, & Jahjah, 2005).

In this regard, this thesis will evaluate remittances from a macroeconomic perspective and how their impact can affect the economic growth of a region. To this end, it is essential to consider what Glytsos (2005) states regarding the productive use of remittances, which can be manifested in various ways, such as management (for example, through banks); the expansion of credit for investment, made possible by increased banking liquidity due to remittance deposits; the release of other resources previously allocated to consumption; investment in human capital through spending on certain consumer goods (such as education and health); the purchase of more investment goods abroad; and the growth of investment as a result of the multiplier effects of consumption spending. This perspective is critical because the author argues that, although most of the literature maintains that remittances are mainly allocated to consumption, housing, and land, and are not used for productive investments that contribute to long-term growth and development, this view is limited and ignores the potential of remittances and their macroeconomic impact on a country.

2.1. Remittances and Migration

2.1.1 History of migration in the Northern Triangle of Central America

Before providing a historical overview of migration in the region of the Northern Triangle countries of Central America, I would like to present the definition that Morales A. (2017) offers in his book regarding the concept of "region." In this respect, the author goes back to the etymological roots of the word and explains that it originates from the Latin *regio*, which is in turn etymologically related to the verb *regere*, meaning "*to direct, guide, draw boundaries, govern (rule)*." Therefore, both the Latin word and its derivatives in European languages have meant "direction, boundary, area, territory." Thus, in the original concept of region, at least three components relevant to the social sciences can be identified: the geographic component (direction, area), the political component (governing, ruling), and the territorial component (drawing a boundary). To these three components, the author suggests adding the social, economic, and cultural dimensions, so that, with this sixfold ambiguity, the concept of region can be defined.

According to Morales A. (2017), in the region of the Northern Triangle of Central America (NTCA), elements of all six components are present. For example, geographically, the NTCA is made up of neighboring nations; historically and culturally, before the arrival of the Spanish, the region was inhabited primarily by people of the Maya culture; politically, by the end of the 20th century, the region was marked by military and authoritarian regimes. The author argues that in the NTCA, during transitions toward new economic, social, and political orders, an authoritarian oligarchy adapted itself to the changes in both the regional and global economy. This oligarchy, manipulative and coupled with the existence of weak institutions, led to the NTCA states being considered weak or "failed" by the beginning of the 21st century. In other words, the region exhibits similar characteristics that make it possible to group

these countries for this study. To some extent, they also share regional contexts that, for this research, will help trace the history of migration in the NTCA countries, along with its leading causes and nuances.

An important aspect to understand is that mass migration from the NTCA countries is of a survival type; that is, it is not voluntary but forced by the extreme social and economic vulnerability experienced in these countries (North, L., 2021). In this regard, the NTCA has experienced four waves of migration. The first wave occurred before the 1970s and was characterized by intraregional mobility: Salvadorans moving to Guatemala and Hondurans to El Salvador. The second wave, between the 1970s and 1990s, was determined by dynamics related to conflicts, with people fleeing civil war, repression, and the military regimes that prevailed in the countries at that time. It is essential to mention that during this period, there was a significant flow of people emigrating abroad, mainly from El Salvador and Guatemala. The third wave occurred in the context of the post-Civil War transition and gradual integration into the global economy. During this stage, people migrated for economic reasons, partly responding to the demand for foreign labor and economic necessity. The last wave has been ongoing since 2009. The persistence of economic needs, external demand for labor, and insecurity arising from the consolidation of transnational organized crime networks in the NTCA countries (Orozco, 2018) are key factors.

Migration from the Northern Triangle of Central America results from a combination of push and pull factors, where migrants are mainly attracted by the search for economic opportunities and family reunification, and, on the other hand, pushed away by the high levels of violence, poverty, and social insecurity in their countries of origin (Abuelafia, Del Carmen & Ruiz-Arranz, 2019). In 2019, approximately 3.5 million people from El Salvador, Guatemala, Honduras, and Nicaragua were residing in the United States. Compared to 2010,

this figure reflects a 24 percent increase in the number of people born in NTCA countries living in the United States. Although the COVID-19 pandemic reduced migration flows in 2020, recent figures for 2021 and 2022 from encounters with migrants at the U.S. southern border suggest that, currently, more people from the Northern Triangle of Central America are willing to migrate than before the pandemic (Mejia-Mantilla et al., 2022).

To these migration cycles, a new nuance was added since 2016: Donald Trump, who used xenophobic and anti-immigrant rhetoric as a political instrument. Schmidt, A. (2019) points out that Donald Trump used his anti-immigrant hostility to achieve the electoral victory that brought him to the presidency in 2016 and to promote his reelection years later. In this regard, President Trump's threat to deport more immigrants and confront illegal migration did not go unnoticed in the Northern Triangle of Central America and generated anxiety among its citizens. The main newspapers in the region published numerous articles about the political discourse in the United States and its possible consequences for the Northern Triangle countries. Migration data reflected a sharp increase in migrant detentions during the second half of 2016, suggesting that Central Americans wishing to leave their countries were rushing to reach the United States before Donald Trump's inauguration in January 2017. Although it is impossible to confirm the reason and many factors influence the decision to migrate or not, there are indicators that support this assumption. (Meier, 2017). Trump's immigration policies demonstrate a deliberate historical amnesia regarding the role of the United States in destabilizing the Central American region. Worse still, they criminalize Central American families, women, and children fleeing violent social environments that U.S. military aid helped create. (Villeda & Miklos, 2017, p. 54)

In summary, the Northern Triangle of Central America has a long and complex political-economic history, which has produced significant social, economic,

and political inequalities. Political unrest, internal struggles, armed conflicts, and gang-related violence have generated large population movements from the NTCA countries, particularly toward the United States (Pederzini, 2015). Hamilton and Chinchilla (1991) point out that, in addition to the internal factors of each country, it is essential to highlight that U.S. intervention, especially after the second wave of migration, has prolonged and intensified the political and social conflicts in each NTCA country. For this reason, to this day, part of the migration becomes a vicious cycle, in which Central Americans are forced to move from their countries to the United States. This nation has historically perpetuated sociopolitical conflicts in the region.

2.1.2 Remittances

Traditionally, remittances are defined as the transfer of financial resources between countries. In this regard, remittances play an important role in the relationship between migration and development, as their impact varies depending on the country and the community. This is because the amount of money sent, as well as how the received money is spent, closely depends on the migrant's socioeconomic position, both in the destination and origin countries, as well as on investment conditions in the country of origin (Triandafyllidou, A. (Ed.), 2018). The literature on remittances has developed several theories to explain the motives behind migrants' decisions to send funds to their families in their countries of origin. According to Solimano (2003), the analytical literature on remittance motives can be summarized into four approaches: (i) the altruistic motive, (ii) the self-interest motive, (iii) the implicit family contract I: loan repayment, and (iv) the implicit family contract II: co-insurance (Addison, E. K., 2004).

In this regard, Yang (2011) points out that as international remittances grow, both the public and private sectors have increasingly focused on this dynamic.

In the private sector, the growth of remittance transfer services has been significant, both by operators dedicated to money transfers—such as Western Union and MoneyGram—and by other financial institutions offering these services. In the public sector, many national governments have established agencies dedicated to harnessing the potential of remittances from international migrants for national economic development. Exploring the development potential of migrant remittances is one of the primary motivations behind the creation of these public agencies, even when countries seek to expand their scope "beyond remittances," promoting activities such as foreign direct investment.

It is important to note that remittances, unlike other types of private capital flows, such as investments, are more stable. For example, it has been observed that remittance flows often increase when a country's economy is in crisis, during natural disasters, or in times of political instability. This occurs because migrants send more money at these times to support their families and friends facing difficulties (Ratha, 2007). On the other hand, according to De Haas (2005), it is a migration myth to believe that remittances are mainly spent on consumption and unproductive investments. In this regard, more recent empirical studies, especially in Latin America but also in Asian and African countries, suggest that remittances potentially allow migrants and their families to invest in agriculture and other private enterprises. Households with international migrants often tend to have a higher propensity to invest than households without migrants. Various studies have shown that migration does not necessarily lead to passive dependence on remittances but can also result in increased economic activity and wealth generation among families.

2.1.3 General effects of Remittances

One of the topics that has generated significant debate among scholars of migration is related to the remittances sent by migrant workers to their places

of origin and the effects these have on the receiving communities. In this regard, Aragonés, Salgado, & Ríos (2008) mention that the focus of research on migration and its effects centers on analyzing the capacity of remittances to reduce poverty in recipient communities, whether these transfers can be invested in productive projects and transform the living conditions of the population, and their potential to increase levels of human development, understood as improvements in education, health, and nutrition. As cited in Binford (2006), there are two important approaches that analyze the impact of remittances: the functionalist and the historical structuralist.

The first approach presents a “positive” view regarding remittances, considering that they generate employment and, therefore, increase the incomes of recipient families. Furthermore, even unproductive spending generates multiplier effects at the local and regional levels by increasing the demand for goods and services produced. Remittances contribute to reducing regional and rural-urban class inequalities and promote development because they are directed toward productive investment, mainly in rural areas. Accordingly, remittances are considered a form of migrant savings that, in many cases, constitutes an important source of productive capital and a dynamic force in promoting entrepreneurial activity, business formation, and economic growth, at least at local and regional levels.

The second approach, the “historical-structuralist,” holds that remittances have a rather negative or, at least, limited effect, arguing that they generate minimal regional impacts in the migrants’ communities of origin since they are invested in meeting basic needs, acquiring durable goods, and purchasing and improving housing, while only a small portion is allocated to savings and productive investment, as cited in Canales (2002). Under this concept, remittances cannot be considered a form of savings or a source for productive investment; rather, they should be conceptualized as a wage fund that, as such, is primarily intended for consumption and the material reproduction of the household. That is, to the

extent that migration is an essentially labor phenomenon, the income obtained by migrants represents a wage fund that, like any other, tends to be used primarily for the material maintenance of the family. Although this income is channeled as “international transfers” and takes the form of external savings, it is far from being a true form of savings, as it lacks the uses and properties traditionally attributed to personal or family savings. When allocated to investment projects, these have a limited multiplier effect and thus are more aligned with family survival strategies than with market dynamics.

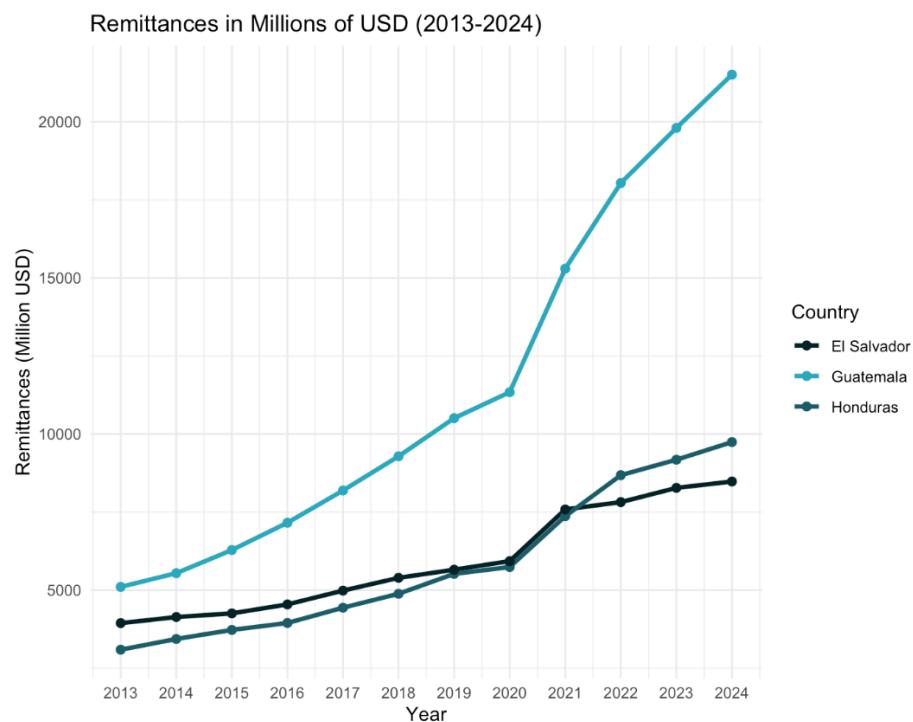
2.1.4 Remittances in the Northern Triangle of Central America

The flow of remittances to the countries of Latin America and the Caribbean is the highest and fastest-growing in the world, surpassing foreign direct investment and net official development assistance in the region. Remittances exceed tourism revenues and almost always surpass the earnings from these countries' main exports, representing at least 10 percent of GDP in at least six Latin American countries. Moreover, remittances are the most stable source of foreign exchange in many of these economies, thus playing a crucial role in economic development (Amuedo-Dorantes, 2006, p. 187). For example, regarding the countries of the Northern Triangle of Central America, few macroeconomic indicators show an invariably increasing trend, like family remittance inflows. In 2020, when global economic activity experienced a sharp contraction, family remittances provided enormous relief to these countries, representing the equivalent of 24% of GDP in El Salvador and Honduras, and 14.6% in Guatemala (Gatica López, 2022).

Migration and remittances have become increasingly important factors in the development of El Salvador, Guatemala, and Honduras over the past three decades. An overview of remittances in the Northern Triangle indicates that 54% of recent migrants send remittances to their countries of origin. Seven out of ten Guatemalans send remittances to their country, compared to half of Hondurans and Salvadorans. Parents are the most frequent recipients of

remittances, followed by siblings, children, and spouses (Abuelafia, Del Carmen, & Ruiz-Arranz, 2019). A World Bank study shows that, in the Northern Triangle countries, remittances are associated with a reduction in labor force participation, particularly among women. Likewise, receiving remittances is also associated with a lower likelihood of youth being in school or employed. At the same time, evidence suggests that remittances may support small businesses and self-employment in El Salvador and Guatemala (Sousa & García-Suaza, 2018).

Figure 1: Historical series of remittances sent to the Northern Triangle countries of Central America in millions of dollars from 2013 to 2024

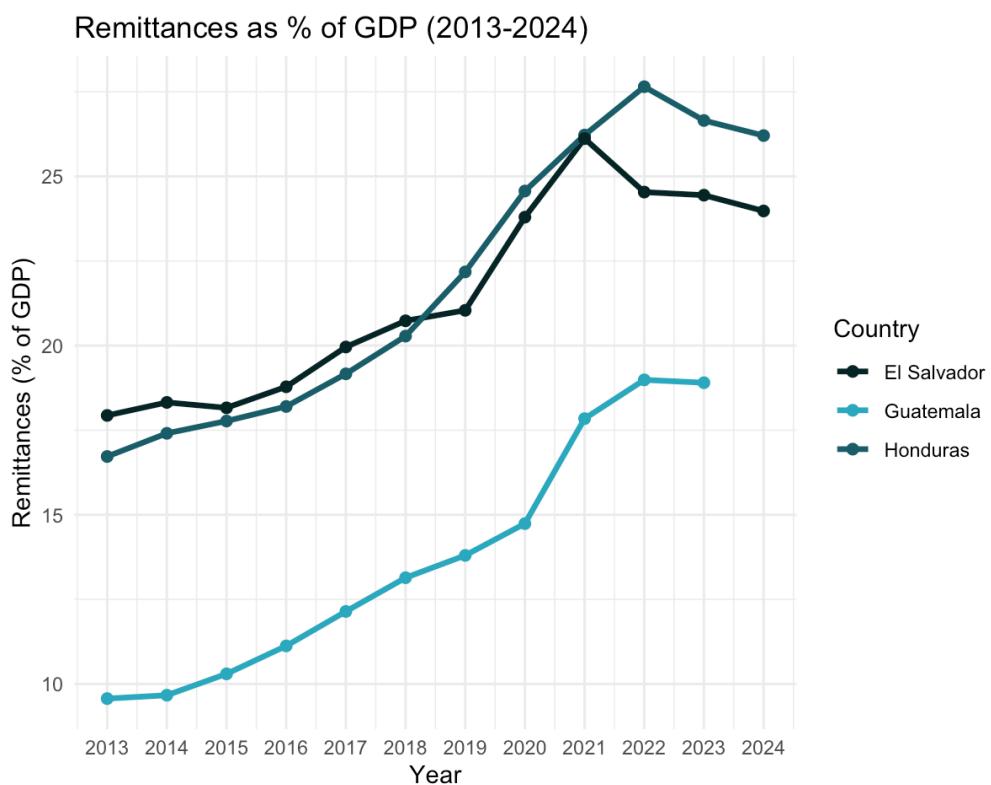


Note: Prepared by the author using data from the central banks of the Northern Triangle countries of Central America

According to the central banks of each Northern Triangle country of Central America, between 2013 and 2024, family remittances in Guatemala, Honduras, and El Salvador showed a growing and sustained trend, reaching historic figures for all three economies. In the case of Guatemala, remittance flows increased

from \$5,105.2 million in 2013 to \$21,510.2 million in 2024, meaning they quadrupled in just over a decade. Honduras also experienced a significant increase: in 2013 it received \$3,093.3 million in remittances, while by 2024 the amount had risen to \$9,742.9 million, tripling the initial level. Meanwhile, El Salvador, although with lower amounts in absolute terms compared to Guatemala, maintained a steady growth dynamic, increasing from \$3,944.2 million in 2013 to \$8,479.7 million in 2024.

Figure 2: Historical series of remittances as a percentage of GDP in the Northern Triangle countries of Central America



Note: Prepared by the author using data from the central banks of the Northern Triangle countries of Central America

According to the Central American Bank for Economic Integration (2021), in 2020, Honduras ranked as the fifth country in the world where remittances represented the highest percentage of GDP, at 24.1%. El Salvador occupied the

sixth position globally, with remittances accounting for 24% of GDP, while Guatemala ranked 18th, with 14.6%. The graph shows that, although all three countries experienced growth in absolute remittance amounts, the relative magnitude in relation to GDP is even more significant, especially in Honduras and El Salvador, where remittances constitute a true economic pillar. These data reflect the importance of remittances in the economies of the Northern Triangle countries of Central America, placing them among the most remittance-dependent countries in the world. Therefore, it is essential to keep this perspective in mind and, later, to analyze the impact of remittances on the economic growth of these countries.

2.2 Macroeconomic impact of remittances

2.2.1 Why study the macroeconomic impact of remittances?

Remittances are an influential factor in economic policy decisions. In this regard, the macroeconomic effects of remittances are substantial and sustained over time. Three of the main characteristics of remittances that drive interest in studying their macroeconomic impacts are: the size of remittance flows relative to the size of recipient economies, the likelihood that these flows will continue steadily over time due to globalization trends, and the fact that they differ from official aid or private capital flows, which are much better documented in the literature (Fullenkamp et al., 2008). It is important to note that, in general, remittances can have a positive impact on a country's macroeconomic variables through various channels. Migration scholars argue that remittances can positively influence the economy through savings, investment, growth, consumption, poverty reduction, and improved income distribution. However, the importance of remittance flows becomes critical in economies with imperfections in the credit market, as is the case in most developing countries (Addison, 2004).

Regarding remittance flows, Fullenkamp et al. (2008) state in their study that, using the remittance indicator from the World Bank's World Development Indicators (WDI) database (2006), remittances increased from \\$48 billion in 1994 to \\$114 billion in 2003. However, other studies, which include unofficial remittance flows, suggest that this figure could be substantially higher. In many developing countries, the level of remittances received is equivalent to or even exceeds foreign direct investment, portfolio flows from financial markets, and official development assistance. Given that remittance flows are substantial and reach a significant number of households in recipient economies, it is important to study their macroeconomic effects and how they influence market prices and the interactions between households, firms, financial intermediaries, and government.

The second reason for studying the macroeconomic impact of remittances is that the factors driving the increase in remittance flows in recent years remain present. In this regard, to improve their growth prospects, many countries have implemented policies in recent decades aimed at liberalizing their economic systems. During this period, policymakers have focused primarily on understanding the effects of globalization, trade openness, and capital account liberalization on the direction and magnitude of private capital flows, foreign direct investment, and economic growth. However, the trend toward greater economic integration through regional agreements, such as the Association of Southeast Asian Nations (ASEAN) and the European Union (EU), along with the proliferation of trade agreements such as the North American Free Trade Agreement (NAFTA), has also promoted greater flexibility in labor migration. Consequently, the growth and persistence of remittance flows can be understood as an additional implication of globalization. However, this has not yet received the same attention as the economic impacts of trade openness and capital account liberalization (Fullenkamp et al., 2008).

The final reason proposed by the authors (Fullenkamp et al., 2008) for studying the macroeconomic impact of remittances refers to the difference between remittances and other international flows. It is important to highlight that remittances behave differently and, consequently, generate different economic impacts. For this, we must consider the most widely accepted definition in the remittance literature, which holds that remittances are non-commercial, non-repayable personal transfers between households in different countries. They differ significantly from official aid flows, which are government-to-government transfers, whereas remittances consist of multiple small transfers between individuals. Furthermore, a crucial element that distinguishes remittances from official aid and private capital flows is the presence of family ties. This factor introduces well-known economic issues regarding interactions among family members and explains the unique behavior of remittances.

2.2.2 The Impact of Remittances on Economic Growth

The effects of remittances on economic growth have been widely analyzed from various perspectives. For some authors, remittances have a direct and negative effect on economic growth because their main destination is household consumption rather than productive investments. Others, on the contrary, argue that remittances positively influence economic growth due to their multiplier effects on aggregate demand variables (Mayoral & Proaño, 2015). Similarly, these authors assert that remittances can indirectly affect economic growth, for example, by facilitating human capital accumulation by enabling households to access education or by reducing labor market participation as remittances become a source of income that substitutes for the wages of some recipients. Additionally, remittances represent fiscal revenue for the state, which expands its capacity to spend on investment and redistribution policies. Finally, remittances can strengthen the financial system, as they increase credit capacity to finance investment projects and reduce the financing costs for recipient households by improving their solvency.

2.2.2.1 Negative Effects of Remittances on Economic Growth

Research that has empirically analyzed remittances as a source of resources for developing countries usually focuses on their direct effects on economic growth, through a regression analysis of GDP growth in relation to remittances and a set of control variables that allow for determining structural differences between countries. For example, Chami et al. (2005) studied the effect of remittances in 113 countries during the period 1970–1998. They used a linear model relating GDP growth to remittance growth relative to GDP, along with other variables such as the investment rate or private capital flows relative to GDP. By applying panel data methods and controlling for regional differences through dummy variables, they found that remittances harm economic growth. This is because remittances can create negative incentives—for example, recipients may reduce their labor effort knowing they will receive money from abroad, which decreases production in the economy and, at the aggregate level, slows economic growth.

Similarly, Amuedo-Dorantes (2023) indicates that although remittances represent an important income source for households, as in the case of households in the Northern Triangle countries of Central America, they can have negative effects on the economy and economic growth. On one hand, they reduce the labor supply because recipients depend on these flows and decrease their productive effort, and with that, their participation in the labor market, generating a culture of dependency that slows economic growth and increases inequality. On the other hand, because remittances are largely spent on non-tradable goods—that is, goods that cannot be easily exported or imported because their consumption or use is limited to the domestic market—their prices increase, and the real exchange rate appreciates. This raises the cost of exports, undermining the country's competitiveness in international markets and limiting its long-term development capacity.

Finally, Mayoral & Proaño (2015) conducted a study on the impact of remittances in Latin American countries from 1975 to 2012. They adapted a neoclassical growth model, extended with human capital, and under the assumption of an open economy, incorporating remittances as a variable of analysis. This log-linear model allowed them to determine the impact of a set of variables on the steady-state per capita income level of each country, as well as the speed at which countries converge to this level. Among the general conclusions, they found that, in general, remittances did not have a powerful direct effect in most Latin American countries, except in some cases, such as the Dominican Republic, El Salvador, Costa Rica, Ecuador, and Bolivia, where they did help improve per capita GDP. After the 2008 crisis¹, remittances played a more positive role, assisting families to maintain their standard of living amid the global crisis. However, the authors also found that, in the short term, increased remittances can have negative effects because they are often spent more on consumption (even on imported products) rather than productive investment. Additionally, they can reduce labor force participation (fewer people seek employment because they have this income) and even decrease citizen pressure on governments.

2.2.2.2 Positive Effects of Remittances on Economic Growth

There is empirical evidence that remittances contribute to economic growth through their positive impact on consumption, savings, or investment (Meyer & Shera, 2017). For example, Pradhan et al. (2008) found that workers'

¹ The 2008 economic crisis, also known as the Great Recession, was a global financial crisis triggered by the collapse of the subprime mortgage market in the United States. Major banks and insurance companies faced enormous losses and required government bailouts. The crisis quickly spread to Europe and emerging markets, causing a severe credit contraction and affecting productive activity. Over time, it became a global economic crisis, leading to massive layoffs, business closures, and a decline in economic activity in numerous countries (IMF, 2009).

remittances have a positive impact on economic growth through a cross-sectional study of 39 developing countries using data from 1980 to 2004. The authors applied a standard econometric growth model, where the dependent variable was real per capita GDP growth, and the independent variables included per capita remittances, investment, trade openness, and polity (a measure distinguishing between democracy and autocracy). Using a linear regression model, they tested two methods: fixed effects and random effects. The results showed that although remittances positively contribute to economic growth, their effect is not very large, and official data tend to underestimate it so that the real impact could be greater. Additionally, variables such as investment and trade openness show positive correlations. In contrast, variables like democracy (polity) present mixed effects, not always being significant in the short term, but long-term increases in democracy are associated with higher growth.

A study conducted by the World Bank in 2022 examined the long-term relationship between remittances and real GDP in 80 developing countries. Through a panel analysis, the authors found that, on average, a 10% increase in remittances is associated with a permanent 0.66% increase in GDP. However, the remittance-growth relationship is not homogeneous, meaning remittances do not have the same impact on GDP in all countries: in some, they strongly stimulate investment and growth, while in others, the effect may be weak or even negative. For example, GDP growth in response to remittances ranges from -0.53% in Bosnia and Herzegovina to 0.59% in the Dominican Republic. This heterogeneity is partly explained by the relationship between remittances and investment in each country; where remittances stimulate investment, the impact on GDP is more substantial. Moreover, the authors concluded that the effects of remittances do not depend on the proportion they represent of GDP. Finally, the authors suggest that, on average, remittances tend to have a greater

positive impact in upper-middle-income countries than in low- and lower-middle-income countries (Francois, Ahmad, Keinsley, & Nti-Addae, 2022).

Similarly, Meyer and Shera (2017) performed an econometric estimation using annual World Bank data for the period 1999 to 2013 in six Eastern European countries: Albania, Bulgaria, Macedonia, Moldova, Romania, and Bosnia-Herzegovina. In their model, the dependent variable was per capita GDP growth, and the primary variable of interest was workers' remittances as a percentage of GDP. They also included other control variables such as gross fixed capital formation, household final consumption, secondary education, trade openness, population growth, real exchange rate, and public debt as a percentage of GDP, resulting in Equation 1. The results using the country data for the selected years showed that remittances have a positive and significant effect on economic growth, estimating that a 1% increase in remittances raises GDP by approximately 0.29%. However, this positive effect on economic growth depends on how remittances are used, being more productive when directed toward investment and consumption.

$$GDP\ GROWTH = \beta_0 + \beta_1 WORREM + \beta_2 GCF + \beta_3 CONSUM + \beta_4 ENR + \beta_5 FDI + \beta_6 POP + \beta_7 REAL\ EXCH + \beta_8 DEBT + \varepsilon^2 \quad (1)$$

² In this econometric model, the dependent variable is GDP growth, while β_0 represents the intercept or constant of the model. The coefficients $\beta_1, \beta_2, \dots, \beta_8$ indicate how much GDP growth changes when the independent variables change, holding all other variables constant. The explanatory variables include workers' remittances (WORREM), gross fixed capital formation (GCF), final consumption (CONSUM), school enrollment (ENR), foreign direct investment (FDI), population growth (POP), real exchange rate (REAL EXCH), and public debt (DEBT). Finally, the error term (ε) accounts for factors that are unobserved or not explained by the model.

3. METHODOLOGY

To study the impact of remittances on the economic growth of the Northern Triangle of Central America, a theoretical framework was first established that explores the econometric possibilities and the outcomes of both negative and positive effects of remittances on economic growth. For this research, a model adapted from the one proposed by Meyer and Shera (2017) is proposed, which considers economic growth as the dependent variable and remittances as a percentage of GDP, along with other variables that will be explored later as independent variables in a panel data regression model. This model is derived from a general formulation presented in Equation 2, where y_{it} is the dependent variable, $X_{it}\beta$ is the matrix of independent variables, and $\eta_i + \mu_{it}$ are the residuals.

$$y_{it} = X_{it}\beta + \eta_i + \mu_{it} \quad (2)$$

Equation 2, presented above, represents only the general form of the equation that will be used in this research. The techniques described below are typical of panel data studies, which consist of repeated observations of the same unit—in this case, the countries of the Northern Triangle of Central America. Observations are made over different periods of time; for this research, the analysis will be conducted annually. The observation period spans 22 years, from 2003 to 2024. Additionally, the panel is balanced, meaning that the period is the same for each country. The panel data study will allow for variables that cannot be observed or measured, such as cultural factors between countries.

A fixed effects (FE) model will be used to analyze the panel data, which considers the explanatory variables as non-random. That is, they do not change unpredictably or by chance but rather exhibit systematic behavior specific to each country. For example, in this research, which analyzes how remittances

influence economic growth in the countries of the Northern Triangle of Central America, the fixed effects model assumes that each country has unique individual characteristics that do not change over time and could affect growth. However, the FE model "removes" these constant differences to focus solely on the net effect of remittances on economic growth. The approach described above contrasts with the random effects (RE) model, which considers differences between countries as random events unrelated to the independent variables. In contrast, fixed effects recognize that these differences are systematic and country specific. In panel data analysis, the term "fixed effects estimator" (or Within estimator) is used to identify the parameters of the regression model (Meyer & Shera, 2017).

In this research, the FE model will allow exploring the relationship between the independent variables and economic growth outcomes within each country of the Northern Triangle of Central America. It is assumed that each country has individual characteristics that may influence the independent variables, and the FE model controls for these differences to estimate the impact of remittances accurately. Econometrically, this refers to the correlation between the error term and the independent variables. FE techniques remove the effect of constant individual characteristics, allowing estimation of the net effect of variables that change over time, such as remittances. Moreover, it is assumed that these individual characteristics are not correlated across countries. In summary, FE models are designed to study factors that vary within each country, ignoring constant differences between countries that could bias the results.

Some previous studies have used multiple regression analysis to investigate the impact of workers' remittances on economic growth (Chami et al., 2003). To investigate the impact of remittances on the economic growth of Guatemala, Honduras, and El Salvador, this research will perform a panel data regression analysis. For this purpose, data for all variables will be collected from the

official statistics of the central banks of each Northern Triangle country (Bank of Guatemala, Central Bank of Honduras, Central Reserve Bank of El Salvador). This dataset covers the most recent annual information from 2013 to 2024. According to Meyer & Shera (2017), Gujarati recommended that standard stationarity tests are mostly applicable to large samples; therefore, since the sample size in this study is not very large, no stationarity test will be applied.

3.1 Econometric model and description of variables

To determine the sensitivity of the growth rate with respect to remittances and traditional sources of economic growth, we propose the following equation, which takes as a reference the one proposed by Meyer & Shera (2017):

$$\begin{aligned}
 GDP\ GROWTH_{i,t} = & \beta_0 + \beta_1 REM_{i,t} + \beta_2 GFC_{i,t} + \beta_3 CONSUM_{i,t} + \\
 & \beta_4 ENR_{i,t} + \beta_5 FDI_{i,t} + \beta_6 TRADE_{i,t} + \beta_7 POP_{i,t} + \beta_8 REALEXCH_{i,t} + \\
 & \beta_9 DEBT_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

In Equation No. 3, the subscript i represents the countries of the Northern Triangle of Central America (Guatemala, Honduras, and El Salvador), while the subscript t represents the years from 2003 to 2024 considered for the analysis. Y_{it} is the dependent variable representing the real per capita GDP growth of the countries, and $X_{it}\beta$ is the set of independent variables, which includes remittances as a percentage of GDP, gross fixed capital formation, final household consumption, schooling, foreign direct investment, trade openness, population growth, changes in the real exchange rate, and public debt of the countries. In this regard, Table No. 1 presents the variables of the equation along with a brief description of what each measure.

In summary, to estimate the effect of remittances on the economic growth of the countries in the Northern Triangle of Central America, an econometric analysis method will be used, consisting of a panel data estimation, which is

empirically presented in Equation 3. Here, GDPGROWTH is the dependent variable, representing economic growth, and REM is the independent variable, representing remittances, measured as the ratio of remittances received by the country relative to GDP. The remaining variables shown in the equation are control variables included in the model to account for the effects of other factors that influence economic growth. The proxies and the expected relationship of all variables are presented in Table 2. In general, it is expected that received remittances and economic growth will have a positive relationship. Additionally, the appendix presents the data used for this model, which were obtained from various sources, including official data from the World Bank, the central banks of each of the Northern Triangle countries, and the corresponding Ministries of Economy and Finance.

Table 1: Data description

Variable	Description
GDPGROWTH	Growth of real GDP per capita (%) ³
REM	Remittances as a percentage of GDP
GCF	Gross fixed capital formation as a percentage of GDP (investment)
CONSUM	Final household consumption expenditure as a percentage of GDP
EDUCATION	Secondary school enrollment (%)
FDI	Foreign direct investment as a percentage of GDP
TRADE	Trade openness is measured as (exports + imports)/GDP, or in terms of trade
POP	Population growth rate (%)
REALEXCHAR	Annual variation of the real effective exchange rate index
DEBT	Government debt as a percentage of GDP

³ In this research, GDP per capita is used as the dependent variable, as it allows for a more precise measurement of the impact of remittances on the average economic well-being of the population. Unlike total GDP, which can increase simply due to population growth, GDP per capita reflects the average income per person and is therefore more directly linked to the effects of remittances on household consumption and investment. Additionally, its use facilitates comparisons between countries with different population sizes and is consistent with common practice in the academic literature.

4. RESULTS

4.1. Results of the model applied to the Northern Triangle of Central America

The statistical results of the panel data regression model, presented in equation (3), are shown in Table No. 2. The model was based on 66 observations corresponding to the countries of the Northern Triangle of Central America over 22 years, from 2003 to 2024. The adjusted coefficient of determination (R^2)⁴ was 0.86, indicating that the variables selected as independent in the model explain 86% of economic growth. In other words, the proposed independent variables broadly capture the factors that affect economic growth in the countries of the Northern Triangle of Central America.

Answering the research question regarding the impact of remittances on economic growth in the Northern Triangle of Central America, the coefficient result of -0.097 indicates that, holding all other variables constant, a one-unit increase in remittances in the Northern Triangle countries is, on average, associated with an approximate 0.097% decrease in economic growth. However, it is important to note that the p-value of 0.2058 indicates that this result is not statistically significant at the 5% level, meaning that it cannot be asserted with certainty that the effect of remittances on economic growth is different from zero for the panel analyzed.

According to the results presented by Meyer & Shera (2017), a positive effect of remittances on economic growth would be expected; however, the results obtained show a negative effect in the countries of the Northern Triangle of

⁴ R^2 (R squared) is a statistical measure that indicates how well the independent variables explain the variation of the dependent variable in a regression model. In the case of the present research, the dependent variable is GDPGROWTH (per capita GDP growth), and the independent variables are REM, GCF, CONSUM, EDUCATION, FDI, TRADE, POP, REALEXCHVAR, and DEBT. If $R^2 = 0$, it means that the model explains none of the variation in GDP growth. If $R^2 = 1$, it means that the model explains all the variation in GDP growth.

Central America, indicating that as remittances increase, economic growth is expected to decline. This result, despite remittances representing a large percentage of GDP and constituting an important support for households, allows us to conclude that, as noted by Mayoral and Proaño (2015), in most Latin American countries, remittances in the short term negatively affect economic growth. This supports the argument that remittances promote the consumption of imported goods more than productive investment, reduce labor market participation for part of the population in favor of greater leisure, and even discourage citizen action in monitoring the macroeconomic outcomes of governments.

Regarding consumption, the results shown in Table 2 indicate that domestic consumption is the most influential variable in economic growth in the presented equation, surpassing other variables such as foreign investment, foreign trade, or education, which did not show statistical significance. The estimated coefficient for the consumption variable was 0.768, with a highly significant p-value of 2×10^{-16} . This result implies that a 1% increase in household consumption in the countries of the Northern Triangle of Central America is associated with a 0.77% increase in per capita GDP. In other words, economic growth in the Northern Triangle countries depends directly on the internal consumption dynamics of households. However, it is essential to note that this household consumption can be strongly influenced by remittances sent from abroad, which represent a significant weight for the economies of these countries.

In general terms, the results indicate that variables such as domestic investment (GCF/GDP), education (secondary enrollment), foreign direct investment (FDI/GDP), trade openness (TRADE/GDP), real exchange rate variation (REALEXCHVAR), and public debt (DEBT/GDP) do not exhibit a statistically significant effect on economic growth in the Northern Triangle of Central America. Nevertheless, it is worth noting that domestic investment, trade

openness, and public debt all show positive coefficients aligned with theoretical expectations. In contrast, foreign direct investment displays a negative—though statistically insignificant—coefficient, which contradicts conventional economic theory. This anomalous result may suggest that foreign direct investment in the region is not channeled toward productive local sectors. However, elucidating the precise reasons behind the signs of the coefficients falls beyond the scope of this research.

Table 2: Economic Growth Model and Remittances Results

Variable	Coeficiente	StdError	t_value	p_value
REM	-0.097188	0.075891	-1.2806	0.2058
GCF	0.117612	0.10424	1.1283	0.26419
CONSUM	0.767548	0.052365	14.6577	2E-16**
EDUCATION	0.011664	0.039959	0.2919	0.77148
FDI	-0.13419	0.115856	-1.1583	0.25186
TRADE	0.054957	0.035688	1.5399	0.12941
POP	-2.592061	1.433419	-1.8083	0.07613**
REALEXCHVAR	0.004189	0.048021	0.0872	0.93082
DEBT	0.021396	0.01616	1.324	0.19109

From a more general perspective on remittances and their impact on economic growth in the Northern Triangle of Central America, Table No. 3 presents statistical results from the applied model. The Northern Triangle is characterized by low average economic growth (1.76%), although positive in most years, accompanied by high volatility and episodes of deep crises. The distribution shows negative skewness and heavy tails, indicating that GDP declines are more frequent and severe than periods of expansion, reflecting the vulnerability of these small, open economies to external shocks. This is evidenced by the Skewness value (-0.81), which shows a leftward bias in the distribution, and by the Kurtosis (6.33), indicating heavier tails than usual, i.e., a higher probability of extreme events.

In contrast, remittances exhibit very different behavior: they average 17.6% of GDP, reaching up to a quarter of the economy, and show remarkable stability over time. This pattern confirms that remittances constitute a constant and low-volatility external flow, acting as a buffer in economic cycles by supporting household consumption. However, despite their magnitude, their effect on long-term economic growth seems limited, as much of these resources are directed toward current consumption rather than productive investment, restricting their capacity to transform the region's economic structure.

Table 3: Statistical Summary of Model Variables

Variable	Min	Median	Mean	Max	SD	Variance	Skewness	Kurtosis
GDPGROWTH	-10.55	1.93	1.76	11.53	3.02	9.11	-0.81	6.34
REM	9.67	18.27	17.58	27.00	4.89	23.93	-0.03	-0.99
GCF	13.27	19.86	20.05	36.07	4.90	24.05	0.90	0.71
CONSUM	-8.13	3.81	3.34	16.83	3.57	12.74	-0.34	4.43
EDUCATION	35.81	57.35	57.87	73.24	8.97	80.51	-0.29	-0.80
FDI	-0.61	2.42	3.08	9.11	2.19	4.81	1.02	0.32
TRADE	41.14	76.30	81.79	136.49	25.91	671.50	0.55	-0.64
POP	-0.05	1.73	1.38	2.57	0.83	0.70	-0.49	-1.44
REALEXCHVAR	-9.70	-1.01	-0.94	13.38	3.60	12.93	0.39	2.64
DEBT	19.57	40.56	44.74	95.37	21.85	477.47	0.60	-0.95

4.2 Results for each country of the Northern Triangle of Central America

As an additional part of this thesis, the same model applied in equation (3) was evaluated separately for each country in the Northern Triangle of Central America (Honduras, Guatemala, and El Salvador) to analyze whether the effects of the studied variables showed different results in each country. The data are presented in Table No. 4. Notably, domestic consumption is the variable with the most significant weight and effect on economic growth in all three countries of the Northern Triangle of Central America. Additionally, in Honduras and

Guatemala, as in our original model, the impact of remittances on economic growth is negative, while in El Salvador, the effect of remittances on growth is positive. The results for each country will be analyzed in detail below.

Table 4: Statistical Results Disaggregated by Country

Country	Variable	Estimate	Std. Error	t value	Pr(> t)
Guatemala	(Intercept)	-5.19	8.58	-0.60	0.56
	REM	-0.12	0.11	-1.11	0.29
	GCF	0.37	0.12	3.01	0.01**
	CONSUM	0.73	0.10	7.61	0.00**
	EDUCATION	0.17	0.06	3.12	0.01**
	FDI	0.17	0.21	0.80	0.44
	TRADE	0.07	0.03	2.25	0.04**
	POP	-5.46	2.52	-2.17	0.05**
	REALEXCHVAR	0.08	0.02	3.43	0.00**
	DEBT	-0.13	0.13	-0.99	0.34
Honduras	(Intercept)	1.78	5.42	0.33	0.75
	REM	-0.16	0.11	-1.55	0.15
	GCF	0.10	0.10	0.98	0.34
	CONSUM	0.81	0.07	10.96	0.00**
	EDUCATION	-0.03	0.07	-0.45	0.66
	FDI	0.07	0.26	0.28	0.78
	TRADE	0.04	0.04	0.99	0.34
	POP	-3.24	1.76	-1.84	0.09
	REALEXCHVAR	0.00	0.13	-0.02	0.98
	DEBT	0.00	0.02	0.12	0.91
El Salvador	(Intercept)	22.33	17.33	1.29	0.22
	REM	0.38	0.36	1.08	0.30
	GCF	-0.50	0.45	-1.11	0.29
	CONSUM	0.88	0.14	6.47	0.00**
	EDUCATION	-0.35	0.23	-1.48	0.16
	FDI	-0.54	0.23	-2.35	0.04**
	TRADE	0.08	0.15	0.56	0.58
	POP	2.54	3.60	0.71	0.49
	REALEXCHVAR	-0.27	0.18	-1.46	0.17
	DEBT	-0.04	0.05	-0.70	0.50

When analyzing the model data for Guatemala, the coefficient for remittances is -0.12, with a low-significance p-value of 0.29, indicating that, holding all other variables in the model constant (GCF, CONSUM, EDUCATION, FDI, TRADE, POP, REALEXCHVAR, DEBT), a 1-percentage-point increase in remittances is, on average, associated with a 0.12-percentage-point decrease in economic growth. The negative sign, like that in the original model, can be explained theoretically: in Guatemala, remittances discourage labor force participation and are directed more toward domestic consumption than productive investment. It is important to note that, unlike the original model covering all three Northern Triangle countries, variables such as education (EDUCATION = 0.17, p = 0.01), trade openness (TRADE = 0.07, p = 0.04), and domestic investment (GCF = 0.37, p = 0.01) show statistically significant effects. This suggests that Guatemala's economic growth depends more on internal factors such as human capital, investment effects, and domestic economic dynamics than on the other Northern Triangle countries.

In Honduras, as in Guatemala, the coefficient for remittances is negative, meaning that, holding other variables constant, a 1-percentage-point increase in remittances is associated with a 0.16-percentage-point decrease in economic growth. However, this effect is not statistically significant at the 5% level, so it cannot be concluded with certainty that remittances have a tangible impact on per capita GDP growth in Honduras. On the other hand, the consumption variable is positive and highly significant. According to the data, a 1% increase in household consumption is associated with a 0.81-percentage-point increase in economic growth, indicating that domestic consumption is a key factor in Honduras's economic growth. Unlike in Guatemala, the other variables in the model do not appear to have a significant influence on per capita GDP growth in Honduras.

Finally, in El Salvador, the coefficient for remittances on per capita GDP is positive, 0.38, with a p-value of 0.30. This indicates that, holding other variables constant, a 1-percentage-point increase in remittances is associated with a 0.38-percentage-point increase in economic growth. However, this effect is not statistically significant at the 5% level. Notably, unlike Guatemala and Honduras, in El Salvador, remittances are positively related to economic growth. This may be due to various factors, including, as Meyer & Shera (2017) note, that remittances contribute to economic growth through the savings and investment they generate within the country. As in the other countries, domestic consumption in El Salvador is highly significant, with a coefficient of 0.88, suggesting that a 1% increase in household consumption is associated with a 0.88-percentage-point increase in economic growth, showing that domestic consumption is a key driver of El Salvador's economic growth. It is also important to note that, in El Salvador, investment was highly significant for our model, with a coefficient of -0.54 and a p-value of 0.04. This indicates that, during this period, a 1% increase in investment is associated with a 0.54-point decrease in per capita GDP growth, which could reflect that foreign investment is not directed to local productive sectors or that its effect is volatile in the short term.

In summary, it is crucial to highlight the marked heterogeneity in the results among the studied countries. The positive sign of remittances in El Salvador, although not statistically significant, suggests the existence of differentiated dynamics in the use of these resources. As Meyer and Shera (2017) point out, the impact of remittances critically depends on their allocation, potentially being directed more toward savings or productive investments in small businesses—a pattern that Sousa and García-Suaza (2018) identified as relevant in the Salvadoran context. In contrast, the negative coefficients found in Guatemala and Honduras, though not significant, align with the perspective of Chami et al. (2005) and Amuedo-Dorantes (2023), who argue that remittances

can foster dependency and reduce labor supply. This interpretation is reinforced by the historical-structuralist approach of Aragonés, Salgado, and Ríos (2008), according to which remittances are often allocated to basic consumption rather than investment in human or productive capital.

The case of Guatemala deserves particular attention, as variables such as domestic investment (GCF) and education showed statistical significance. This could indicate that Guatemala's economic structure—the largest in the region according to annex data—has a greater capacity to channel resources into productive sectors compared to its neighbors. Finally, the negative and statistically significant coefficient of foreign direct investment (FDI) in El Salvador is particularly revealing. This finding suggests that investment flows in the country may be directed toward sectors that generate limited productive linkages or technology transfer, thereby constraining their contribution to economic growth.

5. CONCLUSIONS

The impact of remittances on economic growth remains a topic of debate, primarily due to the multiple effects and relationships they have with many other variables that directly or indirectly influence economic growth. Using a panel data econometric model, it was shown that remittances can have a negative effect on GDP in the Northern Triangle countries of Central America. This result, although not statistically significant, aligns with the theory presented, which suggests that, even though remittances are a key factor in these economies—reaching levels of up to 20% of GDP—their use is primarily for the consumption of non-tradable goods, rather than for other purposes such as investment or savings. Additionally, remittances may reduce labor force participation among Central Americans, as fewer people seek employment due to this fixed income, and they may even decrease citizen accountability over governments (Mayoral & Proaño, 2015).

An important conclusion of this thesis is that the most significant variable in the model, and the one that could define economic growth in the Northern Triangle, is household domestic consumption. The estimated coefficient for consumption is 0.768, with a highly significant p-value of 2×10^{-16} . This result implies that a 1% increase in household consumption in the Northern Triangle countries is associated with a 0.77% increase in per capita GDP. This makes sense and relates to the initial research question about the impact of remittances on economic growth in the Northern Triangle. While remittances have a negative effect, they are highly representative in household consumption, which has a positive impact. In the long term, this puts Northern Triangle countries at an economic disadvantage, as it confirms that remittances are primarily used for basic consumption, allowing recipients to "survive" on them, rather than generating investment and savings. Although remittances do not directly impact economic growth, they do positively affect household consumption, which is

consistent with the hypothesis that their contribution to growth occurs indirectly through increased aggregate demand.

When the results are disaggregated by country—Guatemala, Honduras, and El Salvador—rather than analyzed collectively as in the initial model, the findings are particularly interesting. This allows us to conclude that domestic consumption is the most significant variable for per capita economic growth in each country. However, El Salvador, unlike Honduras and Guatemala, shows a positive coefficient for remittances. On the other hand, in Guatemala, unlike the other two countries, variables such as education and direct investment have a positive and highly significant effect on economic growth. This reinforces the idea that, when studying remittances in Northern Triangle countries and similar economies, these flows must be directed toward investment to maximize their impact on economic growth. It is also important to emphasize that remittances should not be seen as a cushion allowing governments in the region to evade the inefficiencies they have historically carried. While remittances provide relief for households—and especially for governments that have been unable to generate opportunities—they do not replace the need for public policies that provide people with the means to drive their countries' development.

The disaggregated results by country demonstrate that the impact of remittances on economic growth is not homogeneous among the Northern Triangle of Central America countries. Specific national realities—such as economic structure, human capital, and investment patterns—are crucial to understanding how these flows affect recipient economies. This heterogeneity implies that implementing a single policy for all three countries would be ineffective, necessitating differentiated strategies tailored to local contexts. These findings carry clear policy implications: rather than passively relying on remittances, governments in the region should design mechanisms to transform these monetary flows, shifting them from consumption toward productive

investment. Furthermore, given the strong economic dependence of the Northern Triangle countries on the United States, international cooperation from the U.S. should focus on promoting genuine development in the region. As Zubieta (2020) argues, this cooperation should foster local development, encourage educational cooperation and cultural exchanges, and support vulnerable Central American youth in training as technicians and professionals. Crucially, it must also work to eliminate prejudices and discrimination that perpetuate a negative perception of Central American migrants, as this comprehensive approach would not only promote more productive use of remittances but also address structural factors limiting the region's development.

Finally, it is important to highlight that this research opens the door to future lines of study in this field. Subsequent investigations could, first, utilize microeconomic data through household surveys, which would allow for a more precise analysis of how remittances affect spending patterns and economic outcomes at the family and community levels. Second, it would be useful to expand the analysis to include other Central American countries, which would increase statistical power and enable more robust regional comparisons, thereby improving the understanding of cross-border dynamics. This approach would help establish clearer causal relationships and strengthen the validity of empirical findings.

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7. APPENDIX

Table 5: Description of the variables and expected coefficient sign according to Meyer & Shera (2017)

Variable	Proxy or definition	Expected sign
REM	Remittances received as a % of GDP	+
CAP FIX GDP <i>i</i>	Gross fixed capital formation as % of GDP	+ / -
SCHOOL <i>i</i>	Ratio of school enrollment percentage to GDP	+
FCONSUM <i>i</i>	Household final consumption expenditure as % of GDP	+
TRADE <i>i</i>	Trade as a % of GDP	+
POP <i>Gi</i>	Population growth as a % of GDP	-
REAL EXCH <i>i</i>	Real exchange rate	- / +
DEBT <i>i</i>	Total debt as % of GDP	-

Figure 3: Model results in R

```
> summary(modelo_FE)
Oneway (individual) effect Within Model

Call:
plm(formula = GDPGROWTH ~ REM + GCF + CONSUM + EDUCATION + FDI +
    TRADE + POP + REALEXCHVAR + DEBT, data = pdata, model = "within")

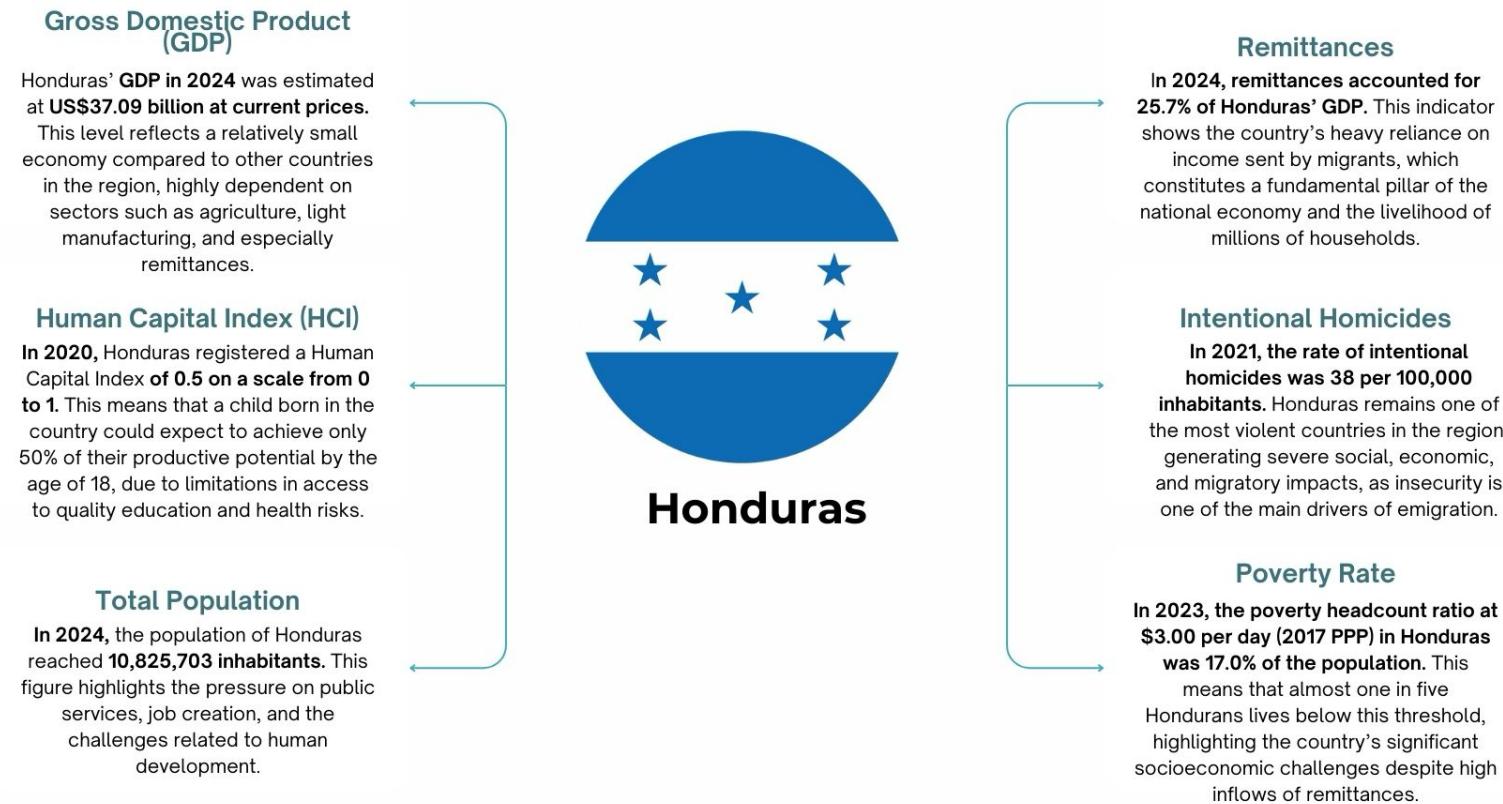
Balanced Panel: n = 3, T = 22, N = 66

Residuals:
    Min.  1st Qu.    Median  3rd Qu.    Max. 
-3.77377 -0.67313  0.10926  0.64807  3.01523

Coefficients:
            Estimate Std. Error t-value Pr(>|t|)    
REM      -0.0971880  0.0758906 -1.2806  0.20580  
GCF       0.1176125  0.1042398  1.1283  0.26419  
CONSUM    0.7675485  0.0523650 14.6577 < 2e-16 ***
EDUCATION 0.0116644  0.0399594  0.2919  0.77148  
FDI      -0.1341901  0.1158555 -1.1583  0.25186  
TRADE     0.0549570  0.0356877  1.5399  0.12941  
POP      -2.5920615  1.4334190 -1.8083  0.07613  
REALEXCHVAR 0.0041886  0.0480213  0.0872  0.93082  
DEBT      0.0213961  0.0161604  1.3240  0.19109  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

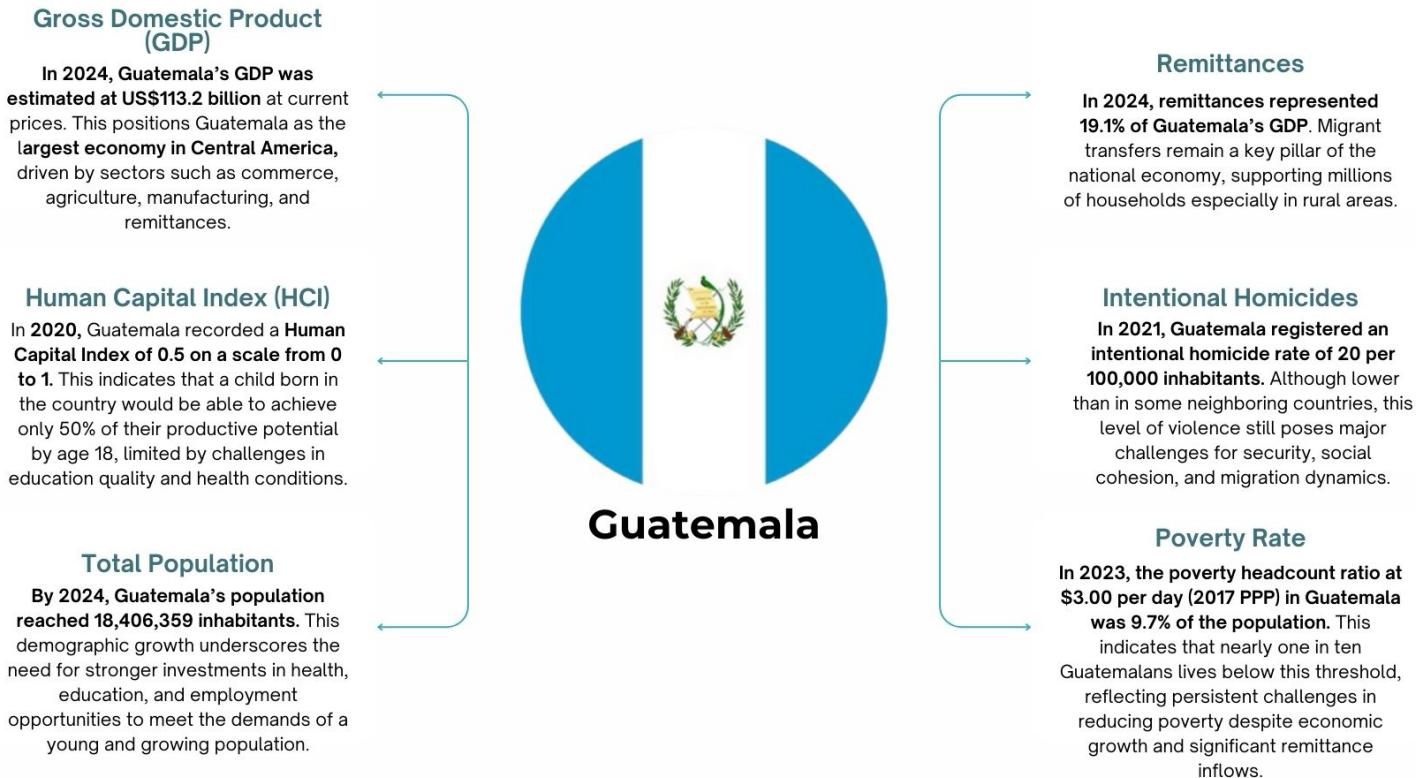
Total Sum of Squares:  590.48
Residual Sum of Squares: 82.153
R-Squared:  0.86087
Adj. R-Squared: 0.83253
F-statistic: 37.1254 on 9 and 54 DF, p-value: < 2.22e-16
```

Figure 4: Technical Note on Socioeconomic Data of Honduras



Note: Own elaboration based on official data from the World Bank (<http://datos.bancomundial.org/pais/honduras>)

Figure 5: Technical Note on Socioeconomic Data of Guatemala



Note: Own elaboration based on official data from the World Bank (<https://datos.bancomundial.org/pais/guatemala>)

Figure 6: Technical Note on Socioeconomic Data of El Salvador

Gross Domestic Product (GDP)

El Salvador's GDP in 2024 was estimated at US\$35.36 billion at current prices. The economy is driven mainly by remittances, services, and manufacturing, with limited natural resources compared to neighboring countries.

Human Capital Index (HCI)

In 2020, El Salvador registered a Human Capital Index of 0.5 on a scale of 0 to 1. This means that children born in the country will only reach 50% of their potential productivity by age 18, constrained by gaps in education and health.

Total Population

In 2024, El Salvador's population reached 6,338,193 inhabitants. Despite its relatively small size compared to other Central American countries, the nation faces demographic challenges related to migration and urban concentration.



El Salvador

Remittances

Remittances represented 24.0% of GDP in 2024, highlighting their critical role in sustaining the Salvadoran economy. These transfers are a primary source of household income and significantly support consumption and poverty reduction.

Intentional Homicides

In 2021, El Salvador reported an intentional homicide rate of 18 per 100,000 inhabitants. Although historically one of the most violent countries in the world, recent government policies have contributed to a significant decline in homicide rates.

Poverty Rate

In 2023, the poverty headcount ratio at \$3.00 per day (2017 PPP) in El Salvador was 4.6% of the population. This relatively low percentage reflects improvements in living standards, although significant portions of the population remain vulnerable to economic shocks and income instability.

Note: Own elaboration based on official data from the World Bank (<http://datos.bancomundial.org/pais/el-salvador>)

Table 6: Database used for the model estimation⁵

Count ry	Yea r	GDPGROW TH	REM	GCF	CONSUM	EDUCATI ON	FDI	TRADE	POP	REALEXCH VAR	DEB T
GTM	200 3	0.276550484	9.950523 24	20.62150 678	3.8597368 31	35.81	0.0903239 7	67.00233 919	2.2519801 72	2.81	19.8
HND	200 3	1.898504218	10.51455 532	25.28088 236	4.4025172 54	57.3545684 8	4.7405555 4	122.2482 772	2.5659833 83	2.56	67.7 6
SLV	200 3	1.362756612	16.01719 47	18.42922 732	0.7851682 54	63.9578285 2	1.0661518 37	68.23698 248	0.1997125 46	-0.16	45.9 6
GTM	200 4	0.870516167	11.14419 468	21.18960 61	3.8515853 58	38.6573181 2	1.3631757 07	70.21487 236	2.2229414 78	-6.52	20.5 5
HND	200 4	3.615702692	13.18147 048	29.66555 73	4.9789634 4	57.3545684 8	6.6760639 97	135.4617 587	2.4939344 83	1.69	60.9 1
SLV	200 4	0.787383831	18.67420 993	18.14074 1	1.5815492 47	67.6739273 1	2.6468124 23	69.78226 418	0.1011724 39	-0.11	46.8 1
GTM	200 5	1.064722556	11.44963 382	20.05113 862	4.2787665 85	40.6833801 3	2.0161750 03	67.10369 961	2.1644147 85	-7.24	20.0 2
HND	200 5	3.507079755	18.50151 246	27.62297 589	6.1392105 03	57.3545684 8	6.1602827 72	136.4897 68	2.4276317 58	-2.32	55.6 1
SLV	200 5	2.665322592	20.60552 456	18.60470 812	4.0443482 75	67.4190521 2	3.4776160 02	69.71581 168	0.0151037 67	-0.06	46.2 9
GTM	200 6	3.146006198	12.43971 657	21.16500 831	4.6831592 73	42.5541114 8	2.1358752 29	67.91192 374	2.1155887 81	-1.56	20.8 6
HND	200 6	4.083213351	21.60269 159	28.34192 973	8.6900266 72	57.3545684 8	6.5728730 53	133.1318 351	2.3585473 17	-0.54	39.2

⁵ The database used was mostly constructed with official data from the World Bank website (<https://datos.bancomundial.org/>), with the exception of the variables for schooling, public debt, and changes in the exchange rate, which were compiled using information from the central banks of each of the countries in the Northern Triangle of Central America.

SLV	200 6	4.393649087	21.76702 465	20.07545 052	4.4221537 88	67.1278762 8	1.5070728 61	73.45556 751	- 0.0542809 47	-0.17	52.5 6
GTM	200 7	4.121076026	12.61981 299	21.16956 642	5.3900994 11	44.4090499 9	2.5595919 28	69.00136 431	2.1065640 32	-1.32	20.7 8
HND	200 7	3.776278786	21.14384 094	33.66530 061	6.0713230 57	59.2733383 2	7.8222328 13	135.0706 349	2.2976772 54	-2.09	24.0 2
SLV	200 7	1.720416076	21.80287 154	20.80003 527	7.0998903 61	66.9662094 1	9.1143474 36	77.62105 603	0.1249569 04	3.22	52.2
GTM	200 8	1.194812594	11.49407 588	16.67156 432	4.3495530 03	45.4309692 4	1.8995220 87	65.17873 052	2.0527186 39	-9.02	19.5 7
HND	200 8	1.918834963	20.32415 082	36.06596 984	2.9922338 55	59.3647995	8.6502037 19	135.7489 552	2.2438586 5	-9.7	22.3 2
SLV	200 8	1.824471867	20.87492 613	20.17258 125	- 0.3889360 34	65.7248535 2	5.0206011 16	80.66597 394	0.3234956 6	-5.13	54.2 1
GTM	200 9	- 1.505249539	10.77988 212	13.26660 146	- 0.2953320 05	48.5042686	1.3462782 25	58.04068 697	1.9924579 54	13.38	22.7 8
HND	200 9	- 4.543991317	16.98262 054	20.59944 375	0.0704721 01	60.15	3.3898720 02	96.90500 602	2.1887885 45	-0.59	23.7 9
SLV	200 9	- 2.415991532	19.32969 806	14.05461 543	- 6.5439996 83	66.2814865	2.0948639 95	66.07119 117	0.3143348 57	3.74	65.7 8
GTM	201 0	0.865525448	10.38602 587	14.16419 369	3.4468253 43	52.4429397 6	2.7103070 68	63.12519 26	1.9815646 59	-6.13	24.0 1
HND	201 0	1.549121631	16.52787 351	21.87984 069	3.6485883 38	66.0755767 8	3.8346057 47	109.4418 38	2.1259724 4	-2.36	21.8 2
SLV	201 0	1.818016136	18.81966 487	16.67158 14	0.9207311 64	67.6990127 6	0.6134061 93	73.53728 77	0.3296326 82	2.51	66.7 9

GTM	201 1	2.107588602	9.670296 833	15.48217 542	3.6402739 88	53.0007400 5	1.8703824 4	65.04705 104	1.9938638 6	-5.29	23.7 7
HND	201 1	1.711641948	15.86984 068	25.99999 164	3.6004107 18	65.6973037 7	5.8868141 82	122.2169 026	2.0667982 4	-0.8	24.7 7
SLV	201 1	3.400791706	17.96484 307	17.78992 87	1.5711415 94	69.2876663 2	0.6039308 47	79.27664 37	0.3598839 8	-1.71	65.6
GTM	201 2	0.944366953	10.01185 875	15.19414 459	3.1413042 48	53.3110084 5	2.8225629 72	61.95941 934	1.9913867 36	0.48	24.5 6
HND	201 2	2.04382617	15.76145 511	24.56420 879	4.2748159 19	64.1757583 6	5.8361098 9	121.1882 158	2.0225127 08	1.89	27.0 9
SLV	201 2	2.486379215	18.30179 127	17.70954 566	3.2132695 88	70.3625183 1	2.0112394 59	77.64857 162	0.3908199 12	1.26	69.9 9
GTM	201 3	1.688694724	10.00770 429	15.84262 667	3.7031234 15	53.4995193 5	2.8721614 56	56.68522 126	1.9536018 91	-3.34	25.0 4
HND	201 3	0.777167217	16.74748 482	21.76035 23	3.7677242 24	61.5013999 9	5.7786211 39	116.3060 492	1.9791431 85	0.41	37.3 2
SLV	201 3	1.769083037	18.03685 945	17.01940 252	3.4808378 3	73.2414321 9	1.1149085 73	80.45119 449	0.4058501 85	1.41	69.6 6
GTM	201 4	2.483284492	9.941623 079	15.07116 236	4.5387411 13	53.0899581 9	2.4330214 32	55.08327 931	1.8951123 19	-7	24.6 5
HND	201 4	1.081275113	17.05518 98	22.18383 223	2.5553956 97	49.1755714 4	8.6289969 31	112.9750 973	1.9367820 93	-2.83	35.2 3
SLV	201 4	1.331326807	18.41407 274	16.39721 566	- 0.1408307 68	72.4806366	2.2408951 36	78.10442 575	0.3920733 98	-0.79	71.7 9
GTM	201 5	2.202044943	10.42339 065	14.82815 509	5.1428971 62	54.9180488 6	1.9350880 05	49.89345 327	1.8325076 79	-6.05	24.8
HND	201 5	1.88202222	17.47491 768	25.11800 475	3.9016224 38	50.0197715 8	6.2759432 84	107.2644 054	1.9036524 14	-1.1	38.5 2
SLV	201 5	2.05686594	18.23780 572	16.01698 762	2.9739163 48	70.6981887 8	2.1099780 45	76.56027 074	0.3356546 32	-2.91	73.4 6

GTM	201 6	0.803225141	11.14654 756	13.86196 876	4.0718416 97	54.3751907 3	1.2804587 15	46.37273 79	1.8425606 02	-5.97	24.9 4
HND	201 6	1.960510683	17.79081 61	23.37712 854	3.9994852 31	50.6989898 7	5.2815697 34	99.81571 7	1.8775667 6	2.78	39.6 2
SLV	201 6	2.255892674	18.85618 201	15.96751 412	1.9697936 13	69.1290283 2	1.9819803 16	72.81909 34	0.2765399 35	1.76	75.2 1
GTM	201 7	1.222021181	11.71450 429	13.59610 647	3.2734362 05	54.0077896 1	1.3932898 32	46.06942 051	1.8187609 15	-3.01	25.0 8
HND	201 7	2.921072783	18.68393 534	24.82071 317	5.2021354 93	50.7352905 3	4.1059204 67	101.8131 111	1.8500761 12	1.12	41.5
SLV	201 7	2.038089506	20.00206 39	16.67700 194	1.6637264 09	66.9067306 5	2.0168845 15	74.30465 119	0.2051339 28	2.86	77.1 4
GTM	201 8	1.698363049	12.87042 796	13.79042 358	3.5479157 19	54.1130104 1	1.2579004 85	47.01168 207	1.6660227 33	2.92	26.4 1
HND	201 8	1.961968725	19.84624 999	26.57208 628	5.5341210 91	52.18	5.9938612 07	103.5511 622	1.8299464 31	-1.25	42.6 2
SLV	201 8	2.309139463	20.72084 003	18.37153 667	1.3404181 65	67.7265930 2	1.5862047 87	75.63361 689	0.1009222 06	-0.92	76.9 6
GTM	201 9	2.448136415	13.80754 361	14.32983 672	4.7192690 33	52.6072883 6	1.5170710 19	45.51674 275	1.5206295 53	-1.57	26.4 1
HND	201 9	0.719361516	21.70812 901	22.96771 051	4.7652710 23	64.1083908 1	3.8384640 82	99.45997 799	1.8106377 38	-1.18	43.5
SLV	201 9	2.396133219	21.04358 007	18.34479 49	1.6906228 53	66.0821228	2.5902436 9	76.04201 31	0.0403628 81	2.91	77.9 1
GTM	202 0	- 3.220077328	14.67513 874	13.50068 307	- 1.6288083 01	51.9058113 1	1.2923038 91	41.14076 165	1.4713771 05	-1.47	31.4 9
HND	202 0	- 10.54841749	23.93195 822	19.66637 273	- 7.6388431 73	56.8269882 2	1.0106822 39	88.00085 638	1.7545643 25	-4.85	53.7 2

SLV	2020	-8.075625886	23.80027956	17.2116179	-8.127609689	66.20303345	1.551019986	66.45950695	0.198362575	3.3	95.37
GTM	2021	6.560160413	17.82138684	16.76824319	8.552323555	48.32254028	4.194485839	49.26115095	1.380758706	0.23	30.61
HND	2021	10.70299037	25.59459148	24.23093305	16.83194591	54.55513	2.843613297	103.3726435	1.668250632	0.93	51.03
SLV	2021	11.52715941	26.24524951	23.35491273	9.550880354	66.03547668	2.756049983	81.84507598	0.33800242	-1.47	87.96
GTM	2022	2.72968988	19.03416871	16.56853287	4.297989122	46.11190033	1.516155352	54.43104147	1.406237102	-1.36	29.01
HND	2022	2.411845511	27.00110447	26.32623174	5.736882958	54.16175842	2.41292398	112.6985249	1.67679658	-1.32	48.69
SLV	2022	2.552374867	24.63436663	24.471574	-0.094679462	65.33146667	0.082318757	88.70110938	0.391461928	-1.96	83.35
GTM	2023	1.951093092	19.14464644	16.47544293	4.345281592	47.63087845	1.581235467	48.29706892	1.539869719	0.36	27.2
HND	2023	1.814897327	26.10390393	22.18643096	4.605457354	55.10287094	3.161363643	98.79197983	1.714773884	-1.25	44.94
SLV	2023	3.058269878	24.4783736	20.68468249	0.91146106	65.74420166	1.899288275	81.71477234	0.465531145	3	84.68
GTM	2024	2.066533354	19.12491712	16.68361256	5.59246236	47.63087845	1.614961295	47.34419471	1.541293997	-3.95	26.48
HND	2024	1.824018399	25.6991309	22.49233553	4.34448374	55.10287094	3.529037496	91.11015859	1.684691298	-1.34	42.62
SLV	2024	2.139548111	24.00229766	20.34423339	3.21174377	65.74420166	2.612418578	84.65964616	0.451762523	-0.09	87.58