Globalization and income inequality: A panel data econometric approach

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Abstract

The research delves into three distinct phases of globalization in the modern era. The first section of the literature review delineates these phases, while the subsequent portion presents empirical evidence about the correlation between globalization and income distribution. Employing Gini data, our analysis explores the interplay between economic and financial globalization and within-country and cross-country income inequality. Our study encompasses data from over 133 countries from 1990 to 2021 across six continents. Our within-country analysis reveals a positive association between foreign direct investment (FDI) and income distribution in Asia and South America. According to our cross-country analysis, the development of FDI exacerbates income distribution in Asia, North and South America, Europe, and Oceania while ameliorating income inequality in African regions. Notably, China and India warrant heightened attention due to their substantial populations, economic growth, and the attendant opportunities and challenges arising from FDI development in Asian regions.

Keywords: Economic Globalization, Financial Globalization, Income Inequality, Worldwide

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Section 1 Introduction

1.1Significance of the study

Globalization is an unavoidable phenomenon; we cannot prevent the advent of it. The issue of income inequality is a widespread concern in many nations and must be given due attention. Globalization is viewed as a well-known multidimensional phenomenon encompassing all dimensions of the political, social, cultural, and economic spheres; nevertheless, economists and policymakers are most concerned with economic globalization due to its direct influence on people's income (Ogunyomi et al., 2013). For the past two decades, there has been a contentious debate surrounding the extent to which income inequality results from economic growth, industrial structural changes, and financial flows. The crux of the matter is that globalization affects different countries with varying degrees of inequality, making some people more prosperous and others poorer. It is precisely because of the disparate results of globalization that people tend to be suspicious about the benefits of its arrival.

Investment-20th century, the economic and social characteristics characterized by neoliberalism, which focus on economic liberalization, market integration through foreign investment, privatization, and deregulation, had set off a trend of policy change; a series of developed countries learned to follow this ideology at that time, leading to big fortune gap for the pattern of wealth distribution. Globalization is the consequence of this, or in a positive way - good result, or they share similar approaches regarding goods, services, and capital across borders. (Related research shows that the applied force of globalization and neoliberalism acts as an ideological alignment driven by neoliberal policies that lead to increased economic inequality). However, we cannot reject globalization development, even though it brings adverse outcomes in some economies with different economic policies and environments.

Globalization has long been the subject of academic discussion, including differing views on its origins. Some scholars believe it started with Columbus's journey to the New World in the 15th century. Some believe that when the Spaniards encountered the Incas in the early 16th century, that was a step in globalization (Basu, 2006). Some scholars believe that globalization has its roots in the history of development that spans over 2000 years since the start of the old Silk Road, which brought globalization to its ancient birthplace. Globalization presents immeasurable advantages for worldwide economic growth by integrating the economy and labour market jobs, resource access, and increased trade, leading to information and culture exchange. It entails managing capital flows, facilitating global value chain specialization, establishing a reputation in internationalization, and running a business in the worldwide market. These critical components highlight the importance of globalization to economic growth for the course of better-off human life history. However, many have noticed that globalization has gradually increased income inequality over the years. By grouping all affluent individuals, it becomes evident that only a handful own significant wealth. This concentration of riches in the hands of a select few, combined with limited social mobility and a widening wealth disparity, those situations and cases will considerably severely affect economic progress in the long run.

According to the Kuznet inverted U curve, income inequality tends to increase initially when a country becomes more developed and integrated into the global economy. However, once a country reaches its development threshold and its economies mature, everyone in that country tends to have equitable income distribution; in other words, everyone starts to benefit from the country's wealth, not just a few of the rich Krugman (1995). A similar statement was confirmed by Aghion and Howitt (1998). In the short run, globalization can raise income inequality. However, in the long run, globalization has the potential to reduce poverty, create

more job opportunities through foreign direct investment, effectively access information and markets, to improve living standards by boosting productivity and innovation. However, some critics argue that globalization can also cause income inequality and poverty in the global economy, making the world worse off (Rodrik, 1997).

1.2 Hypothesis

This study has two types of hypotheses: the link between globalization and income inequality can be positively and negatively related. Based on the theories of Skilled Biased Technology (SBTC), income inequality can be increased due to the series of tech advancements and FDI. Moore and Ranjan (2005) have utilized the standard model framework, following the study of Pissarides (2000). The model comprises two intermediate goods - skilled intermediate, produced by skilled labourers, and unskilled intermediate, produced by unskilled labourers. When considering technological advancements, it has been observed that advanced technology has increased the marginal production of skilled intermediate in the final production process. Consequently, such disturbances can increase wage inequality while decreasing unemployment for skilled intermediate workers. Therefore, this can result in unemployment for unskilled workers, which causes income inequality.

Another hypothesis, for the consideration of the negative nexus between the focus of this study, when we draw attention to the effect of trade openness, we think about the Stolper-Samuelson Theorem, the theorem derived from the Heckscher-Ohlin model of international trade, suggests that trade liberalization tends to benefit the abundant factor of production in a country. In many cases, capital is this plentiful component. Trade liberalization may lessen income inequality in an economy where capital is distributed more unevenly than labor.

1.3 Objective

The objective of this paper is to understand whether globalization manifests in ways that allow the movement of human capital, mobility of financial investment and capital assets flows, and international trade across the country borders, which are essential in explaining the income inequality prevailing in the whole economy (Mallick et al., 2020). The selected country samples at the intra- and inter-country levels from 1990 to 2021 give policymakers a better understanding of the mechanism of globalization and provide valid political guidance to stimulate economic development, making the economy better off worldwide. This study not only focuses on the impact of trade openness on income inequality but also includes the development of FDI, which impacts income distribution hosted by developed and developing countries. In other words, it investigates whether trade liberation and inflow of foreign direct investment are associated with greater income inequality within and across economies.

1.4 Purpose

This research examines how globalization, represented by foreign direct investment and trade openness, impacts income inequality within and across economics. It also investigates whether globalization exacerbates or reduces income disparities and identifies the mechanisms through which these effects might occur. The research aims to contribute to understanding globalization's role in economic and financial disparities and offer insight that could inform policy decisions. Therefore, we examine how trade openness and FDI influence income inequality and provide new empirical evidence for future literature review.

1.5 Scope of the paper

Our research covers the period from the early 1990s to the 2021s, including 133 countries at intra and inter-country levels, spanning all sample counties into more homogeneous sub-samples based on their geographic positions. Data in the study is gathered within this timeframe to test the econometric analysis of this relationship and shed more light on this critical debate on whether globalization has something to do with income inequality. Only empirical evidence can open the mysterious veil. Prior studies have focused on economic globalization, including FDI, and trade openness due to technological, social, and political limitations (Destek, 2018). We provide brief definitions and measurements of these concepts at the beginning of the literature review. While measuring globalization, most existing studies focus solely on the economic aspects by using proxies such as international trade or capital flows, according to FDI, and trade openness are commonly used as indicators to measure the extent of globalization in an economy. This study also focuses on the economic dimension of globalization, including the financial aspect of globalization with the modernization development since financial investment is a crucial channel for modern globalization development, allowing us to establish economic and financial globalization indicators that distinguish different dimensions of international market integration, such as captured trade openness (e.g., Potrafke, & Sturm, 2019). These provided valuable insight into the level of cross-border economic integration, the openness of an economy to international trade and investment, and the involvement of foreign actors in the domestic market (Bokpin et al., 2015). Furthermore, a nation's capacity to draw in foreign investment and engage in international markets and its general economic performance may be inferred from the correlation between trade openness and foreign direct investment (Li et al., 2020).

1.6 Contribution

This study contributes to the globalization-inequality literature in several dimensions. Several studies have highlighted the interplay between globalization and income inequality. Despite numerous studies, the precise answer to the unresolved issue remains elusive and necessitates empirical analysis for clarity. This paper seeks to contribute to the ongoing scholarly discourse by providing further empirical evidence, positioning itself within this academic conversation, and giving new proof of globalization's enigmatic impact on income inequality. Second, this paper applies extensive unpaneled data collection across 133 countries. Existing papers broadly address within-country experience for the specific country being studied. In contrast, the study addressed world inequality, which has two dimensions, within-country and cross-country analysis, respectively, across many countries being investigated. Third, this is the first study in the literature to identify the effects of trade openness and foreign direct investment on inequality from six continents and 133 countries worldwide in a comprehensive framework using a large unpaneled of countries from 1990 to 2021. Fourth, an extensive amount of literature has investigated the matter of the veil. At the same time, only some studies on the effect of openness on income inequality and less research includes worldwide research.

The research question is, "To what extent has globalization contributed to income inequality in the world and six continents over the past three decades?" The paper is organized as follows: Section 2 provides an in-depth analysis of the theoretical foundations and implications of globalization and inequality and an overview of previous empirical research on the relationship between these two phenomena. Section 3 details the data sources and outlines the econometric model and measurement. Section 4 explains the methodology of the study. Section 5 presents the empirical findings. Section 6 performs research gaps. Section 7 presents

limitations and future research. Section 8 summarizes our main conclusions and suggests the implications of policy recommendations.

Section 2 Literature review

The literature review aims to concisely overview the complex relationship between inequality and globalization, which is reviewed in six sections. The literature review section summarizes prior studies exploring the link between globalization and income inequality. The first section solely examines research that specifically focuses on the effect of FDI on income inequality. The second section solely evaluates the impact of trade on income inequality. In the third section, we delve into the total effects of economic globalization on income inequality, including their effect on income inequality separately from the proxies of economic globalization, such as FDI and trade openness. In the fourth section, we focus on seeking the effect of modernization and financial development on inequality. Fifth, we evaluate research incorporating created globalization indexes and assess the influence of other technological, social, and political dimensions of globalization on income inequality. Finally, we search for the influence of FDI, trade openness, and financial aspects through tech and net migration towards the effects of inequality.

2.1 The role of inequality and globalization

Two centuries ago, global inequality in income distribution was witnessed to be on a rising trend. Moreover, the average inequality within countries has been observed to have surged since the 2000s (Ravallion, 2018). In the present day, this inequality is defined as the relative disparity of incomes among all individuals across the globe. Inequality is unequal treatment and unevenness in various circumstances, and income inequality has increased since the 1970s (Piketty & Saez, 2003). This paper focuses on income inequality, referring to the fact that income inequality is a critical issue in industrialized countries. Greater inequality exposes a more significant proportion of the population to the risk of poverty. Failure to address this issue can also result in a backlash against economic liberalization and increased protectionist pressures, thereby impending economic development driven by globalization. As we mentioned, protectionist pressures come from some individuals, ethnic plot fanatics, who are malevolent in their pursuit of resources and unfriendly to the long-term development of the economy (Mallick et al., 2020).

On the one hand, the continuous gap between the rich and the poor in national income inequality will undoubtedly have a particular impact on social development and stability, and even riots and unrest will mostly occur in some countries. When social wealth is unevenly distributed, social contradictions will appear in time. On the other hand, income equality promotes economic development, social stability, and social justice to a great extent. It is a wise investment that can yield significant returns by fostering social harmony, discouraging unproductive behaviour, and reducing crime rates, all of which drawbacks can hinder economic growth, waste government resources, and destabilize politics (Mdingi & Ho, 2021). In addition, social norms must also support income equality, as they play a significant role in upholding social order, cohesion, and fairness in earning and income distribution. Changes in social norms in a beneficial way are substantial, as they can significantly affect inequality levels and be influenced by various social forces that impact economies worldwide simultaneously (Atkinson, 1997). Besides, researchers have found that shifts in social norms can shape the relationship between globalization and income inequality (Dreher & Gaston, 2008).

Addressing income inequality is a crucial priority that profoundly impacts a nation's economic development and political stability.

Policymakers and economists express concern over the potential negative impact of an uneven distribution of the benefits of economic growth. These negative impacts could erode public confidence in policies that harm economic expansion and exacerbate rising public discontent because income inequality leads to social issues. When a significant percentage of the population lives below the poverty line, intergenerational earnings mobility is low in some countries, and the income gap between the rich and poor is vast, which raises concerns about the nation's long-term prospects and affects economic performance. Ultimately, the worst-case scenario is that the adverse effects of income inequality may impede economic growth and social unrest. Therefore, most countries make it a priority and enact primary policy objectives to reduce inequality to ensure a fair income distribution, which is a challenging task that all nations strive to accomplish, as it addresses the socioeconomic problems that arise from a growing income disparity in market economies (Mallick et al., 2020).

Over the past three decades, income inequality has worsened in numerous countries and regions. It has become a critical political issue that government leaders must address, including affluent Western areas. This issue has proven to be a challenge on a global scale, with income disparities remaining a significant concern in countries like the U.S. and the U.K. despite having Gini coefficients ranging from 30 to 50 (the higher the Gini coefficient, the worse the income distribution situation). Historical data from the U.S. indicates a consistent increase in income inequality from the late 18th century until the 1860s, followed by a period of stability until the Great Depression (de Zwart, 2019). Since the early 1980s, most Western nations have seen increased income inequality (de Zwart, 2019). Furthermore, upon analyzing the GDP per capita of vast regions across the globe, the glaring disparity is evident. Five hundred years ago, the most prosperous region was 1.8 times wealthier than the poorest region. In stark contrast, the most affluent region boasts a staggering 20 times more GDP per capita income than their poverty-stricken counterparts (Basu, 2006). The income inequality issue has become a severe issue. Studies have shown that globalization, technological advancements, and economic growth have not benefited all societal groups equally. Even if resources are distributed evenly within a country, economic dualism can significantly lead to unequal income in different geographical regions due to historical, social, and structural factors, such as formal, informal, and rural-urban sectors. and modern-traditional sectors (Pan-Long, 1995). For example, residents in urban areas have an advantage over rural areas as they are closer to financial and technological resources via foreign direct investment and global trade or opportunities in terms of development and economic structure.

The intricacies of globalization are multifaceted and have profound implications for various aspects of society, which come with pros and cons. Some economists say globalization has played a crucial role in developing economies and transitioning to modernity for over two millennia. However, some say one brings up inequality since the day it comes, especially to the unskilled workers in developing countries. Over the past century and a half, globalization has undergone three distinct phases, each of which has significantly impacted our understanding of economic progress throughout this period. These periods have extensively promoted economic growth (Palley, 2018). Between 1870 and the start of World War I in 1914, the "golden age" of the first globalization. This era saw a massive increase in migration, particularly transatlantic migration, notably reflecting a constantly moving world (Zinkina et al., 2019). The advancements in telegraph and steamship technology allowed for faster and more affordable transportation of goods and services, increasing global trade within and across countries. The transportation revolution and the liberalization of mercantilism played a substantial role in the integration of global markets throughout the 19th century. The

phenomenon of convergence in commodity prices owes a significant portion of its manifestation to the reduction in transportation costs, which accounts for approximately 75% of the overall effect (Lindert & Williamson, 2003).

During the years after the First World War, which spanned from 1914 to 1918, and the Second World War, which lasted from 1939 to 1945, a noticeable decrease in income inequality was observed in most Western nations. The period between 1950 and 1990 was characterized by a steep decline in inequality within countries, mainly attributed to industrial European countries that continued to embrace an egalitarian approach, while the rich but labor-scarce New World countries underwent a revolutionary trend towards egalitarianism. (Lindert and Williamson 1985; Williamson 1997; Lindert 2000; Lindert & Williamson, 2003). Despite that, globalization has not significantly developed during the past few decades. During the first wave of the globalization boom, the immigration barriers caused the income inequality issue within sending countries while lowering it in receiving countries. Between 1929 and 1939, the Great Depression occurred, resulting in a significant economic decline and increased income inequality following the initial wave of globalization.

Between 1945 and 1990, they marked the third phase of rapid globalization. This phase commenced before the conclusion of World War II and was characterized by a surge in trade activities, reflecting the reconstruction of a thriving global economy. Back in July of 1944, representatives from 44 countries gathered in Bretton Woods, New Hampshire, with one goal - establishing a stable monetary system that would stand the test of time. Thus, the Bretton Woods system was born, which saw exchange rates tied to the U.S. dollar and the price of gold fixed, providing a framework for economic integration and development (Bordo, 1993). Such a system's numerous benefits include reduced inflation and currency volatility, increased investment, excellent opportunities for lower-income people, and reduced inequality issues. All of this can lead to economic growth, job creation, and a reduction in income inequality. However, the end of the Bretton Woods era in 1972 marked a pointed shift in the global economic landscape (Palley, 2018). Massey (2009), by looking at the connection between globalization and inequality during the second globalization, the wage gaps fell when three East Asians (Korea, Singapore, and Taiwan) liberalized in the 1960s and early 1970s; wage gaps generally widened when the six Latins (Argentina, Chile, Colombia, Costa Rica, Mexico, and Uruguay) liberalized after the later 1970s. The historical context can explain the differences. First, resources and conditions were not the same during these liberalizations. Second, in some exceptional cases, wages have widened for reasons other than the liberalization of international trade and foreign investment.

For example, the competition was not intense from other low-wage nations when four Asian countries removed trade barriers. On the other hand, Argentina had union-bursting and an easing of minimum-wage controls during the trade liberalization (Lindert & Williamson, 2003). Moreover, the United States aided war-torn countries devastated by war in their rebuilding efforts, including fostering international trade and economic interconnectivity through the Marshall Plan. Undoubtedly, World War II had a significant impact on globalization. In addition, the U.S. was one of the two superpowers alongside the Soviet Union that catalyzed accelerated globalization. Consider this: Since the 1980s, the world economy has experienced a substantial demand for financial capital, land, energy, and human resources while supplies remain limited. As a result, individuals who own these resources are seeing increased returns. Despite the high demand for affordable labour, payment for labour is decreasing due to its abundant supply. This pressure on inequality has resulted from the second wave of globalization (Massey, 2009).

The third wave of globalization commenced in 1990 and has persisted to the present day, characterized by a remarkable increase in international trade, finance, institutional transformations, and investments among developed, developing, and emerging economies. During this phase, the Gini index, which measures income inequality levels across countries, has steadily increased up until the present day since it decreased notably until its historical nadir of 35% in 1979 (de Zwart, 2019; Palley, 2018). The primary driver of globalization is the new era of digitalization, known as Globalization 4.0, which is marked by the dominance of two global powers, the U.S. and China. The digital realm has experienced significant advancements, including developing the digital economy, e-commerce, artificial intelligence, and various digital products and services. Nevertheless, cyberattacks and web hacking incidents continue to pose a significant threat to the growth and development of the digital economy.

Direct Relationship

(1) Economic globalization goes through foreign direct investment (FDI), and international trade in goods and services causes reduced income inequality in developing countries because of industrialization and a rise in inequality in developed countries because of deindustrialization. Most of the attention has traditionally been paid to international trade; trade is only part of the economic globalization story (Freeman, 2011). FDI is also a significant aspect of economic globalization. Globalization prompts a "capital flight" for international firms by looking for and investing in a cheaper cost and valuable tax system and strategy advantage to replace domestic production and employment regulation in other countries through FDI. As a result, deindustrialization is happening in home countries, such as the delay in domestic development and a reduction in manufacturing and industrial activities due to the decline in the concentration of laborers who work in specific industrialized industries. Hence, laborers may face challenges in negotiating better benefits and job security.

(2) Moreover, it weakens domestic workers' wages and increases reliance on host developing countries. Developed countries face the risk of less industrialized industries due to a shift away from typical higher wages in the manufacturing and industrial sectors to be replaced by low wages in the service sector. As these sectors decline, employment is shifted from typical high-paying jobs to lower-paying jobs (Mills, 2009). Because of the service sector, jobs often have lower wages than jobs in highly industrialized sectors, resulting in the rise of income inequality and reduced industrialized expansion domestically (Alderson & Nielsen, 2002).

Conversely, developing countries have a contrasting relationship compared to developed countries. In fiercely competitive global marketplaces, the growth of trade and foreign direct investment (FDI) can create job opportunities and give people the possibility to boost their earnings. For developing countries, income inequality lessens gradually due to globalization through the growth and support for raises in pay for lower-skilled labor-intensive workers and pay reductions for higher-skilled labor-intensive workers because of the labor-abundant factor. Hence, it increases the relative share of the income of the overall country, and the income gap shrinks (Mills, 2009).

According to Feenstra and Hanson (1997), Foreign Direct Investment (FDI) leads to a rise in skilled labor demand in both developed and developing countries, increasing wages and benefits for skilled workers and vice versa for unskilled laborers. Hence, a more robust trend toward economic globalization is likely associated with higher levels of income inequality. Despite this, FDI can also serve as a remedy for deindustrialization. In situations where

deindustrialization is causing a rise in unemployment and other negative impacts on economic growth, attracting FDI can help restructure and revitalize the economy. The financial inflows from FDI can be directed towards other industries to offset the adverse effects of deindustrialization by creating new job opportunities and promoting economic growth with time.

International trade integration has grown remarkably since the 1980s, which increased five times from the 1980s to 2005s, mainly in some developing countries and the Eastern Bloc countries integrated into the global trading system, which is considered the gradually dismantled trade barriers. This phenomenon has a positive relationship with the synergies between financial and trade openness (Mills, 2009). There are two causes for income inequality via open trade. First, we consider Ricardo's theory of protectionism to have arrived with globalization. Speaking of protectionism, we think about the empire of Thailand back in Ayutthaya's time. The Thai empire was under the control of King Mongkut. Free trade was conducted between Thailand and British with the treaty, which asked for Siam to abolish its Royal Storage, which the Royals enriched themselves in the wealth generated by it and reduce its high tariffs down to 3% along with the removal of various tax barriers, which made goods from British are challenging to reach the Siamese people. Another example of protectionism is the Corn Laws in France, which set up overly high taxes on imported goods such as corn, which means ordinary British citizens must buy over-priced domestically produced goods. Corn laws protect the producers in their home country from these cheaper importers, which may flood the domestic economy, but this thinking is false. Ricardo came up with the thought that all people suffer from loss through an opening to trade, especially those who barely have savings, living under the average standard of living, and corn serfdoms. All in all, this type of protectionism only benefits a few people who empower the direction of the economic rules, such as the royal family and the landlord who charges the rent fees from corn growers in the U.K. (Phol, 2023, p36). Secondly, we consider the endowment of economies inherently, in which within labour-abundant countries before 1914, these international countries opened up to international trade and international factor movements lowered inequality, whereas within labour-scare countries, when they opened up to international trade and international factor movements raised inequality (Lindert & Williamson, 2003).

2.3 Empirical Evidence

Some studies claim that globalization can lead to unequal income distribution, whereas others claim the country. Some empirical evidence sheds light on the impact of globalization on income inequality, but this controversial issue remains unresolved.

2.3.1 The connection between financial openness/FDI and inequality

This section discusses the channels through which the globalization of foreign direct investment (FDI) sets the stage for the following empirical analysis. Several pieces of literature have been proposed to explain the effects of FDI on income distribution. The effects of foreign direct investment (FDI) on income distribution in industrialized economies are poorly and inconsistently demonstrated, and the effects need to be clearly understood conceptually. According to theoretical explanations, there is a nonlinear link between FDI and income distribution. Due to theoretical ambiguity, the impact of foreign direct investment (FDI) on Wage and income inequality in developed host countries is an empirical problem. However, the amount of empirical analysis is lower. One measure often used to capture globalization is the foreign direct investment (FDI) level and how it impacts countries' income distribution (Bornschier et al., 1978).

Foreign direct investment (FDI) is crucial in international economic integration, facilitating technology transfer between nations and promoting economic development in international trade. Foreign direct investment (FDI) can contribute to higher economic growth in the short term by increasing investment, trade, and consumption opportunities for foreign projects. However, this high dependency on foreign investment can have the opposite effect in the long term, leading to potential economic risks and challenges (Jin, 2009). Since the 1990s, FDI has become one of the most significant sources of private capital flows, offering indirect benefits of financial globalization such as new technology and management expertise to host countries; as Kose et al. (2009) noted, Foreign Direct Investment (FDI) has emerged as a vital source of foreign capital for emerging markets (EMEs). In the context of globalization, FDI created capital flight among firms to replace domestic production due to the discovery of cheaper cost or lenient tax systems or being favourable to domestic enterprises' employment regulations or in abroad markets, which is considered a critical factor in the economic development of these markets (Bundesbank, 2003).

There are two competing theories regarding the impact of foreign direct investment (FDI) on income distribution in least-developed countries (LDCs). The first theory is the modernization theory, which posits that FDI and modernization are intertwined in development and that foreign capital should not cause significant variance in income inequality. The modernization theory rarely addresses the distributional effects of FDI and treats foreign and domestic capital as homogeneous goods. However, the theory states the positive effect of FDI, which can provide capital, promote technology transfer, modernize management skills and corporate governance, and spur economic growth in preferred industries or institutions, ultimately leading to equal income distribution over time in the host country. (Jin, 2009) states that all excellent reviews on the effect of FDI on inequality have been done well. On top of that, capital is significant in the overall economic development of any nation. Regardless of its origin, whether domestic or foreign, capital has the potential to permeate and positively impact the entire economy; even in cases where foreign direct investment (FDI) is initially limited to specific leading sectors and regions, it can eventually lead to equal income distribution and other beneficial effects in other sectors in the host countries over time.

The second theory is the dependence theory, which critiques and warns against FDI in the economic development of host countries since underdeveloped countries often are the recipient or host countries in the FDI, which states that a country's position in the global economy determines its income distribution. Poor or peripheral nations are inherently disadvantaged and exploited by more sophisticated core governments, perpetuating income inequality due to unequal access to resources, unfavourable terms of trade, and even unequal investment set by core nations, such as the investment between recipient and investors in FDI is also seen as the underdeveloped countries servers the interests of the investing countries more than benefiting the recipient countries and peripheral countries develop their economies in a way that is depended on, or influenced by the economic interests and structures of core countries. It is aligned with the statement of Alderson and Nielsen (2002) that not every nation may profit from globalization; this depends on international organizations and laws. In the process of industrialization in less developed countries (LDCs), a group of labour elites, which typically consist of powerful actors in the state organization, play a significant role. These elites are known to earn 4 to 10 times higher wages than the ubiquitous workers in traditional industries. While dependent industrialization did improve the relative Wage of the elite labour class, it, unfortunately, led to a capital-intensive production process, ultimately leading to unemployment in traditional industries. The increased share of labour income did not contribute to reducing income inequality; it increased income inequality. The labour elite considered exceptional role players, have established a coalition with both the nation and the

political system, leading to the emergence of an economic-cum-political "triple alliance." To protect its interests, this alliance possibilities manipulation and intervention in natural market procedures, leading to a detrimental disruption in the distribution structure at its core.

The study tackled the link between FDI and income distribution by focusing on wage inequality. In 2011, (Figini & Görg, 2007) conducted a study that analyzed data from the UNIDO industrial statistics database from 1980 to 2002. The study involved 103 countries and showed a nonlinear correlation between FDI and Wage inequality in developing nations. Inward stock but eventually decreased with further growth of FDI inward in developing countries. In the same year, the study conducted by Paolo and Görg (2011) also investigated the same research question of whether FDI affects wage inequality and provided empirical investigation, which consisted of 103 countries, including developing and developed countries across a period of 1980 to 2002 with data from the United Nations Industrials Development Organization (UNIDO) Industrial Statistics database. The research found that wages increase with FDI inward stock but diminish with further increases in FDI in developing countries, and wages are reduced with FDI increases in developed countries. There is a nonlinear effect between FDI and Wage inequality in developing countries.

Similarly, the study conducted by (Khan et al., 2020) found the exact relationship between inward FDI and income distribution, which is the nonlinear effect of FDI with the square term on income distribution confirmed, with knowledge spillovers through imitation causing an equalizing effect. The study applied unbalanced panel data from five South Asian countries from 1990-2016. The study applied the dynamic panel system-generalized method of moments (SYS-GMM) estimator to reduce the issue of non-linearity and possible endogeneity.

Conversely, wage inequality decreased with an increase in FDI inward in developed countries. The empirical research of Wang et al. (2023) has yielded results that diverge from Figini and Görg (2007), which drew on a dataset comprising 126 countries and territories, encompassing 95 emerging markets and 31 developed nations, with data from 1974 to 2019. The author proposed a Schumpeterian growth model incorporating the Pareto distribution to explore the connection between FDI inflows and distribution. Using a GLS approach, the study indicates that FDI inflows negatively impact income inequality in emerging economies but positively in developed countries. Research has shown that while FDI in less developed countries often leads to economic growth, it can also increase income inequality. However, the potential negative consequences of FDI for developed countries, such as those within the United States, have received little attention. Panel cointegration methods were used in research by Chintrakarn et al. (2012) to analyze data from 1997 to 2001 across 47 U.S. states and one District of Columbia. This panel is thought to have 48 cross-sectional units and 25 time series observation units. The study revealed that FDI substantially negatively impacts income inequality in the U.S. long-term. However, FDI does not reduce the income gap of individual states when we look at them separately; upon analyzing 48 states, heterogeneity was observed to positively correlate with FDI's impact on income inequality over a long time in 21 states examined. These findings offer valuable insights for policymakers and business professionals to understand the complex relationship between FDI and income inequality within the United States.

This research highlights the need to examine further the effects of FDI on developed economies and their potential impact on inequality. Theoretically, FDI inflows increase the relative income and demand for unskilled labourers and cause income disparity in host countries.

2.3.2 The connection between Trade openness and inequality

Since the advent of globalization, it has been associated with unprecedented trade and financial market integration; many debates over the increasing inequality have focused on the role of globalization per se, especially on trade openness, which has played an essential role in explaining income inequality pattern along with globalization (Mallick et al., 2020). This section discusses the channels through which the globalization of trade sets the stage for the following empirical analysis. Globalization is identified with the history of trade, so trade is globalization, and globalization is trade (Palley, 2018). The degree of trade openness is often utilized as a quantifiable and tangible parameter in assessing a country's level of globalization from an economic angle, particularly in advanced countries (Mills, 2008). The growing significance and interconnectedness of international commerce have contributed to the expansion of globalization. Since the 1990s, countries in the Eastern Bloc have joined the global trading system, while developing Asian countries have gradually lowered their trade barriers. Interestingly, emerging markets and developing countries have caught up with and surpassed high-income countries in trade. This highlights the rapid pace of trade integration during the 1990s, the convergence of trade openness across different income groups, and the alignment of trade systems of low and middle-income countries with those of advanced economies.

Over the last two decades, the global economy has experienced remarkable growth, surpassing the levels observed during World War I. The global market was more integrated steadily, reaching the highest point historically in 1913 that even today cannot compare with European countries with more positive prospects overseas with investment at that time, a link between globalization and income inequality was established (Lindert & Williamson, 2003). However, not all population segments have equally benefited from globalization in terms of increased income and overall GDP. This period leading up to the World War 1 peak, mainly around 1913, has been characterized by a time of significant trade and financial integration because this period is referred to a high degree of globalization in terms of trade, investment, and financial flows, spontaneously sparking debates about the impact of globalization on unequal income distribution. Opening to trade has become a crucial factor in explaining patterns of inequality (Jaumotte et al., 2013).

The issue of inequality was absent in the basic Ricardian framework; the primary theoretical model to examine the relationship between income inequality and international trade was the Hecksher-Ohline and Stopler-Samuelson theorem until the 1990s (Milanovic, 2005) (Jaumotte et al., 2013). The Heckscher–Ohlin (H.O.) model, first introduced by Ohlin in 1933, provides insight into the relationship between trade openness and inequality because of production differences and relative factor endowment of countries, such as capital and labour (Ohlin, 1933). This model considers the varying levels of productivity and factors endowment across different countries and the degree to which individuals rely on capital and labour income. By specializing in the production of goods that are abundant in factors of production and exporting these goods, countries can experience significant benefits from trading up (Dorn et al., 2022). Overall, the H.O. model offers a valuable framework for understanding the impact of trade policies on income distribution, which concerns the developing level of the countries when exploring the link between trade and inequality.

H.O. theory predicts that international trade will raise inequality in advanced countries and reduce inequality in developing countries (Ohlin, 1933). In the context of increased trade openness through the reduction of the tariff, developing countries with a surplus of low-skilled labour tend to experience an increase in the value of exportable products produced with low-skilled labour, which leads to an improvement in the wages and benefits of low skilled

labourers working in the relevant sectors. While the price of importable goods is reduced, so is the compensation of high-skilled workers due to the tariff reduction on imports. Conversely, the compensation of highly skilled labour is expected to decrease, thereby reducing inequality in developing countries. However, the opposite holds for advanced countries with a significant number of highly skilled workers, where trade openness exacerbates income (Jaumotte et al., 2013; Lee, 2010). The impact of trade openness on income inequality is contingent upon a country's factor endowments, such as the inclusion or later absorption of higher or lower-skilled workers per se. It is consistent with the statement of the Hecksher-Ohlin theory. However, trade could reverse the effects of income distribution due to all countries' different income levels, industrialization, technological advancement, and human development. Therefore, in international trade, a highly regarded theorem (Stolper-Samuelson theorem, 1914) posits that in developing countries, the income gap is diminished by promoting the employment of low-skilled workers, reducing the wage premium.

Conversely, the opposite is true in developed countries, where inequality increases because skilled labourers are relatively abundant. Hence, the income concentration toward the top income received is expected to rise (Dorn et al., 2022). This theorem refers to the international trade changes in product prices leading to the export production based on the abundant factors gaining more return and scare factor-based production loss when open compared with less abundant factors concerning product price changes. However, regarding the New and Old World, trade and emigration augmented inequality in the rich, land-abundant, participating New World countries. However, more trade and emigration reduced inequality in people experiencing poverty, land scarcity, and participation in the Old World countries. (Lindert & Williamson, 2003).

The empirical evidence between trade and inequality is mixed. The study conducted by Dorn et al. (2022), utilizing OLS panel fixed effects, is designed to exploit within-country variation and eliminate country-specific time-invariant effects. The methodology is the 2SLS panel IV model, which addresses the endogeneity issue for this study; among them, the IV/ predicted trade openness is constructed in two steps. The first step includes exogenous natural disasters in gravity to predict bilateral trade openness. The second step is constructing the IV using an exogenous proxy for multilateral openness. With unbalanced panel data encompassing as many as 139 countries over the period from 1970 to 2014, Solt's (2016) Standardized World Income Inequality Database (SWIID, v.51), which utilizes the Luxembourg Income Study (LIS) as a baseline, is employed. The study's findings align with the Stolper-Samuelson theorem, which suggests that the impact of trade openness varies from country to country. For example, trade openness disproportionately benefits the relative income shares of the very poor but not all poor people in emerging and developing countries. Trade openness contributes to income inequality in advanced countries, but outliers drive the estimated effect. The relationship between trade openness and income inequality in transition countries, including China and the countries of Central and Eastern Europe (East E.U.), is also positive (Dorn et al., 2022).

A certain degree of discrepancy exists regarding elucidating the link between international trade and income inequality within the framework of the Kuznets hypothesis. Kuznets (2019) states that income inequality follows an inverted U-shaped curve. As the economy develops and industrializes, income inequality increases until a certain threshold reaches the peak and decreases as an economy matures.

According to the findings of Spilimbergo et al. (1999), which employed a panel data model with no fixed effects, they analyzed 320 observations from 34 countries spanning the period 1965 to 1992. Given the limited number of observations and the relatively slow pace of

change in relative endowments, no fixed effects were deemed necessary. Furthermore, the study used variables. The results revealed two significant conclusions. Firstly, trade openness is associated with higher inequality, even when holding countries' factor endowments constant, thus demonstrating a positive correlation between trade openness and inequality. Secondly, trade appears to reverse the effect of factor endowments on inequality, contradicting the simple Hecksher-Ohlin framework.

Yand and Greaney (2017) state that the effect of trade openness on inequality differs across countries. Trade openness reduced inequality in the U.S. and Japan but raised inequality in China, whereas there is no effect on the income distribution in South Korea. The relationship between trade openness and globalization in China is the same as the result of (Dorn et al., 2022; Spilimbergo et al., 1999). In contrast, Lee conducted a study on the impact of globalization in Asia through panel data regression, using the existing data from 1960 to 1980. He found that trade openness is explanatory in this study, which explains income inequality in Asian countries, i.e., “trade expansion is found to significantly raise income inequality in Asia, which is consistent from many estimations” (Lee, 2008, p.853). Lee (2010) found that globalization is increasing inequality but at a decreasing rate.

The relationship between trade policy and income inequality also exists negatively. Some economists claimed that the rise in income inequality coincided with liberalized trade and capital flows, two significant components of globalization that lead to no support for the position that trade liberation generally has an opposite impact on income distribution (Zhou et al., 2011). The study conducted by Winters et al. (2004) also agrees with this argument and found that increasing trade liberation tends to increase the opportunities for economic activities. Also, it can increase income inequality at ease, while poverty is at the same time. However, some papers support the opposite argument: trade liberation leads to a beneficial effect on income distribution.

2.3.3 The connection between economic globalization and inequality

In this study, we examine the prior research on the impact of FDI and trade openness on income inequality. We aim to comprehensively understand the relationship between these factors and income inequality and provide valuable insights into this crucial topic through an in-depth analysis of these studies. This section discusses several empirical studies that have examined the relationship between economic globalization and income inequality.

Specifically, the studies employ trade openness and FDI as proxies for globalization to investigate this relationship. Despite exploring a large panel of countries, the findings of these studies vary. The study (Çelik & Basdas, 2010) analyzed the relationship between FDI inflows, outflows, and trade openness on income inequality in developed countries from 1990-2005 using panel cointegration coefficients through the FM-OLS method. The study's theoretical framework suggests that FDI inflows, outflows, and trade openness negatively correlate with income inequality in developed countries. Theoretically, FDI outflows are believed to disrupt income inequality in home countries due to the less demand for less skilled workers, but this paper found a contrasting effect. Similarly, (Jaumotte et al., 2013) examined the relationship between FDI inflows and outflows in 51 developed countries from 1981 to 2003 using panel data regression approaches. The results indicate that financial openness and FDI inflows positively correlate with inequality. They also noted that trade openness has a discernible pattern that can explain disparities and that trade and financial globalization have opposing effects on income distribution. According to a study conducted by (Asteriou et al., 2014) applying a panel data regression model, the impact of FDI on income distribution varied between 1995 and 2009. The findings indicated that financial globalization played the most

significant role and the driving force through FDI, capital account openness, and stock market capitalization in contributing to income inequality in EU-27 nations.

Furthermore, the evidence suggests that trade openness has an equalizing effect and can decrease inequality among a selected sample of EU-27 countries, starting with the role of trade globalization (Asteriou et al., 2014). Li, Xue, Song, and Wang (2022) conducted a comprehensive study on the impact of globalization on income inequality across 83 countries with varying levels of economic development. Their findings, based on a multiple linear regression model, indicate that the effect of globalization on income inequality is contingent on a country's economic status. The study found that wealthy and middle-income countries experience a decrease in income inequality due to globalization, while impoverished nations experience an increase. These results highlight the complexity of the relationship between income inequality and globalization, which influences a country's economic status. The authors utilized country-specific data to examine the effects of economic globalization on income inequality in China. (Mallick et al., 2020) have found that the exact impact is evident when using annual data from 1980 to 2013, employing the combination cointegration method and the ARDL bounds testing of the cointegration approach. The study demonstrates that economic globalization significantly diminishes income inequality in China, whereas economic globalization and infrastructure development have led to noteworthy and positive effects on income inequality in India. He pointed out that the Chinese economy has become better off due to the positive influence of income redistribution and remittance inflows to the countries of origin. However, it has the opposite effect in India.

Similarly, Helpman (2016) has shown that income inequality has decreased in emerging countries (China is one of the emerging countries), with a particular focus on Latin America. However, in most OECD countries, income inequality has increased significantly. Furthermore, evidence suggests that trade has played a role in the rising wage inequality. However, its cumulative effect is modest in the long term based on the review of theoretical and empirical literature review on these two factors. However, there is no explanation for why globalization raises wage inequality within these sample countries.

2.3.4 The connection between the KOF index and inequality

According to the research conducted by (Zhou et al., 2011), the Gini coefficient of a country can be accurately estimated by utilizing both the Kearney and the P.C. index across 60 test cases spanning from developed to transitional countries. The most significant contribution of this paper is to form two thorough globalization indices based on 15 fundamental determinant variables generally applied in the present study. The study's key takeaway is the identification of a negative correlation between globalization indices and the Gini coefficient for all 60 selected sample countries under the investigation, which have the potential to endure over an extended period. This finding is a significant addition to the proof of the Washington consensus, as the policies designed to liberalize trade and capital flows promote better income equality. Destek (2018) drew upon data from the KOF Globalization Index, which was developed initially (Dreher & Gaston, 2008), and the income inequality dataset was drawn from the SWIID database. The study uses annual panel data analysis from 1991 to 2013 to investigate the relationship between income inequality and economic, social, and political globalization of 11 transition economies. Among the research, many statistical methodologies are applied, such as Cross-sectional dependence to test the independence level of these sample countries, the L.M. and CD test, the Swamy test to deal with slope homogeneity, and the CIPS unit root test to deal with cross-sectional dependence—finally, the Panel bootstrap causality

test to seek for the optimal lag length for the sample data. The results witnessed a decrease in income inequality when economic globalization was reduced only in China and Russia.

In contrast, economic globalization positively affected income inequality in Hungary and Moldova in Central and Eastern Europe (Destek, 2018). Atanasova and Tsvetkov (2021) conducted a comparative analysis of various European countries using panel regression analysis, using data from the European statistics database and the KOF Swiss Economic Institutes, which include three dimensions of globalization to determine the effects of globalization on income inequality in developing developed countries. For the methodology part, we noticed many tests ran for a random component in the statistical samples and the immobility of the traits over time—for instance, Levin, Lin, and Chut test and ADF-Fisher Chi-square and so on. In addition, the study concludes that there is no effect between globalization and income inequality in both developing and developed countries; this effect could be hidden due to the restructuring process, and global globalization trends could neutralize this effect but not wholly erase this effect on income inequality.

Not like a lot of existing studies that focus on various aspects of economic globalization, the study conducted by (Dreher & Gaston, 2008) used a panel data fixed effect model to also test the effects of economic development, social integration, and political aspects of globalization as the research of (Destek, 2018). The study applied an unbalanced panel data and fixed effect model to analyze UTIP-UNIDO measures of industrial Wage and household income inequality, and with an OLS estimator to address issues of bias and inconsistency. Also, the researchers employed the Generalized Method of Moments (GMM) developed by Roodman (2006), and the Sargan-Hansen test of the instruments was conducted. The study also created composite indices and utilized the KOF index for 123 countries to evaluate the effects of three types of globalization on Wage and household income inequality between 1970 and 2000, with data averaging over five years. Results showed that globalization has worsened industrial Wage and household income inequality, especially regarding income inequality in OECD nations. The study also found that increased political globalization did not decrease income or earnings inequality. However, the analysis identifies a strong negative impact of globalization on inequality in non-OECD countries at different levels of development. Consistent with the prior study (Bergh & Nilsson, 2010), the research has also used data averaging over five years in 79 countries. This study employed Silt's (2008) Social Welfare in Industrialized Countries Database (SWIID) as a measure of inequality and the KOF Globalization Index as a measure of globalization. GMM estimator was utilized to control potential endogeneity issues, and the system GMM estimator was applied to another robustness check. Panel data fixed effects models estimated the relationship between trade openness, social globalization, and income inequality across 79 countries from 1970 to 2005. Results indicated a significant positive correlation between income inequality and social globalization in middle-and low-income countries, predominantly the second dimension of the KOF index, a positive relationship between economic globalization and income inequality. Furthermore, the study found that free trade and FDI are linked to increased income inequality in a time lag.

2.4 Descriptive statistics

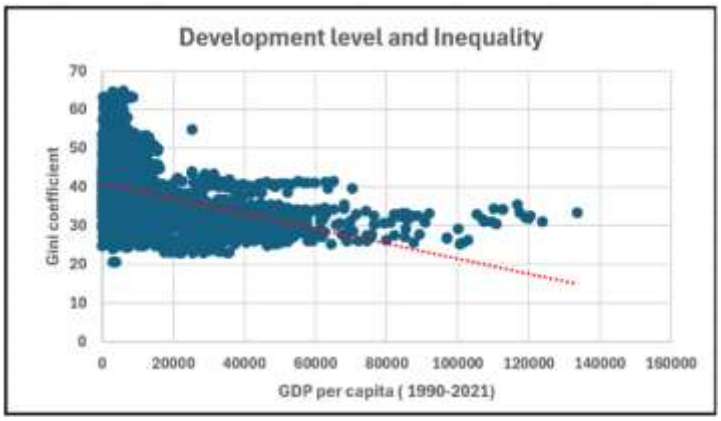

Figure 1: Development level and inequality in 133 countries.

The scatter plot above illustrates the inverse correlation between GDP per capita and the GINI coefficient from 1990 to 2021.

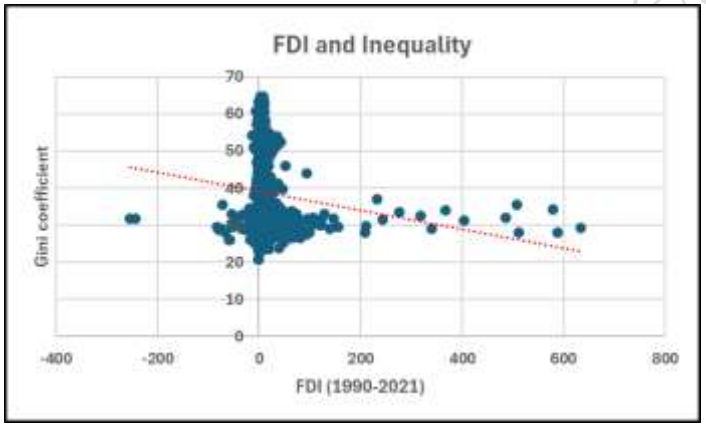

Figure 2: After taking the difference in trade openness and inequality in 133 countries.

The scatter plot above demonstrates the negative relationship between foreign direct investment and income inequality from 1990 to 2021.

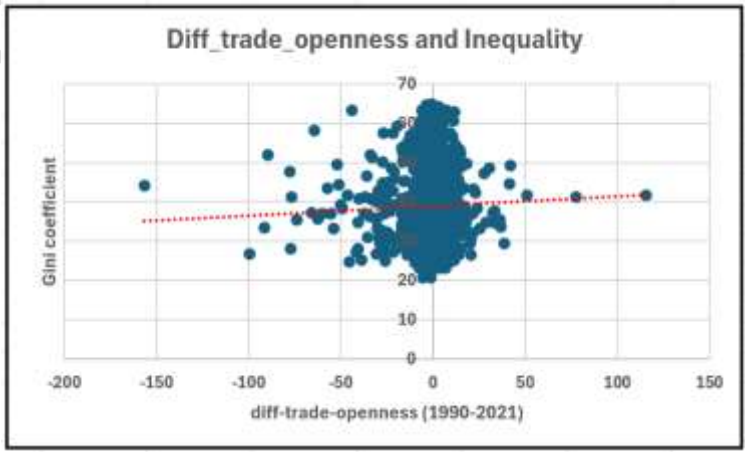

Figure 3: Foreign direct investment in 133 countries.

The above scatter plot shows the positive relationship between income inequality and trade openness after taking the first-order difference from 1990 to 2021.

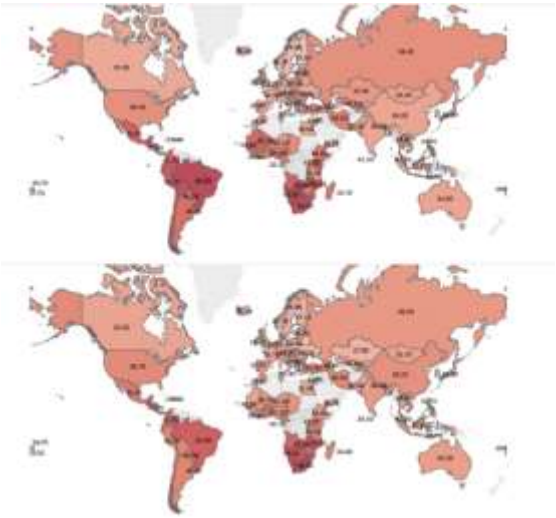

Figure 4: GINI (Worldwide).

The two heat maps above demonstrate the GINI coefficient's evolution across 133 countries from 1990 to 2021.

Section 3 Data and Measurement

This study used a mono method to deal with data. The Gini coefficient to measure income is widely used; the Word Bank estimates the Gini using household or consumption data obtained from various sources based on the quality and availability of the data across the nation. However, the good news is that the underlying concept of measuring income or consumption inequality remains consistent. (Mills, 2009) Our dataset draws heavily from the World Bank's Main Economic Indicators Database, which includes annual data on Gini coefficients, FDI shares in GDP, trade openness in GDP, and per capita GDP, as well as global governance index and employment-to-population ratios (for ages 15 and up), based on availability across nations. We also incorporated data on the human development index (HDI) and population density from Our World in Data and the global peace index from the Institute for Economics & Peace's public release data, respectively.

3.1 The method to fill back unbalanced Gini coefficients

One significant difficulty in this research is that the data should be appropriate to support enough observation. We use two methods to fill back missing data for a meaningful regression analysis. The original Gini coefficient dataset from the World Bank must be completed, with missing data for some countries or periods and an unbalanced panel. The number of observations also depends on the choice of explanatory variables, and 195 countries are observed irregularly and nonconsecutively. We employed two methods to address this issue. The first method used the "taking average" technique to fill in missing Gini coefficients, but this was not always suitable for some countries that consistently had missing data over a long period. The second method was statistical imputation, specifically the "forwards and backward" technique, to fill in the data gaps. Ultimately, 57 countries were excluded from the

regression model due to unavailable Gini coefficients, leaving a sample of 133 countries with complete data. The baseline examination of this analysis includes approximately 4416 observations worldwide.

3.2 The way to classify all sample countries.

All 133 sample countries are divided into developing and developed countries based on their level of development. We obtained the information from the International Monetary Fund (IMF).

Section 4 Methodology

Before we use imputation-statistical techniques to estimate GINI missing values based on available information, we can do a sensitivity analysis. Therefore, we run the regression with 133 countries worldwide two times, with and without observing the Gini coefficient missing values. This allows us to assess the robustness of our results and understand how the inclusion or exclusion of these observations affects our findings. After running the regression two times, we found that with large amounts of missing data in the Gini coefficient, even though other variables remain constant, the regression results of FDI and trade openness are insignificant.

It is essential to test for stationarity of the variables in this study to get a comprehensive understanding of the properties of the data to assist us in deciding whether these variables need to be differenced or transformed before proceeding with panel data analysis because using non-stationary variables in panel data analysis might lead to biased or inconsistent estimators. Therefore, we check the stationarity of all variables by using the Levin-Lin-Chu (LLC) test on the Stata software program. The test findings demonstrate the stationary nature of the dependent variables, the GINI Index, and the control variables, the dependent variables, FDI. However, the panels of the independent variable - Trade Openness, are not stationary. Therefore, we take the first-order difference to make ‘trade openness’ stationery.

The Hausman test, which is a statistical test to determine whether the coefficients estimated in a regression model are significantly different between two different estimation techniques we used, fixed effects (F.E.) and random effects (RE) models in panel data analysis, both models are used to address unobserved heterogeneity across country to country in the dataset, which based on the validity of assumptions and the significance of coefficients. After running the Hausman test, the coefficient differs significantly, which suggests that the random effects assumption might be violated. This empirical analysis is based on a panel data regression in which we regress the dependent variable on all the explanatory variables, and the econometric method analyzes panel data due to the specific nature of the GINI Index. Fixed-effect model polling together all the variables, which is a statistical technique that allows the investigation to control unobserved, adjusts for the impact of time-invariant characteristics of each country, and addresses the primary concern of this study - the omitted bias, and controls potentially confounding variables that are not directly measured, which could bias the results. Therefore, we selected the fixed-effect model throughout the model-building process.

I ran the regression model multiple times with worldwide data samples and six sub-groups for the within-country analysis. For Cross-country analysis, which considers the relationship between globalization and income inequality at the cross-country level, I calculate the average value of 133 countries and the GINI index of all continents, the difference in trade openness, FDI, and control variables. The panel data explained the individual country's heterogeneity and has helped minimize probable misleading estimates. The dataset comprises an unbalanced panel of observations from 133 countries covering the time frame from 1990 to 2021. The baseline of the empirical specification for the Gini index is given below.

$$\text{GINI (Country n) it} = \alpha it + \beta 1(\text{FDI})it + \beta 2(\text{Trade Openness}) it + \Upsilon i + \Upsilon t + \mu it, \quad (1)$$

$$\text{GINI (Country n) it} = \alpha it + \beta 1(\text{FDI})it + \beta 2(\text{Trade Openness}) it + \Upsilon i + \Upsilon t + \pi(x)it + \mu it, \quad (2)$$

This study has identical intercepts for all 133 countries or pool members, and "α" represents the unique intercept. The fixed effects model controls for Fixed effects (αit= αi) and time-invariant, country-specific effects. β1 and β2 are the regression coefficients to be estimated. ϒi represents the country-fixed effects that consider stable differences in economic inequality among different countries. Additionally, ϒt represents a period-fixed effect that considers the influence of shock on economic inequality over multiple countries, which helps ensure that the analysis is more accurate and considers any external factors that could affect the results, and "μ" is the customarily distributed disturbance term which is the white noise of the study (Dreher & Gaston, 2008).

Table 5.1

Variables	Unit	Description	Calculations	Source
GINI Coefficicent	Unitless	Annual, country-level household or consumption data across nations.	G=A/(A+B), where A and B are the areas between the Lorenz and the line of equity	World Bank
Foreign Direct Investment	U.S. Dollars (USD)	Quantifies foreign investment in the domestic economy.	FDI Inflow/GDP (Gross Capital Formation) *100%	World Bank
Trade Openness	%	Quantifies a country's engagement in global trade and investment.	(Export + Import)/GDP *100%	World Bank
GDP Per Capita	%	Assesses average income, assumed constant.	Total PopulationGross/ Domestic Product (GDP)	World Bank
(Human Development Index (HDI)	Unitless	Captures the impact of education on income inequality.	$\sqrt[3]{IHealth * IEducation * IIncome}$	Our World in Data
Population Density	People/km²	Measured in individuals per square kilometer (individuals/km²).	Population Density = Total Population/Total Land Area	Our World in Data
Employment-to-population ration (+15)	%	Captures governance stability affect income inequality and economic performance.	(Employed individuals aged 15 and over/Total population aged 15 and over)×100	World Bank
Global Peace Index	Unitless	Captures governance influences economic policies affecting income distribution.	W1 * Conflict Index + W2 * Safety Index + W3 * Militarization Index	The Institute for Economics & Peace's
World Governance Index (WGI)	Unitless	Accesses global governance quality through multiple dimensions.	$\theta i = \lambda i1 x1 + \lambda i2 x2 + \ldots + \lambda ik Xik + V$	World Bank

Section 5 Empirical Findings

Table 5.1

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopennes	-0.0144*	-0.0104	-0.0208	-0.0271	-0.0139	-0.0044	-0.0743*
	(-2.52)	(-1.16)	(-1.78)	(-1.12)	(-0.24)	(-0.51)	(-2.32)
FDI	0.00170	0.00398	-0.0431	-0.130*	-0.00291	0.000835	0.0122
	(0.96)	(1.73)	(-1.96)	(-2.40)	(-0.03)	(0.45)	(0.32)
_cons	38.89***	35.82***	43.86***	48.52***	50.23***	32.04***	36.79***
	(831.53)	(432.35)	(349.05)	(166.22)	(116.85)	(472.94)	(184.19)
N	4154	992	1178	341	279	1209	124

** represent statistical significance at the 1% level.

Table 5.2

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0120*	-0.00680	-0.0113	-0.0233	0.0751	-0.00298	-0.0756*
	(-2.10)	(-0.76)	(-0.98)	(-0.96)	(1.88)	(-0.34)	(-2.36)
FDI	0.00239	0.00579*	-0.0370	-0.122*	0.333***	0.000987	0.00841
	(1.34)	(2.52)	(-1.71)	(-2.25)	(4.95)	(0.53)	(0.22)
GDPpercapita	-0.0000321***	-0.000114***	0.000792***	-0.0000389	-0.00102***	-0.00000635	0.0000235
	(-4.68)	(-5.32)	(-6.72)	(-1.41)	(-17.09)	(-1.08)	(1.28)
_cons	39.28***	36.56***	45.01***	48.92***	54.95***	32.19***	36.52***
	(460.37)	(224.86)	(214.49)	(120.54)	(135.27)	(209.45)	(125.74)
N	4131	989	1178	341	279	1206	124

** represent statistical significance at the 1% level.

Table 5.3

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	0.00281	0.0000173	-0.0110	0.0224	0.0849*	0.0121	-0.0463
	(0.50)	(0.00)	(-1.00)	(1.14)		(1.37)	(-1.62)
FDI	0.00415*	0.00550*	0.00637	0.0548	0.223***	0.00194	0.0977**
	(2.51)	(2.58)	(0.30)	(1.21)	(3.85)	(1.08)	(2.67)
HDI	-17.19***	-9.548***	-13.34***	-45.29***	-79.45***	-12.44***	-40.01***
	(-19.42)	(-6.65)	(-7.38)	(-13.59)	(-21.07)	(-8.75)	(-6.27)
_cons	50.61***	42.04***	50.13***	79.90***	106.9***	42.24***	66.64***
	(84.25)	(43.59)	(56.98)	(34.43)	(39.56)	(35.74)	(13.93)
N	3875	905	1093	341	279	1168	120

** represent statistical significance at the 1% level.

Table 5.4

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0111	-0.00845	-0.0159	0.00374	0.0138	-0.00740	-0.0694*
	(-1.87)	(-0.96)	(-1.39)	(0.17)	(0.30)	(-0.86)	(-2.11)
FDI	0.00156	0.00464*	-0.0207	-0.0371	0.0444	0.00168	0.00923
	(0.87)	(2.07)	(-0.96)	(-0.74)	(0.59)	(0.90)	(0.24)
population~y	-0.0126***	-0.0115***	-0.0291***	-0.104***	-0.692	0.0102***	0.0124
	(-9.71)	(-8.93)	(-7.49)	(-8.82)	(-12.09)	(3.59)	(0.72)
_cons	40.86***	38.26***	46.39***	56.75***	66.79***	30.57***	35.37***
	(227.62)	(136.52)	(129.31)	(58.51)	(47.24)	(73.85)	(17.83)
N	3813	961	1178	341	279	1209	124

** represent statistical significance at the 1% level.

Table 5.5

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0134*	-0.00966	-0.0169	-0.0137	0.0250	-0.00326	-0.0393
	(-2.33)	(-1.08)	(-1.48)	(-0.61)	(0.46)	(-0.38)	(-1.50)
FDI	0.00178	0.00434	-0.0319	-0.0538	0.145	0.000811	0.00214
	(1.00)	(1.89)	(-1.48)	(-1.07)	(1.60)	(0.44)	(0.07)
employtmen~n	0.0153	0.0810*	0.283***	-0.486***	-0.488***	-0.0186	0.582***
	(0.91)	(2.48)	(7.00)	(-7.67)	(-6.12)	(-0.92)	(8.03)
_cons	38.11***	31.37***	27.02***	76.58***	79.21***	33.02***	4.38
	(40.35)	(17.47)	(11.22)	(20.84)	(16.66)	(30.90)	(1.08)
N	4120	992	1178	340	279	1207	124

** represent statistical significance at the 1% level.

Table 5.6

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0130	-0.0103	-0.0108	-0.0628	-0.115	0.0250	-0.0956*
	(-1.79)	(-0.80)	(-1.02)	(-1.84)	(-1.43)	(1.52)	(-2.40)
FDI	0.00220	0.00492*	0.00696	-0.0343	0.00383	0.000816	0.0250
	(1.36)	(2.44)	(0.33)	(-0.66)	(0.04)	(0.46)	(0.54)
controlofc~n	-0.429	-2.246***	0.472	0.514	-1.66	-0.670	-0.461
	(-1.45)	(-4.32)	(0.76)	(0.53)	(-1.07)	(-1.24)	(-0.83)
ruleoflaw	-0.351	0.0944	-1.193	-2.497*	0.734	-1.489*	1.815*
	(-0.99)	(0.16)	(-1.73)	(-1.98)	(0.33)	(-2.36)	(2.03)
regulatory~y	0.309	1.149*	-1.085	-2.408*	7.501***	-2.171***	0.528
	(1.08)	(2.57)	(-1.66)	(-2.00)	(4.85)	(-4.50)	(0.58)
politicals~y	0.303*	0.737**	0.681**	-1.811*	-5.203***	0.689*	-4.293***
	(2.04)	(3.11)	(2.63)	(-2.48)	(-5.13)	(2.54)	(-3.76)
voiceandac~y	-1.339***	0.108	-2.981***	6.512***	-4.143*	1.583**	2.113*
	(-5.10)	(0.26)	(-6.32)	(5.92)	(-2.24)	(2.91)	(2.01)
government~s	-0.315	-0.513	1.392*	1.944	-2.058	0.256	-3.699***
	(-1.05)	(-1.06)	(2.16)	(1.76)	(-1.14)	(0.53)	(-4.17)
_cons	38.58***	35.46***	41.76***	45.28***	48.45***	33.50***	38.68***
	(654.53)	(162.23)	(116.44)	(64.01)	(41.82)	(75.28)	(48.05)
N	3046	727	871	253	207	890	78

** represent statistical significance at the 1% level.

Table 5.7

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.00404	-0.0166	-0.00674	-0.0227	0.127*	0.0218	0.0395
	(-0.68)	(-1.30)	(-0.75)	(-0.89)	(2.19)	(1.32)	(0.64)
FDI	0.00314	0.00282*	0.00348	0.0214	0.139*	0.00402	0.0716
	(1.94)	(2.12)	(0.16)	(0.44)	(2.23)	(1.09)	(0.88)
globalpeac~x	0.611**	1.017**	1.290**	-1.116	1.676	-1.200**	12.49**
	(2.84)	(3.29)	(3.16)	(-1.48)	(1.56)	(-2.71)	(3.17)
_cons	37.05***	33.32***	40.26***	47.94***	43.46***	33.42***	20.57***
	(105.50)	(56.24)	(55.29)	(40.79)	(27.62)	(55.10)	(4.93)
N	1750	406	518	154	126	490	14

** represent statistical significance at the 1% level.

We commenced our empirical analysis by employing panel regression models to evaluate the various variables that are anticipated to have an impact on income inequality. Our analysis began with the execution of all regression models under the assumption of fixed effects. The outcomes of these estimations are expounded upon in the subsequent sections. The results from tables 5.2, 5.3, 5.4, 5.6, and 5.7 for within-country analysis reveal that the p-values are all below the critical threshold of 0.05, 0.001, and 0.001 in Asia, suggesting a positive correlation between FDI and income distribution. However, this correlation is not observed in the base model or when controlling for the employment-to-population ratio (15+). Before incorporating the employment-to-population ratio, a robust positive association between FDI

and income distribution was evident in Asia. However, subsequent to the inclusion of control variables, including the employment-to-population ratio above the age of 15, the relationship maintained its positive nature but failed to achieve statistical significance. This observation can be attributed to the presence of multicollinearity and confounding. Multicollinearity has the potential to inflate standard errors, rendering the FDI coefficient statistically insignificant. Furthermore, the employment-to-population ratio (15+) may act as a confounding variable, capturing some of the variance in the dependent variable that was previously accounted for by other independent variables. Consequently, the explanatory power of these variables may diminish, thereby leading to the insignificance of the FDI coefficient.

On top of that, the regression results shown in Tables 5.2, 5.3, and 5.7 indicate similar outcomes in South America. The p-values of FDI in Models 2, 3, and 7 are all less than 0.05, which are 0.333, 0.223, and 0.139, which are considered statistically significant. The regression results suggest enough evidence to reject the null hypothesis, indicating a positive correlation between globalization and income inequality. Before incorporating the employment-to-population ratio, population density, and WGI index, a robust positive association between FDI and income distribution was evident in Asia. However, subsequent to the inclusion of control variables, the relationship maintained its positive nature but failed to achieve statistical significance. This correlation is attributed to the technological displacement of unskilled workers. Besides, the control variables of population density and employment ratio above the age of 15 also generate the presence of multicollinearity and confounding effects.

Moreover, this outcome aligns with the present circumstances in emerging Asian economies, notably China and India (Asian region), as well as in Mexico and Brazil (South America region). The rapid integration of advanced technology due to FDI may only uniformly benefit some segments of the labor force, leading to job displacement among unskilled workers and exacerbating income inequality. These conclusions perfectly align with the skill-based technology (SBTC) hypothesis, which posits that the influx of foreign capital and technology displaces unskilled workers, increasing unemployment and widening income disparity within this demographic.

Table 5.8s

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
diff_trade~s	-0.00980	0.0173	-0.0795*	0.0187	0.106	0.0261	-0.104
	(-0.53)	(0.98)	(-2.32)	(0.85)	(1.09)	(1.21)	(-1.56)
FDI	0.0811***	0.0130	-0.270**	0.264***	0.748***	0.0297**	0.256**
	(5.25)	(1.30)	(-3.06)	(4.92)	(4.43)	(3.63)	(3.53)
GDPpercapita	-0.000316***	-0.000371***	-0.00152***	-0.000452***	-0.00143***	-0.0000683***	-0.000188***
	(-19.99)	(-12.76)	(-7.25)	(-17.69)	(-17.21)	(-7.36)	(-4.90)
_cons	41.72***	38.24***	46.81***	51.77***	55.78***	33.40***	38.30***
	(257.16)	(200.02)	-182.92	(185.85)	(80.66)	(144.70)	(86.47)
N	31	31	31	31	31	31	31

** represent statistical significance at the 1% level.

Table 5.9

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
diff_trade~s	0.0283*	0.0250	-0.0440	0.0551	0.0494	0.0455	-0.0722
	(2.06)	(1.22)	(-1.64)	(1.74)	(0.33)	(2.03)	(-1.32)
FDI	0.0376**	0.00750	-0.359***	0.259**	0.576*	0.0247**	0.295***
	(3.59)	(0.66)	(-6.04)	(3.45)	(2.24)	(3.06)	(4.98)
HDI	HDI-27.75***	-16.03***	-18.01***	-44.03***	-83.87***	-13.97***	-54.90***
	(-28.23)	(-10.74)	(-10.44)	(-12.23)	(-10.41)	(-7.31)	(-7.15)
_cons	_cons57.44***	46.50***	53.63***	78.10***	108.7***	43.44***	77.38***
	(88.32)	(47.66)	(71.76)	(32.39)	(19.32)	(27.47)	(13.54)
N	31	31	31	31	31	31	31

** represent statistical significance at the 1% level.

In our cross-country analysis, after accounting for the influence of total economic output and the social and economic development of all economies, we observed a correlation between the rise in FDI and the widening of income inequality among the global country groups in Asia, North and South America, Europe, Oceanian and when includes all the countries. However, when we incorporated the same control factors, a different relationship between FDI and income distribution emerged for Africa, as detailed in Tables 5.8 and 5.9. The regression results demonstrate that Africa exhibits a unique pattern in the connection between globalization and economic inequality compared to other continents, suggesting intricate interactions between globalization and Africa's economic, social, and policy components. Moreover, unlike other continents, Africa has distinct economic structures, foreign investment patterns, and trade patterns that potentially benefit lower-income populations. The reason why there is an inverse relationship between globalization and income distribution in African regions can be attributed to three primary reasons. Firstly, there is a new economic diversification effect facilitated by Foreign Direct Investment (FDI), which can help Africa shift its economic reliance from traditional mining and agriculture to new industries, thereby addressing income inequality. Additionally, FDI involves crucial infrastructure investments that have enhanced the living standards, services, and market access for the low-income population. Lastly, Africa is a preferred destination for FDI because it has abundant natural resources and growing market potential. The countries investing in FDI are interested in improving income levels in FDI-supported sectors and benefiting from lower-skilled but cheap labor, ultimately reducing the income disparity between different socioeconomic groups in Africa. In short words. African government should leverage their advantage of abundant natural resources, large consumer needs, and growing market potential to attract foreign assets through FDI.

Table 5.10 Developing Counties

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopennes	-0.0161*	-0.0128	-0.0208	-0.0296	-0.00811	-0.0173	-0.0753*
	(-2.26)	(-1.36)	(-1.78)	(-1.12)	(-0.13)	(-0.63)	(-2.07)
FDI	-0.0439***	-0.0603***	-0.0431	-0.168**	0.465**	-0.0165	0.00264
	(-3.53)	(-3.82)	(-1.96)	(-2.66)	(3.17)	(-0.40)	(0.06)
_cons	41.42***	36.33***	43.86***	51.17***	49.88***	34.80***	
	(555.67)	(330.08)	(349.05)	(150.52)	(96.41)	(111.50)	(153.67)
N	2946	868	1178	279	217	186	93

Table 5.11 Developed Counties

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopennes	-0.00854	-0.00858		-0.0726**	-0.0313	-0.00116	
	(-1.02)	(-0.32)		(-3.23)	(-0.25)	(-0.13)	
FDI	0.00283*	0.00543***		0.0117	-0.324**	0.000921	
	(2.28)	(4.40)		(0.21)	(-3.29)	(0.55)	
_cons	_cons33.14***	33.94***		42.41***	48.76***	31.55***	
	(542.21)	(264.00)		(113.80)	(62.11)	(470.75)	
N	1209	124		93	62	1023	

It is crucial to highlight the notable findings from Table 5.10, base model one when examining the correlation between FDI and income inequality in developing and developed countries. With a specific focus on Asia and South America, these findings reveal a clear inverse relationship between FDI and income inequality in developing countries. Upon closer scrutiny, it becomes apparent that across global groups encompassing Asian developing countries, an upsurge in FDI is associated with a decline in income inequality. However, South America's association between FDI and income inequality displays a contrasting pattern within developing countries. Moreover, within developed countries, the data in Table 5.11 suggests that an increase in FDI is linked to heightened income inequality within developed country groups worldwide. Notably, this relationship demonstrates a distinct pattern in Asia compared to the observed trend in developing countries in South America. However, given that only two developed countries in the sample are located in the South American region, Chile and Argentina, the inference needs more persuasiveness.

Table 5.12 Developing Countries

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0135	-0.0129	-0.0159	0.000733	0.0210	-0.00244	-0.0704
	(-1.82)	(-1.40)	(-1.39)	(0.03)	(0.42)	(-0.10)	(-1.88)
FDI	-0.0330*	-0.0469**	-0.0207	-0.0635	0.484***	0.00440	-0.000676
	(-2.54)	(-3.00)	(-0.96)	(-1.09)	(4.10)	(0.12)	(-0.01)
population~y	-0.0154***	-0.0113***	-0.0291***	-0.104***	-0.635***	0.183***	0.0121
	(-9.96)	(-8.34)	(-7.49)	(-8.02)	(-10.78)	(6.05)	(0.62)
_cons	43.78***	38.54***	_cons46.39***	60.83***	65.86***	20.13***	35.99***
	(220.87)	(138.72)	(129.31)	(48.92)	(42.79)	(8.25)	(12.15)
N	2636	837	1178	279	217	186	93

Table 5.13 Developed Countries

	Worldwide GiniIndex	Asia GiniIndex	Africa Index	North America GiniIndex	South America GiniIndex	Europe GiniIndex	Oceania GiniIndex
Tradeopenn~s	-0.0114	-0.0307		-0.00414	-0.0309	-0.00406	
	(-1.31)	(-1.20)		(-0.26)	(-0.47)	(-0.46)	
FDI	0.00306*	0.00491***		0.0154	-0.140**	0.00154	
	(2.45)	(4.23)		(0.43)	(-2.67)	(0.91)	
population~y	0.00753**	0.0162***		-0.324***	-1.853***	0.00747**	
	(3.16)	(4.21)		(-10.97)	(-12.85)	(2.89)	
_cons	32.10***	28.76***		51.25***	85.55***	30.39***	
	(81.69)	(23.28)		(60.85)	(29.58)	(74.04)	
N	1178	124		93	62	1023	

It is worth noting that there is an inverse relationship between foreign direct investment (FDI) and income inequality in developing and developed countries after including the control variable of human density. This relationship is demonstrated in Tables 5.12 and 5.13, as explained in Tables 5.10 and 5.11.

Section 6 Research Gap

Gap (1) Firstly, method gap, this study optimizes the control variables for the study. According to Douglas S. Massey (2008), globalization greatly pressures income inequality worldwide. However, its impact is more pronounced in the U.S. than in other developed countries, primarily due to institutional arrangements failing to ensure equal income distribution and proper recognition of globalization. To improve the internal validity of our findings and minimize confounding effects, we have included a control variable for government governance, as specific arrangements within a government organization can significantly influence the government governance index. Previous studies have ignored the importance of the quality of government management, the impact of national policy implications, and whether a country is peaceful in the economy. The effect of national policies

on import and export trade and capital flows is the main decision for foreign direct inflow. This study follows the standard and builds on previous empirical analyses of GINI and Trade Openness and foreign direct investment (FDI) but adds the Worldwide Governance Index and the Global Peace Index to control the effects of governance and peace of a country to find the main research interest - the pure relationship between globalization and income inequality.

Gap (2) The second research gap is the data gap. We employed multiple techniques to address the problem of missing data points in the World Bank's Gini data. Upon analyzing the dataset, we discovered that certain countries or periods needed more complete information, leading to an imbalanced dataset. To remedy this, we employed the "taking advantage" and "statistical imputation" methods to fill in the gaps in the dataset. This approach enabled us to generate a more comprehensive and balanced dataset, encompassing information from 133 countries from 1990 to 2021.

Section 7 Conclusions + Policies Applications

This research paper explores the interconnection between globalization and inequality, which has elicited significant debate over the past three decades. Within the complex landscape of empirical evidence and theoretical perspectives, the objective is to provide a more nuanced understanding of the trajectory of globalization across the six continents and to delineate the necessary course of action to reconcile the dichotomy between economic development and income distribution equality. To sum up, our study shows that foreign direct investment (FDI) has a more significant impact than trade openness. Our within-country analyses observed a positive correlation between FDI and income distribution in Asia and South America. Our cross-country analysis found a positive association between FDI and income distribution in most regions worldwide, except for Africa. When categorizing countries based on their level of development, we found a contrasting relationship between FDI and income distribution in developed and developing countries.

We get from the within-country analysis that in Asia and South America, heightened levels of foreign direct investment (FDI) have been linked to an exacerbation of income inequality. Consequently, governments in these regions should exercise prudence in accepting substantial FDI inflows. Instead, they should prioritize improving self-sufficiency, potentially mitigating income inequality.

On the one hand, how can we bridge the gap between the rich and the poor in Africa? According to research, the answer lies in increasing FDI attraction, as it can improve the living standards of citizens, provide more job opportunities, and, most importantly, increase household income. These are suggestions for the African government to create high-quality FDI-related policies to attract more foreign investments. Firstly, society should establish a good and business-friendly environment to attract more foreign financial inflows to host countries. A favorable business environment and competitive tax rates are essential to attract foreign asset inflows in turn lead to economic development. Secondly, a stable political environment and a robust legal framework can reduce the risk for foreign investors, making the country more attractive for investment. Thirdly, Africa should have a well-developed infrastructure, essential for transporting goods and materials, and skilled professionals with management skills and advanced knowledge. Thirdly, skilled workers are also essential for attracting more FDI to the home country, as FDI requires skilled workers for industrial and high technology-related work, which is associated with higher operational skills and knowledge due to the development of industrialization. Therefore, the African government should strengthen education projects and

support related programs to educate and train professionals for FDI. All the prerequisites for the aforementioned suggestions depend on the assistance of the African government. Finally, special economic zones can benefit African economies by promoting long-term economic development. African countries should strengthen the cohesion and interconnectedness of these economies—for instance, the Mombasa Special Economic Zone in Kenya.

On the other hand, it is recommended that Europe, South and North America, and Oceania, except Asia, prioritize economic autarky. This entails reducing their dependence on foreign capital to stimulate economies, as evidenced by the regression analysis from cross—country analysis.

In developing Asian countries, it is essential to create policies to attract foreign direct investment (FDI) that can be achieved by offering tax incentives, reducing corporate tax rates, providing investment protection, and developing infrastructure. Conversely, developed countries in South America should be cautious when making political decisions about the surge in FDI, considering the potential link between higher FDI and increased income inequality. Additionally, governments of developed Asian countries should avoid implementing policies that encourage FDI growth, as it could worsen income inequality. However, this approach may not work in developed countries in the South American region.

Overall, governments should deliberately reevaluate policy frameworks and institutional mechanisms to actively ameliorate income inequality, particularly by aligning with the actionable targets delineated in 17 U.N. Sustainable Development goals. Adept policy guidance holds the potential to stimulate economic growth and directly confront the pervasive disparities in income distribution that characterize diverse economic spheres. The ascendancy of Asian economies, particularly, has been accompanied by a discernible erosion of income equality at the micro-level. Consequently, we advocate for a strategic approach considering national contextual realities and policy imperatives. Should capital inflows serve as the foundational premise, some sacrifice in the nascent development phase may be imperative.

Conversely, a heightened emphasis on control for income equalization would necessitate policy recalibrations, such as elevating the threshold for foreign direct investment and instituting pertinent legal constraints. Concerning cross-continental analysis, our advisory aligns with the preceding stance. Notwithstanding the non-significant regression outcomes in the Asian context and the inverse correlation witnessed between FDI and income inequality in Africa, it is incumbent upon the remaining continents to carefully deliberate the ramifications of FDI development trajectories and income disparities.

Section 8 Limitations and Future Research

It is essential to acknowledge the limitations of this study to enhance the scope and validity of the analysis and assess potential biases introduced by the selection of specific years and the exclusion of particular observations. Future research in this area can address unresolved issues and delve deeper into certain aspects. For instance, focusing on distinct types of FDI with updated periods, such as inward FDI from various home countries and the role of political democracy, could provide more nuanced insights. Additionally, classifying countries by income levels would clarify the impact of globalization on income inequality across different income groups, thereby offering a clearer understanding of this relationship.

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Modeling Early Warning System for Household Debt Risk in Thailand with Simple Deep Learning Approach

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Abstract

This paper presents a modeling framework for constructing an Early Warning System (EWS) to assess household debt risk in Thailand using a simple deep-learning approach. Macroeconomic data sourced from the CEIC, Bank of Thailand, and related government offices are employed to identify key factors contributing to household debt risk. The dataset is described and summarized, followed by a multicollinearity test utilizing the LASSO technique to address high correlations among independent variables. Stationarity tests, including the Augmented Dickey-Fuller Test (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin Test (KPSS), are conducted to assess the time series properties of the data. Results indicate mixed evidence regarding stationarity, necessitating further investigation. Subsequently, an Autoregressive Distributed Lag (ARDL) model is employed to analyze the lagged effects of explanatory variables on household debt levels. The model reveals significant impacts of lagged household debt levels on current debt levels, highlighting the importance of incorporating temporal dynamics in risk assessment. Additionally, a Debt level index is defined, and an EWS index is constructed to monitor deviations from baseline levels. Deep learning models, including Deep Neural Networks (DNN) and Long Short-Term Memory (LSTM) networks, are then applied to forecast future EWS index values. Overall, the proposed framework provides a robust methodology for assessing and forecasting household debt risk in Thailand, with potential benefits in financial regulation and policy-making.

Keywords: Debt Crisis, Deep Learning, Early Warning Indicator, Household Debt

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E-wallets and Behavioral Economics: Influencing Consumer Spending and Saving Habits

Sirinda Katuratorn [1]

Abstract

This study investigates the future potential of increased spending and saving behaviors through e-wallet usage in Bangkok, Thailand. By applying principles from behavioral economics, the research explores the determinants of e-wallet adoption and their impact on consumer financial behavior. The analysis considers factors such as perceived usefulness, ease of use, attitudes toward e-wallets, social influences, and users' confidence in financial management. Data was collected via a survey in May 2024, with 462 responses, including 387 from Bangkok. Ordinal logit models reveal that perceived usefulness and ease of use significantly boost the likelihood of adopting e-wallets. Furthermore, age and income level are critical factors affecting impulsive spending. Users who perceive greater control over their financial decisions via e-wallets tend to save more effectively. Despite this, many participants indicated that current e-wallets are not highly effective for saving, suggesting a need for better features. These findings underscore the importance of enhancing user experience and developing advanced financial tools within e-wallets to encourage responsible financial behavior and support Bangkok's transition to digital payments.

Keywords: E-wallets, Behavioral Economics, Consumer Behavior

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The Impact of U.S. Monetary Policy Expectations on Emerging Market Sovereign Bonds

Qiaofang Chen[1]

Abstract

This paper investigates the spillover effect of U.S. monetary policy on the sovereign bonds of emerging market economies (EMEs). It analyzes the effects of different periods of U.S. monetary policy, including quantitative easing (QE) and quantitative tightening (QT), on sovereign bond prices and yields for EMEs. Particular attention is given to the differential impacts on bonds denominated in local currencies versus U.S. dollars. The result shows that the US monetary policy has a significant impact on both USD and local currency-denominated emerging market government bond prices, except for the period before the implementation of unconventional monetary policy. The Negative impacts from U.S. monetary policy shifts, particularly during periods of anticipated monetary tightening, are found to be more pronounced.

The findings also demonstrate that long-term sovereign bond yields are more responsive to changes in U.S. monetary policy compared to short-term yields, suggesting a flattening yield curve during periods of U.S. monetary policy tightening. This research underscores the critical role of sovereign bonds in the economic sustainability of EMEs and highlights their vulnerabilities to external monetary shocks, emphasizing the need for robust policy frameworks to mitigate the global spillover impacts of the U.S. monetary policy.

Keywords: Sovereign Yield, Emerging Bond Market, Monetary Policy, Quantitative Tightening, Quantitative Easing

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Introduction

The Covid-19 pandemic precipitated a substantial global economic downturn in 2020. In the U.S., unconventional monetary policies were utilized to address the economic downturn, similar to their role in responding to the 2008 financial crisis. These policies included large-scale asset purchases, or quantitative easing (QE), aimed at providing liquidity to the financial system, supporting credit flow, and stabilizing financial markets. Since the easing monetary policies of the Fed significantly increased inflation to the highest level since the 1980s, the "Tapering" process was then implemented to gradually reduce the stimulus. they supplied throughout the epidemic. The Federal Reserve (Fed) implemented substantial hikes in interest rates while gradually reducing its asset holdings since 2022. Market anticipations consistently outpace the actual adjustments to the federal funds rate.

The history of unconventional U.S. monetary policy shows the Fed's adaptive strategies in response to extraordinary economic challenges. The implementation of unconventional monetary policy became particularly prominent during the global financial crisis of 2008. As the crisis started, the Fed quickly cut the federal funds rate to nearly zero levels to stimulate the economy. However, with rates at the zero lower bound (ZLB), the Fed turned to alternative strategies to provide additional economic support. One of the key unconventional tools employed was quantitative easing (QE), which involved large-scale purchases of Treasury securities and mortgage-backed securities. The first round of QE (QE1) was initiated in November 2008, followed by QE2 in November 2010, and QE3 in September 2012. These asset purchase programs aimed to lower long-term interest rates, support financial markets and encourage borrowing and investment.

In between these periods of aggressive monetary easing, the Fed also engaged in quantitative tightening (QT). After the end of QE3 in 2014, the Fed began normalizing its policy by gradually reducing its balance sheet through QT, allowing maturing securities to roll off without reinvestment. This phase, lasting from June 2014 to December 2018, aimed to unwind the large-scale asset purchases while carefully managing the impact on financial markets.

In addition to QE, the Fed introduced forward guidance as a vital tool to influence market expectations and long-term interest rates. Starting in the wake of the 2008 financial crisis, the Fed began to use forward guidance as a tool to influence market expectations and long-term interest rates (see Campbell et al. (2012), Marco Del et al. (2012)). Forward guidance involved providing explicit statements about the Fed's future policy intentions, such as committing to keep interest rates low for an extended period. This approach aimed to shape market expectations and reduce uncertainty, thereby encouraging economic activity even when traditional policy tools had limited effectiveness.

With the development of financial globalization, Emerging Market Economies (EMEs) are often closely interconnected with the global economy, and changes in major economies like the U.S. can have spillover effects across the world. Choi et al. (2017) find that emerging markets are more sensitive to US monetary policy than their own domestic policy. Easing and Tapering of the U.S. monetary policy can cause a shift in global capital flows, leading to significant impacts on asset prices in EMEs (Chen et al., 2014).

Market expectations regarding United States monetary policy can exert significant influence on emerging economies. This influence was notably observed when Chairman Bernanke discussed the possibility of tapering during his presentation to Congress. The mere

mention of a gradual reduction in the Federal Reserve's asset purchasing program, colloquially referred to as "tapering talk," precipitated a pronounced negative impact on the economic and financial conditions within emerging markets (Eichengreen & Gupta, 2015).

Sovereign bonds play a critical role in the economic sustainability of emerging economies, serving as an important tool for financing government expenditures, managing public debt, and promoting financial stability. For many emerging markets, issuing sovereign bonds is a primary means of raising capital to fund infrastructure projects, social programs, and other essential public services. These bonds help governments bridge the gap between limited domestic savings and the substantial investment needs required for economic development.

Over recent decades, the terrain of emerging sovereign bond markets has witnessed profound changes, evolving amidst global financial integration and variations in international capital flows. Traditionally, EMEs were inclined towards the issuance of USD-denominated sovereign bonds to tap into international capital because it can be less expensive to borrow in foreign currency compared with local currency (Claessens et al., 2007). However, this approach exposed the borrowing nations to currency mismatch risks.

The Latin American debt crisis of the 1980s highlights how reliance on foreign currency-denominated debt, particularly in U.S. dollars, makes countries susceptible to U.S. monetary policy shifts. During the 1970s, Latin American countries borrowed extensively in dollars due to lower interest rates and the availability of foreign capital. However, in the early 1980s, the U.S. Federal Reserve sharply raised interest rates to against domestic inflation. This increase led to higher global interest rates, raising the cost of servicing existing dollar-denominated debt for Latin American countries. Additionally, the strengthened U.S. dollar caused local currencies to depreciate, further increasing the local currency burden of dollar-denominated debt. The combined effect of rising interest costs and depreciating local currencies strained these countries' finances, leading to widespread defaults and economic crises, as they could no longer meet their debt obligations. This crisis highlighted the vulnerability of countries heavily reliant on foreign currency debt to external monetary policy changes.

The resurgence of EMEs following the crises has been significant, particularly highlighted by the growth of local currency bond markets. The increase of local currency bond markets in the 2000s, supported by macroeconomic stabilization and structural reforms, marked a significant shift towards diversifying funding sources and reducing dependency on foreign currency-denominated debt (Burger et al., 2010). In terms of credit risk in different currencies, the credit spreads of local currency typically exhibit lower averages and sensitivity to global risk factors relative to the foreign currency (Du & Schreger, 2016).

Despite the strides in developing local currency bond markets, USD-denominated debt remains a substantial component of emerging market economies' external liabilities, reflecting ongoing global demand and the inherent challenges in completely shifting away from hard currency borrowing. The global financial condition, with the central role played by U.S. monetary policy, remains a key driver affecting both local and USD-denominated bond markets in emerging economies. Market expectations of U.S. monetary policy changes play a crucial role in shaping investor sentiment and capital flows into emerging markets, affecting asset prices and yields across both local currency and USD-denominated bonds.

The interplay between U.S. monetary policy expectations and emerging sovereign bond markets encapsulates a complex array of factors, including global liquidity conditions, risk appetite, and currency valuation pressures. As emerging economies navigate the challenges of global financial integration, research on the impact of the U.S. monetary policy expectations

on their bond markets—across both local and USD-denominated instruments—becomes critical. This backdrop sets the stage for an in-depth exploration of how anticipations of U.S. monetary policy shifts influence emerging bond markets, underscoring the intricacies of international finance and the ongoing evolution of emerging economies' engagement with global capital.

In light of the fluctuating stance of U.S. monetary policy and the evolution of emerging bond markets, this study aims to explore and quantify how expectations of U.S. monetary policy dynamically impact emerging sovereign bond prices and yields. The findings of Hofmann (2021) suggest that contrary to the anticipated resilience of local currency bonds to global risks, they did not safeguard emerging economies from the financial repercussions of COVID-19, as evidenced by widening yield spreads amid currency devaluation and capital outflows. Consequently, this study broadens its scope to include both local and USD-denominated bonds, evaluating their responsiveness to U.S. monetary policy shifts during phases of quantitative easing (QE) and tightening (QT). This investigation aims to estimate the influence of U.S. monetary policy expectations on crucial financial indicators, including sovereign bond prices and yields in EMEs.

The price of a bond is determined by the present value of its expected future cash flows, discounted at a rate that reflects the risk of those cash flows (Campbell et al., 1997). The discount rate used is effectively the bond's yield. As such, there exists an inverse relationship between bond prices and yields: as the yield (or discount rate) increases, the present value (or price) of the bond decreases, and vice versa.

$$P = \sum_{t=1}^{T} \frac{C}{(1+r)^t} + \frac{F}{(1+r)^T}$$

Bond prices and yields are two sides of the same coin, but they offer different perspectives on the market's reaction to monetary policy changes. Bond prices provide immediate information about market sentiment and investor reactions to news and policy shifts. The yield of a sovereign bond, in particular, is a critical measure that reflects not only the time value of money but also the credit risk associated with the bond's issuer—typically a national government (Frankfurter, 2006). Sovereign yields thus provide insight into the market's perception of the risk of lending to a government, offering insights into the long-term expectations for interest rates and inflation. Analyzing both allows for a more comprehensive understanding of market dynamics.

Through comprehensive empirical analysis, this investigation intends to explain the interplay between the anticipatory aspects of U.S. monetary policy and its tangible effects on the financial health and stability of emerging markets, contributing significantly to the field of international finance.

To achieve the objective mentioned above, this research will address the following research questions:

1. How do expectations of U.S. monetary policy affect the returns of emerging market bonds?

2. What are the differences in the impact of U.S. monetary policy expectations on local currency versus USD-denominated bond returns in emerging markets?

3. Is there any variance in the magnitude of the impact during different monetary policy periods?

4. What is the impact of U.S. monetary policy expectations on emerging market sovereign bond yields?

Emerging markets are often seen as attractive investment opportunities due to their potential for growth and relatively higher returns. Researching the effects of U.S. monetary policy on these markets can enhance market participants' ability to make well-informed investment decisions. The findings of this research also carry profound policy implications. It advocates for the strengthening of local currency bond markets in emerging economies as a strategic defense against the volatility of global capital flows and U.S. policy shifts. Furthermore, it highlights the need for regulatory reforms to enhance market liquidity and infrastructure, coupled with the development of advanced risk management strategies to navigate financial complexities. Overall, it presents a compelling case for bolstering economic resilience and implementing inclusive financial policies that can mitigate the vulnerabilities of emerging economies to the whims of global monetary dynamics.

Literature Review

Theoretical Framework

From the theoretical perspective, a wealth of research has shed light on the pathways through which U.S. monetary policy influences the fixed-income markets of emerging economies. As a fundamental framework in international financial economics, the Mundell-Fleming Model illustrates how U.S. monetary policy can impact capital flows and exchange rates, thereby influencing emerging bond markets. When the U.S. Federal Reserve adopts an expansionary monetary policy, such as lowering interest rates or engaging in quantitative easing, it effectively reduces the returns on U.S. assets. According to the model, the scenario of high capital mobility prompts investors to seek higher returns elsewhere, leading to capital outflows from the U.S. This behavior predominantly benefits emerging markets, where bond yields are typically higher. A surge of capital inflows to these markets can lead to the appreciation of their currencies and a decrease in bond yields, driven by the increased demand for these bonds. (see Mundell (1963) and Fleming (1962)).

In terms of the channels of transmission, the interest rate parity theory (IRP) demonstrated that differences in interest rates between countries lead to capital flows seeking higher returns. When the U.S. Federal Reserve lowers interest rates, it reduces the attractiveness of U.S. fixed-income investments, and investors tend to seek higher yields in emerging bond markets (Keynes (1923), Rogoff and Obstfeld (1996)). Conversely, when the Fed increases rates, capital tends to flow back to U.S. markets, increasing emerging market bond yields as prices drop. Another theory, the portfolio balance model suggests that changes in U.S. monetary policy can alter global risk perceptions and exchange rates, impacting the demand for emerging market bonds (Branson, 1980). The easing of U.S. monetary policy is often perceived as risk-tolerant, weakening the U.S. dollar and making emerging market bonds more attractive due to higher relative yields and potential currency appreciation gains. The increasing demand drives up bond prices in these markets and lowers their yields.

The concept of the Capital Flow Channel, as described by Forbes and Warnock (2012), explains how U.S. monetary policy influences capital movements across borders. It indicates that when the U.S. implements an expansionary monetary policy, such as lowering interest rates or engaging in quantitative easing, it effectively reduces the expected returns from U.S.

assets. As investors are always in search of higher yields, they look beyond the U.S. to explore more attractive investment opportunities, often turning their attention to emerging markets. The increased demand for emerging market bonds pushes their prices up, and the yields move inversely to the price, making borrowing costs for these countries lower.

The global financial cycle hypothesis by Rey (2015) posits that U.S. monetary policy influences global liquidity conditions, affecting credit availability and risk premiums in emerging markets. Expansionary U.S. policy increases global liquidity, lowering the cost of borrowing and tightening the spreads on emerging market bonds.

The majority of theoretical literature posits that an easing of monetary policy typically leads to an increase in the prices of bonds in emerging markets, accompanied by a decrease in sovereign yields, with the reverse occurring in response to tightening monetary policy. The hypotheses of this research are formulated within the context of these theoretical underpinnings.

Empirical Evidence

The empirical research exploring the spillover effects of U.S. monetary policy on international and emerging bond markets has been expanding in the past decades.

Tepper (2013) examines the influence of the expanding Fed monetary policy, specifically Large-Scale Asset Purchases (LSAPs), on EMEs. They find that a 10-basis-point reduction in long-term U.S. Treasury yields leads to a 0.4-percentage-point increase in foreign ownership of emerging market debt, which in turn reduces EME government bond yields by approximately 1.7 basis points. The study suggests that LSAPs likely contribute to capital outflows from the U.S. to EMEs, marginally reducing longer-term EME government bond yields. Eichengreen and Gupta (2015) studies the impact of the Fed's Tapering Talk in 2013. The result indicates that the sovereign bond spread increased in most of the emerging countries from April to July 2013.

Gilchrist et al. (2016) measured U.S. monetary policy surprises by examining changes in the 2-year Treasury yield around Federal Open Market Committee (FOMC) announcements to assess the impact on foreign government bond yields. They found that conventional U.S. monetary policy expansions tend to steepen the foreign yield curve, while unconventional policy measures, such as quantitative easing, have the opposite effect, leading to a flattening of the yield curve. Gilchrist et al. (2018) used high-frequency financial data to estimate the impact of U.S. monetary policy on international bond markets, particularly focusing on dollar-denominated sovereign bonds from over 90 countries since the early 1990s. They find that these bond yields are highly responsive to unanticipated changes in U.S. monetary policy across both conventional and unconventional policy regimes. The effect of unconventional policy actions on foreign bond yields is found to be similar to that of conventional policies. Albagli et al. (2019) delve into the spillover effects focusing on the period following the 2007-2009 global financial crisis. They reveal a marked increase in the spillover of U.S. monetary policy to long-term yields in both developed and emerging markets. Another research conducted by Bhattarai et al. (2021) estimates the international spillover effects of U.S. QE on EMEs using a Bayesian panel VAR. Their findings indicate that an expansionary U.S. QE shock has significant impacts on financial variables in EMEs, leading to an exchange rate appreciation, a reduction in long-term bond yields, and an increase in capital inflows.

Some papers also identified an asymmetric pattern for the impact during the QE and QT periods. Tillmann et al. (2019) conduct a study on the spillover effects of U.S. monetary policy on emerging market economies using VAR-X models for 10 emerging economies. Their

research indicates that the impact of a tightening U.S. monetary policy is more significant on emerging financial markets compared to an easing policy. Chari et al. (2021) also find that the spillover effects of unconventional monetary policy exhibit significant asymmetry across the QE and tapering period. But Gilchrist et al. (2018) find no evidence of this asymmetric pattern on the sovereign credit spreads at a global level.

Numerous studies attempt to identify these channels, mainly including signaling and portfolio rebalancing effects stemming from policy surprises. Chen et al. (2014) use a modified event study approach to investigate the effects of U.S. monetary policy shocks on bond yields across various maturities. They identify two additional factors - signaling and market - that contribute to policy surprises. They point out that expansionary surprises in monetary policy are linked with reductions in bond yields and appreciations in currency values through both channels. The researchers also observe that robust fundamentals and more liquid markets tend to mitigate the impact of U.S. monetary policy shocks. Anaya et al. (2017) employ a structural global VAR model to investigate whether unconventional monetary policy shocks in the U.S. affect the financial and economic conditions of EMEs and whether international capital flows play a significant role in transmitting these shocks. The study concludes that U.S. shocks have enduring effects on portfolio flows and that these flows act as a channel of transmission to EMEs. Bauer and Neely (2014) examine the effects of the Fed's LSAPs on international bond yields using dynamic term structure models. Empirical findings indicate that both the signaling channel and the portfolio balance channel have likely played significant roles in contributing to the observed decrease in yields across numerous countries. Signaling effects are significant in countries with strong yield responses to U.S. monetary policy surprises, and portfolio balance effects correspond with the degree of substitutability across international bonds. Lakdawala et al. (2021) argue that in advanced countries, it is the term premium component of yields that responds to this uncertainty, explained by an international portfolio balance mechanism. In contrast, in emerging countries, the expected component of yields reacts to uncertainty, rationalized by a flight to safety channel. The study also notes heterogeneity in the country-level response to uncertainty among emerging countries, driven by the degree of financial openness. Chari et al. (2021) extract monetary policy shock from high-frequency treasury futures data and decompose the shock into a signaling channel and portfolio balance channel by using an affine term structure model. The findings suggest that U.S. unconventional monetary policy shocks have a significant impact on short-term yield expectations and term premia, which in turn affect U.S. holdings of emerging market assets. The impact is mainly through changes in asset valuations rather than physical flows and is more noticeable in equity markets than in bond markets. This result is inconsistent with the findings of Anaya et al. (2017).

The research on the effects of U.S. monetary policy on emerging market bonds reveals significant gaps, particularly in the context of evolving financial market dynamics and recent economic events. Firstly, the existing literature predominantly focuses on the impact of U.S. monetary policy on bonds denominated in foreign currencies, such as the U.S. dollar, in emerging markets. This emphasis largely stems from the more extended history and prevalent issuance of USD-denominated bonds by emerging economies, which has provided a broader dataset for analysis. Consequently, there is a relative under-exploration of the immediate and long-term effects on local currency-denominated bonds, which are increasingly significant components of global financial markets. Secondly, the scholarly investigation into the periods of QE and QT by the U.S. Federal Reserve, particularly during and in the aftermath of the COVID-19 pandemic, remains scant. The pandemic period introduced unprecedented monetary interventions and economic disruptions, suggesting that the impacts on emerging market bonds during this era could deviate from historical patterns. This lack of focused

research on the specific effects of QE and QT in the context of the pandemic highlights a crucial research gap, underscoring the need for contemporary analyses that consider the unique economic and financial landscape shaped by the pandemic.

Drawing from established theoretical frameworks and empirical evidence, this research posits the hypothesis that an expansionary U.S. monetary policy leads to an increase in bond prices and a reduction in sovereign yields within emerging markets. Moreover, it is hypothesized that the impact on USD-denominated sovereign bonds will be more pronounced than on those denominated in local currencies. The higher sensitivity of foreign currency bonds can be ascribed to their direct exposure to fluctuations in exchange rates, heightened external vulnerabilities, and shifts in investor risk perceptions. Conversely, bonds issued in local currencies are primarily influenced by domestic monetary policies and the prevailing economic conditions within the issuing countries.

Data

Dependent variable

In this study, the dependent variables that capture the performance of sovereign emerging bond markets encompass sovereign bond prices and yields from emerging markets, denominated in both local currency and USD. To assess bond prices, this research employs the FTSE Emerging Markets Government Bond Index (EMGBI) and the FTSE Emerging Markets U.S. Dollar Government Bond Index (EMUSDGBI). The maturity of bonds. The bonds covered in the index span a range of maturities from 1 year to over 10 years. These indices monitor the performance of government bonds issued both domestically and abroad, providing an extensive benchmark for sovereign bond markets in emerging economies. Specifically, the EMGBI includes bonds from 16 different countries, predominantly from the Asia-Pacific region, while the EMUSDGBI tracks the performance of sovereign debt from over 25 countries across various global regions. The timeframe selected for analyzing bond prices spans from January 2008 to December 2023, which is dictated by the availability of data from the indices. The data is employed in daily time series analysis to assess the immediate impact of expectations surrounding U.S. monetary policy.

For the analysis of bond yields, this research utilizes sovereign yield data sourced from Bloomberg, focusing on countries such as Brazil, Mexico, the Philippines, Indonesia, Turkey, and Chile. These countries have been selected due to the comprehensive availability of yield data for both local and USD-denominated bonds. The study period extends from January 2010 through December 2023, facilitating a comparative analysis of yield performance across the two currencies. This timeframe allows for the examination of the long-term effects of U.S. monetary policy on bond yields, employing monthly Ordinary Least Squares (OLS) regression analysis to capture these impacts.

Independent variable

Quantifying the U.S. monetary policy shocks or expectations is notably complex. Recent approaches have relied on high-frequency measurement, analyzing the swift changes in asset prices surrounding Federal Open Market Committee (FOMC) meetings, as a lens to measure the effects of monetary policy. Yet, one substantial challenge is the sparse schedule of FOMC announcements—only eight times a year—and the marked correlation between

surprises in monetary policy and the macroeconomic or financial market data available before these announcements (Bauer & Swanson, 2020).

In navigating these challenges, this study introduces a refined method by leveraging an index from Bloomberg that breaks down the U.S. 10-year treasury yield into components attributable to monetary policy news (Ademmer et al., 2022). There's compelling evidence to suggest that Treasury yields react sharply to unexpected monetary policy moves (Bauer & Swanson, 2022). The Economics' asset-price driver model from Bloomberg further reveals how a blend of economic factors, including monetary policy, economic demand, economic supply, and risk sentiment, influence market conditions.

The decomposition of the 10-year Treasury yield into the monetary policy driver involves a structural VAR model and specific identification strategies. The structural VAR model captures the daily movements of the 10-year Treasury yield, by incorporating a vector of underlying structural shocks. Additional restrictions, such as sign restrictions, correlation restrictions, and narrative restrictions, are imposed to identify the drivers and the impact matrix that determine how changes in the perception of the monetary policy stance influence asset prices. Through historical decomposition analysis, the cumulative effect of the monetary policy factor on the 10-year Treasury yield at different time points is assessed, providing insights into the significance of market reactions to shifts in monetary policy expectations. By applying the structural model and decomposition methodology, The contribution of the monetary policy driver to fluctuations in the 10-year Treasury yield can be quantified. Changes in the market's perception of the monetary policy stance are highlighted as a key factor shaping movements in the yield, with a more hawkish stance typically leading to higher yields and a more dovish stance resulting in lower yields. The historical decomposition of the 10-year Treasury yield shows that changes in the perception of the monetary policy stance were the most important driver of the strong increase in the yield especially in 2022, explaining around two-thirds of the overall movement. This suggests that market participants' reactions to shifts in monetary policy expectations play a crucial role in shaping long-term interest rates (Ademmer et al., 2022).

This analytical approach provides valuable insights in monitoring market dynamics regarding monetary policy adjustments. It uniquely separates the direct effects of policy changes from broader market movements, providing a clearer picture of how these policies affect emerging markets' sovereign bond markets. By focusing specifically on changes in these yields, this research offers a precise assessment of how shifts in U.S. monetary policy impact the bond markets of emerging economies.

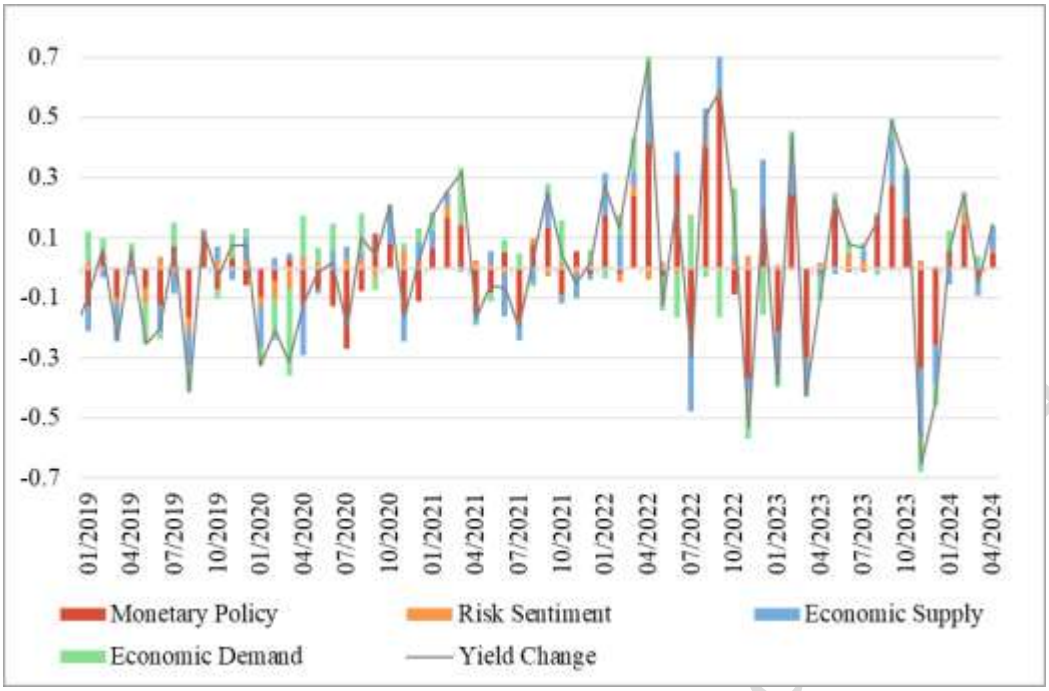

Figure 1: Decomposition of the U.S. 10-year Treasury Yield Change (%)

Table 1: Change in the Decomposed U.S. 10-Year Treasury Yield During Key Federal Reserve Event Dates

Date	Event	Δ MP (%)
2008-12-16	Zero Interest Rate Policy	-0.2331
2009-03-18	Introduction of Quantitative Easing (QE1)	-0.3664
2010-11-03	The FOMC announced a second round of quantitative easing	-0.0074
2012-09-13	The FOMC launched a third round of quantitative easing	-0.0786
2013-05-22	"Taper Tantrum"	0.0884
2013-09-18	Markets were widely expecting the Fed to begin tapering its $85 billion-a-month bond-buying program. However, the FOMC decided to keep purchasing at the same pace	-0.1371
2015-12-16	Fed raised interest rates for the first time since 2006	0.0016
2018-10-03	"A long way from neutral" Comment by Powell: Fed Chair Jerome Powell stated in an interview that interest rates were still "a long way from neutral," suggesting more rate hikes than markets had anticipated.	0.0572
2019-03-20	The Fed unexpectedly announced a more dovish outlook on monetary policy, signaling no rate hikes for the rest of the year amidst slowing growth and muted inflation pressures	-0.0628
2019-06-19	Chair Jerome Powell indicated that the Fed was willing to act (i.e., cut rates) to sustain the economic expansion. This readiness to cut rates preemptively was a significant shift from previous more reactive stances and was interpreted as a bullish signal for markets.	-0.0511
2020-03-03	Facing mounting economic threats from the COVID-19 pandemic, the FOMC made an emergency rate cut	-0.0442
2021-08-17	Fed considers initiating a tapering process.	0.0440
2022-06-15	Surprise 75 Basis Point Rate Hike: The FOMC increased the federal funds rate by 75 basis points, a move not seen since 1994.	-0.1312
2022-11-02	Continued Rate Hikes	0.0401
2023-03-22	The FOMC decided to hold the federal funds rate steady, indicating a possible pause in its aggressive rate hiking cycle.	-0.1031

Table 1 presents dates associated with the Federal Reserve's monetary policy decisions or shifts in policy stance. It reveals that the decomposed 10-year Treasury yield fluctuates in response to FOMC announcements, speeches by the Fed, or the enactment of monetary policies. Notably, the yield exhibits significant changes, particularly when the Fed's stance deviates from expectations.

Control variables

(1) VIX

The CBOE Volatility Index (VIX), also known as the "fear index", represents the market's expectation of near-term volatility. It is calculated from the prices of S&P 500 stock index options. It has become a benchmark for measuring financial market uncertainty. The increase in the VIX index has a great effect on the EMEs' asset price and volatility (see Won et al. (2013), Choi (2018)). Matsumura and Vicente (2010) find that the VIX emerges as the most significant macroeconomic factor influencing the performance of short-term emerging market bonds and the probabilities of defaults. When the VIX is high, suggesting higher financial uncertainty and perceived risk, investors may shift away from riskier assets like emerging market bonds. This can lead to decreased prices and higher yields in these markets as investors demand more returns for taking on additional risk. It is commonly used as a control variable in many papers exploring the determinants of emerging bond markets (see González-Rozada and Yeyati (2008), Bellas et al. (2010); Chari et al. (2021)). The frequency of the VIX index is daily for the autoregressive time series model and monthly for the OLS regression.

(2) Exchange Rate

In addition to domestic and global market risks, exchange risk plays a crucial role in influencing asset returns (Choi & Rajan, 1997). Shifts in exchange rates can significantly influence the performance of emerging market bonds. When the local currency weakens against the dollar, the value of these local currency-denominated bonds falls for international investors, causing bond prices to decline. Currency depreciation can also lead to higher yields by elevating inflation expectations (Gadanecz et al., 2018). Chernov et al. (2023) show that the exchange rate has a great impact on emerging markets yield spread. Additionally, Francová (2017) finds that the impact of exchange rates on bond yields is greater in emerging countries compared with developed countries.

The exchange rate for the autoregressive model is the daily MSCI Emerging Market Currency Index measures the performance of 25 emerging-market currencies relative to the U.S. Dollar. The BIS nominal exchange rate is used for monthly OLS regression.

(3) Exchange Rate Volatility

Volatility in exchange rates can make these markets more susceptible to global financial shifts, affecting the attractiveness of emerging market bonds to foreign investors. Hong Kong Monetary (2020) indicates that local currency fund flows are more vulnerable to the impacts of exchange rate volatility compared to hard currency fund flows. The empirical analysis indicates that exchange rate volatility is a significant factor influencing the yields of local currency sovereign bonds in EMEs (Gadanecz et al., 2018). As exchange rate volatility escalates, investors demand higher yield premiums to compensate for the increased risk associated with holding sovereign bonds denominated in the local currencies of EMEs (Gadanecz et al., 2014).

The volatility of the exchange rate is calculated as the monthly standard deviation of the nominal exchange rate, as sourced from the Bank for International Settlements (BIS).

(4) Bid-ask Spread

The bid-ask spread of bond yield refers to the difference between what buyers are willing to pay and what sellers are asking for. The bid-ask spread serves as a crucial indicator of bond market liquidity, offering insights into the immediate transaction costs associated with trading (Su & Tokmakçıoğlu, 2023). The narrower this spread, the lower the transaction cost, indicating higher liquidity and a more efficient market where securities can be bought or sold with minimal price adjustment (Fleming, 2001). A wider spread indicates markets with higher trading costs and lower liquidity. This, in turn, requires higher yields to attract investors, compensating them for the increased risks and costs of investing in these markets. Anthony and Prasanna (2019) find that trading cost is considered as a more critical factor than other aspects of liquidity when investors make investment decisions in emerging markets.

The bid-ask spread is calculated as the difference between the ask yield (the yield offered by the seller) and the bid yield (the yield offered by the buyer) of the sovereign yield in both local currency and USD.

(5) Interest Rate Differential

The interest rate differential captures the relative attractiveness of investing in emerging markets compared to developed markets, significantly influencing capital flows and bond yields. This differential also reflects global risk aversion trends; during periods of heightened risk aversion, investors tend to move funds to safer assets, impacting emerging market yields. In this paper, the interest rate differential is measured as the sovereign yield spread, which captures shifting macroeconomic fundamentals and changing risk pricing over time (Bernoth & Erdogan, 2012). Additionally, sovereign bond yield spreads reflect global risk aversion, country-specific risks, and spillovers from other sovereigns (Miguel et al., 2010). Controlling for this variable helps isolate the specific effects of U.S. monetary policy changes, enhancing the robustness and precision of the model by accounting for external economic influences and ensuring observed impacts are not conflated with domestic factors.

(6) Policy Rate

The domestic policy rate directly influences local borrowing costs, economic activity, and inflation expectations within a country, all of which are crucial determinants of sovereign bond yields (Bernanke & Blinder, 1992). A hike in rates typically increases yields, reflecting higher borrowing costs and perceived economic risks, while a cut in rates can lower yields, signaling cheaper borrowing costs and efforts to stimulate economic growth. These rate adjustments impact the attractiveness of sovereign bonds to investors, reflecting the country's economic policies and health.

(7) Inflation

In emerging countries, inflation directly influences sovereign yields by shaping expectations around future inflation rates and central bank actions. Rising inflation typically leads to higher interest rates as central banks aim to control it, making new bonds more appealing due to their increased yields. This also causes the yields on existing sovereign bonds to rise, as investors demand higher returns to compensate for the diminished purchasing power

of future bond payments. Evidence shows that inflation has a significant effect on sovereign borrowing costs (see Afonso and Rault (2010) and Alexopoulou et al. (2010)).

(8) Unemployment

Unemployment can affect sovereign yields indirectly through its impact on economic growth, inflation, and fiscal policy. High unemployment can indirectly raise sovereign yields by indicating weaker economic conditions, leading to lower tax revenues and higher government spending. Additionally, to combat high unemployment, central banks may lower interest rates, influencing the yield on sovereign bonds. Afonso et al. (2011) highlight the detrimental impact of a country's long-term unemployment rate on its sovereign credit ratings, which potentially leads to higher sovereign borrowing costs. Prein (2019) argues that during periods of unemployment, the erosion of skills can lead to a decrease in the economy's productive potential. This diminished capacity can result in fewer resources being available to meet external debt obligations in the future.

(9) Foreign Exchange Reserve

Foreign reserves play a crucial role in affecting a country's sovereign yield by serving as a buffer against economic shocks and indicating the country's ability to manage external debt obligations. High foreign reserves can lower sovereign yields by signaling a country's economic stability and its ability to repay external debts, boosting investor confidence. Conversely, low reserves may raise yields due to perceived higher risks. Foreign reserves thus. significantly influence a nation's fiscal health perception and its sovereign yield. Wicaksono and Dewi (2022) demonstrate that the foreign exchange reserve has a significant negative impact on Indonesian government bond yield.

The foreign exchange reserve data is calculated as a percentage of GDP.

(10) GDP Growth

Higher GDP growth in emerging markets generally signals a strong economy, potentially leading to lower sovereign yields as the perceived risk of debt repayment declines. Conversely, weak GDP growth can increase sovereign yields due to heightened concerns over a country's fiscal health and its ability to meet debt obligations, leading investors to demand higher returns for the perceived increased risk. Seip and Zhang (2022) indicates that the bond market receives signals from shifts in GDP growth, particularly during periods of high unemployment and inflation.

(11) Current Account Balance

A country's current account balance affects its sovereign yield by indicating its financial health to investors. A positive balance, suggesting exports exceed imports, can lower sovereign yields by boosting confidence in the country's economy and its ability to repay debts. Conversely, a negative balance may increase sovereign yields, as it raises concerns about debt repayment capabilities, leading investors to demand higher returns for the perceived greater risk. The current account balance thus plays a crucial role in shaping investor perceptions and the cost of government borrowing.

(12) Debt-to-GDP

The debt-to-GDP ratio significantly affects sovereign bond yields, acting as a barometer for a country's fiscal health and influencing investor perception of default risk. A higher debt-to-GDP ratio can signal to investors that a country is at a greater risk of defaulting on its debt obligations, leading to higher yields on sovereign bonds as investors demand higher returns to compensate for this increased risk. Empirical studies suggest that a 1 percentage point increase in the debt-to-GDP ratio could raise long-term interest rates by between 2 and 7 basis points (Poghosyan, 2014). This relationship underscores the sensitivity of bond yields to fiscal health indicators.

To ensure consistency in the frequency of the data used for empirical analysis, linear interpolation is applied to convert quarterly control variables such as GDP growth, foreign exchange reserves, current account balance, and debt-to-GDP ratio into monthly data. Linear interpolation estimates the values for the intervening months by assuming that changes between the quarterly data points occur at a constant rate. This method involves fitting a straight line between two consecutive quarterly data points and using this line to estimate the values for the months within the quarter.

Empirical Methods

The estimation of the impact of U.S. monetary policy on EMEs' sovereign bond prices is measured through a daily time series regression model.

$$r_{c,t} = \alpha + \sum_{j} \rho_j r_{c,t-j} + \beta \Delta MP_{t-1} + \gamma \Delta VIX_{t-1} + \delta \Delta EMXR_{t-1} + \epsilon_{c,t} \qquad (1)$$

Where r_(c,t) denotes the daily return for sovereign bonds denominated in different currencies, saying local currency and USD currency. Subscript j means autoregression with order j. Daily changes in the VIX index and Emerging market Currency Index (EMXR) are control variables. Here we use the t-1 day treasury futures rate to avoid the time lag. The MP is normalized during the whole period to capture the impact of monetary policy surprise.

The VIX and currency indices are closely linked to global financial conditions and capital flows, key factors driving emerging market bonds. Their responsiveness to daily market changes makes them ideal for capturing immediate external influences on bond yields and prices. This focused approach helps isolate the effect of U.S. monetary policy on sovereign bond indices from broader market volatility or exchange rate fluctuations.

Before performing regression analysis, the study investigates the autocorrelation function (ACF) and the partial autocorrelation function (PACF) of the logarithmic differences in the government bond index. This preliminary step is crucial for selecting the most appropriate regression model. The analysis reveals distinct autocorrelation patterns in the bond returns across two currency types. Specifically, the USD-denominated bond index shows first-order autocorrelation, meaning the current returns are correlated with the immediately preceding returns. On the other hand, bond returns calculated in local currency exhibit second-order autocorrelation, indicating a correlation with returns from two periods ago.

To analyze the influence of varying monetary policy eras on treasury futures yield, a piecewise regression model is employed, allowing for the differentiation of the yield's behavior across distinct policy phases identified as QE08, QT13, QE19, and QT21. They are grounded in the recognition of key policy transitions and the corresponding shifts in market expectations, ensuring that the analysis precisely captures the impact of monetary policy changes on emerging bond markets across different financial conditions. The periods of different monetary policy phases are defined as follows:

QE08 (Nov 2008 – April 2013): This period marks the Federal Reserve's response to the Global Financial Crisis with the initiation of Quantitative Easing (QE) programs aimed at stabilizing the financial system and fostering economic recovery. In response to the 2008 financial crisis, the Fed initiated its first round of quantitative easing, commonly referred to as "QE1," in November 2008. In November 2010, the Fed launched a second round of quantitative easing, known as "QE2." QE2 involved the purchase of U.S. Treasury securities to stimulate economic growth and lower unemployment. The program aimed to keep long-term interest rates low by increasing demand for government bonds. Launching QE was a direct response to the severe liquidity crunch and economic downturn. Market expectations were heavily influenced by the anticipation of increased liquidity and support for financial assets, leading to significant shifts in asset prices and yields even before the full implementation of the policies.

QT13 (May 2013 – Aug 2019): This phase represents the Fed's efforts to normalize its balance sheet after years of expansion through QE programs. The tapering of asset purchases and eventual reduction of the balance sheet were in response to economic recovery and improvement in labor market conditions. The market's expectations during this phase were shaped by the anticipation of reduced monetary stimulus, with implications for interest rates, inflation, and asset valuations. The announcement of tapering in May 2013, in particular, led to a notable market reaction known as the "Taper Tantrum," representing the impact of policy expectations on the financial market. Subsequently, in 2017, the Federal Reserve formally initiated QT by permitting a predetermined volume of maturing securities to expire without renewal, aiming for a methodical and transparent reduction of its crisis-era asset holdings. This strategy was carefully implemented to minimize market disturbances.

QE19 (Sep 2019 – July 2021): This period saw the resurgence of QE in response to liquidity strains in short-term funding markets in late 2019 when the Fed started purchasing short-term Treasury bills at a pace of around $60 billion per month. This was followed by the unprecedented economic impact of the COVID-19 pandemic in 2020. The Fed's aggressive monetary easing, including asset purchases and interest rate cuts, aimed to support the economy and ensure the smooth functioning of financial markets. Between June 2020 and November 2021, the Fed purchased approximately $80 billion worth of U.S. Treasury securities and around $40 billion in mortgage-backed securities each month, on average. Market expectations during this phase were influenced by the anticipation of extensive liquidity support from the Fed, leading to lower yields and higher asset prices, despite the underlying economic uncertainty.

QT21 (Aug 2021 – Dec 2023): As the economy began to recover from the pandemic, showing signs of growth and increasing inflationary pressures, the Fed started discussing and then implementing measures to reduce its balance sheet once again. During an August 2021 speech, Fed Chair Jerome Powell indicated that it might be fitting to commence decreasing the rate of asset acquisitions within the current year. In November 2021, the Fed announced that it would start reducing its substantial asset purchases by $15 billion every month. This period marks a transition towards tightening monetary policy in response to concerns over inflation

and as part of the broader effort to normalize policy after the extensive pandemic-related interventions. The Fed's discussions and announcements regarding tapering asset purchases and potential interest rate hikes have shaped market expectations, influencing asset prices and broader financial conditions.

Each of these periods indicates the critical interplay between Federal Reserve policy actions, market expectations, and financial asset prices. By delineating monetary policy into these distinct phases, it's better to assess policy impact on the bond market under different financial conditions over time.

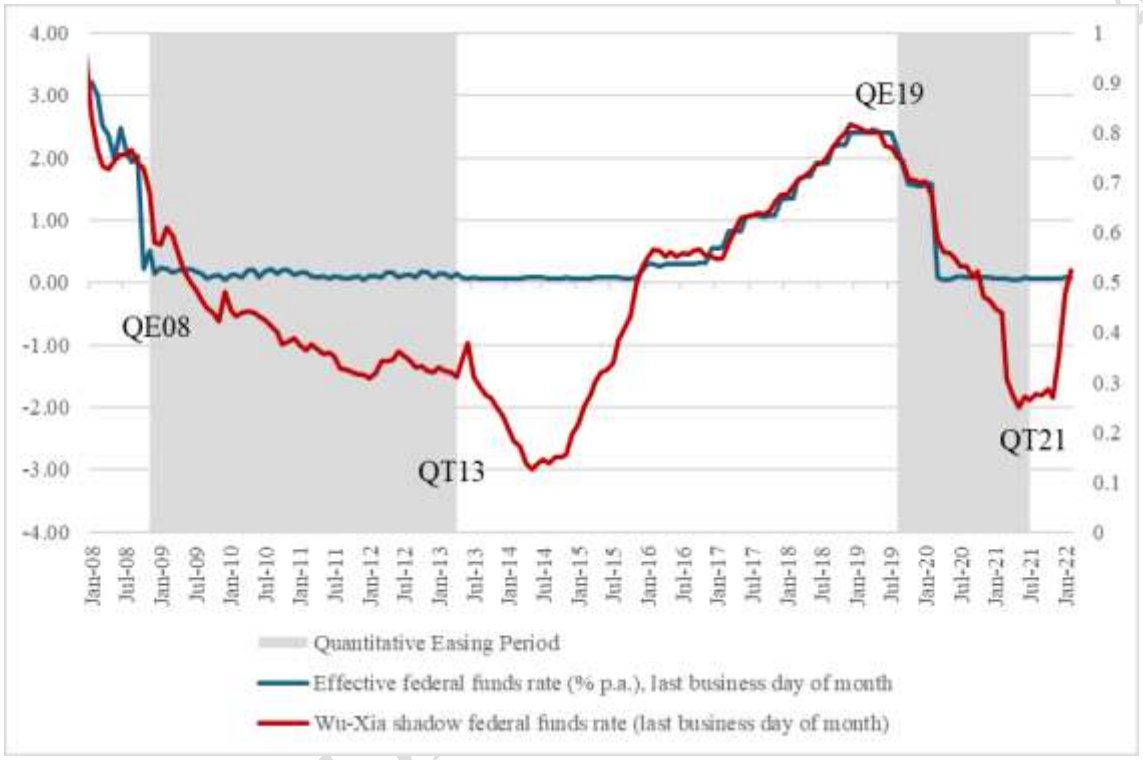

Figure 2: The effective federal funds rate and shadow rate during different periods.

The Wu-Xia shadow rate is an extension of the traditional concept of interest rates, allowing them to extend into negative values. The graph presents the trends of the effective federal funds rate and the Wu-Xia shadow rates throughout the different monetary policy phases defined above. Traditional measures like the effective federal funds rate fail to capture the full extent of monetary policy actions when nominal rates are near zero. During such periods, the Federal Reserve often resorts to unconventional tools such as quantitative easing and forward guidance. The Wu-Xia shadow rate is designed to account for these unconventional measures by extending the concept of interest rates into negative values. This allows it to effectively measure the impact of monetary policy when nominal rates are constrained by the zero lower bound (ZLB). It can also effectively summarize the macroeconomic impacts during unconventional monetary policy periods (WU & XIA, 2016).

Based on the division of monetary policy phases, the model for the piecewise regression is:

$$r_{c,t} = \alpha_0 + \sum_j \rho_j r_{c,t-j} + \beta_1 dummy_{preMP} \Delta MP_{t-1} + \beta_2 dummy_{QE08} \Delta MP_{t-1} + \beta_3 dummy_{QT13} \Delta MP_{t-1} + \beta_4 dummy_{QE19} \Delta MP_{t-1} + \beta_5 dummy_{QT21} \Delta MP_{t-1} + \gamma \Delta VIX_{t-1} + \delta \Delta EMXR_{t-1} + \epsilon_{i,t} \quad (2)$$

Where $r_{c,t}$ represents the return of the bond index for currency c at time t. $\sum_j \rho_j r_{c,t-j}$ represents the autoregressive terms, capturing the influence of past bond return on current return. ΔMP_{t-1} denotes the change in U.S. monetary policy at time t-1. preMP, QE08, QT13, QE19, and QT21 are dummy variables for different monetary policy phases, namely the non-monetary policy period, quantitative easing period, and quantitative tightening. This is to capture the differential impact of U.S. monetary policy changes across different phases. ΔMP is normalized separately in each time scale. By normalizing the monetary policy changes within each time scale, the model ensures that the impact is comparable across different phases.

To estimate the impact of U.S. monetary policy on EMEs sovereign bond yields, another OLS regression model is employed for each country.

$$Y_{k,c,t} = \alpha_{k,c} + \sum_j \beta_j Y_{k,c,t-j} + \eta' GLO_{k,c,t} + \theta' DOM_{k,c,t} + \epsilon_{k,c,t} \quad (3)$$

Where the dependent variable Y is sovereign bond yield. GLO and DOM are global indicators and domestic variables respectively. Subscripts k, c, and t represent country, currency, and time. η' and θ' are transposed vectors of coefficients on the global factors and domestic factors. ϵ represents the error term.

The countries studied in this model cover 8 emerging countries including Brazil, Chile, Colombia, Indonesia, Mexico, Turkey, Peru, and the Philippines for 10-year sovereign yield and 6 countries for 2-year sovereign yield, because they have relatively more sovereign yield data in both USD and local currency.

To ensure the robustness and reliability of this regression models, several strategies were employed to detect and mitigate multicollinearity among the predictor variables. Initially, the Variance Inflation Factor (VIF) was calculated for each predictor to quantify the severity of multicollinearity. Variables with VIF values exceeding 10 were identified and addressed. For such cases, the variables are standardized excluding the constant term and the U.S. monetary policy. This transformation helps reduce the correlation between predictors. When standardization did not sufficiently address multicollinearity, Principal Component Analysis (PCA) was applied to transform the correlated variables into a set of uncorrelated components. This approach retained the maximum variance in the data while ensuring that the primary variable, U.S. monetary policy, remained in its original form for comparability and interpretability across different countries.

Heteroscedasticity, which can lead to inefficient estimates and invalid statistical inferences, was identified and corrected through various. tests and adjustments. The presence of heteroscedasticity was detected using the Breusch-Pagan and White tests, which assess whether the variance of the residuals is related to the fitted values or the predictors. Upon detecting heteroscedasticity, robust standard errors were employed to provide consistent estimates of the coefficient standard errors, ensuring the validity of the inferences drawn from

the model. By incorporating these methodologies into the regression analysis, it is ensured that the estimated coefficients are both reliable and valid.

Table 2: Time Series and Piecewise Regression Result

Variables	LCBond		USDBond	
	Model 1	Model 2	Model 1	Model 2
MP	-0.0405***		-0.1261***	
	0.000		0.000	
MP_before		-0.022		-0.003
		(0.172)		(0.953)
MP_QE08		-0.026***		-0.119***
		0.000		0.000
MP_QT13		-0.091***		-0.202***
		0.000		0.000
MP_QE19		-0.039***		-0.061**
		0.000		(0.016)
MP_QT21		-0.027***		-0.123***
		(0.001)		0.000
VIX	-0.0076*	-0.008***	-0.0425***	-0.070***
	(0.031)	0.000	0.000	0.000
EMXR	0.0649***	0.068***	0.0667***	0.146***
	0.000	0.000	0.000	0.000
1-day Lag	-0.2918***	-0.295***	-0.1422***	-0.122***
	0.000	0.000	0.000	0.000
2-day Lag	-0.0462***	-0.048***		
	0.000	0.000		
const	0.0278***	0.028***	-0.0023	0.002
	0.000	0.000	(0.797)	(0.860)

*** p<0.05, ** p<0.01, *** p<0.001**

The preliminary analysis based on the time series regression suggests that the expectation of U.S. monetary policy has a significant impact on both USD and local currency-denominated emerging market government bonds, except for the period before the implementation of unconventional monetary policy. Additionally, bonds issued in local currencies show less vulnerability to shocks from U.S. monetary policy compared to those denominated in U.S. dollars. Specifically, U.S. dollar-denominated bonds display a significantly stronger reaction to changes in U.S. monetary policy. This can be explained by the study suggesting that EMEs that borrow in U.S. dollars are sensitive to U.S. monetary policy due to changing exchange rates (Davis et al., 2018).

Furthermore, our regression analysis on these dollar-denominated bonds uncovers an asymmetric response pattern. This pattern reveals that negative impacts from U.S. monetary policy shifts, particularly during periods of anticipated monetary tightening, are more pronounced. The impact during phases of quantitative tightening is approximately twice as significant as during easing phases. Such findings align with those of numerous. other studies, indicating a consistent trend. However, this asymmetric response pattern does not extend to the local currency bond markets.

Another interesting discovery in this study is the diminished reaction magnitudes to both the easing and tightening phases of U.S. monetary policy during the most recent rounds of quantitative easing (QE) and quantitative tightening (QT). This suggests that emerging bond markets are becoming less sensitive to U.S. monetary policy shocks over time. This evolution can be attributed to several factors, reflecting a growing resilience in emerging bond markets and a shift in investors' perceptions of risk associated with these markets in the context of global monetary policy changes. This finding is consistent with the study of Özker (2021), suggesting that while EM bonds continue to be influenced by external shocks, their overall vulnerability has generally decreased. The study also highlighted that sensitivity to global financial shocks in EMEs is intricately linked to countries' structural characteristics and capital accumulation, underscoring the need to consider individual country characteristics and the broader global economic context when evaluating EM bond sensitivities.

The results of the analysis also indicate a clear relationship between the control variables and emerging market sovereign bond indices. Specifically, the VIX index, which measures global market volatility and investor sentiment, has a negative impact on both USD-denominated and local currency-denominated bond prices. This suggests that as market volatility increases and risk appetite declines, the prices of emerging market bonds tend to fall, reflecting a shift toward safer assets. On the other hand, the emerging market currency index shows a positive relationship with bond prices, indicating that stronger emerging market currencies relative to the U.S. dollar generally lead to higher bond prices.

Furthermore, the magnitude of the coefficients highlights that USD-denominated bonds are more sensitive to both the VIX index and the currency index compared to local currency bonds. This heightened sensitivity suggests that fluctuations in global risk sentiment and exchange rates have a greater impact on bonds denominated in USD, likely due to the direct connection between U.S. monetary policy, dollar strength, and the cost of servicing dollar-denominated debt. In contrast, local currency bonds appear to be less affected by these factors.

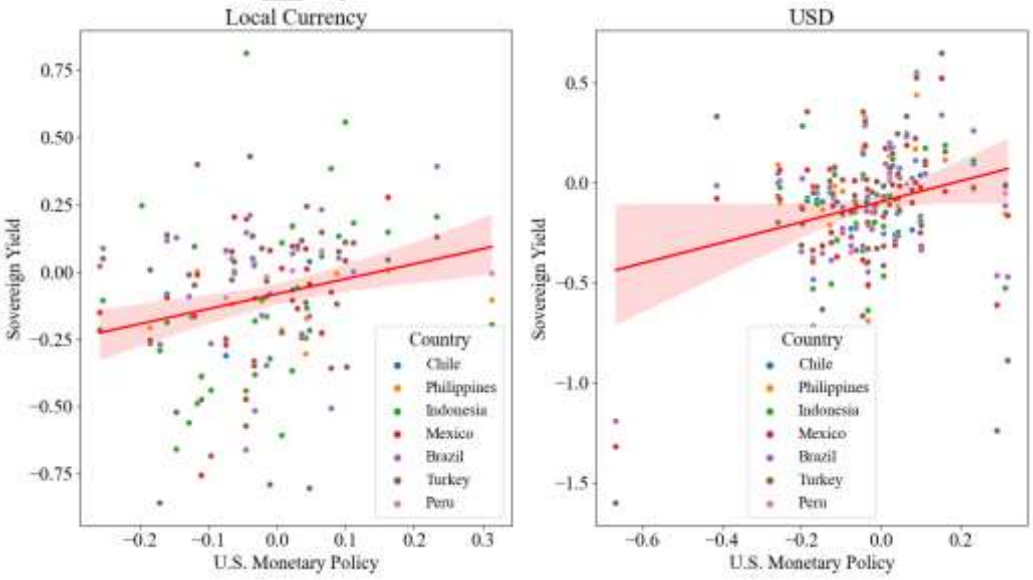

Figure 3: Monthly Change of 10-year Sovereign Yield and U.S. Monetary Policy (%). Ordered by the 4 monetary periods QE08, QT13, QE19, QT21 respectively.

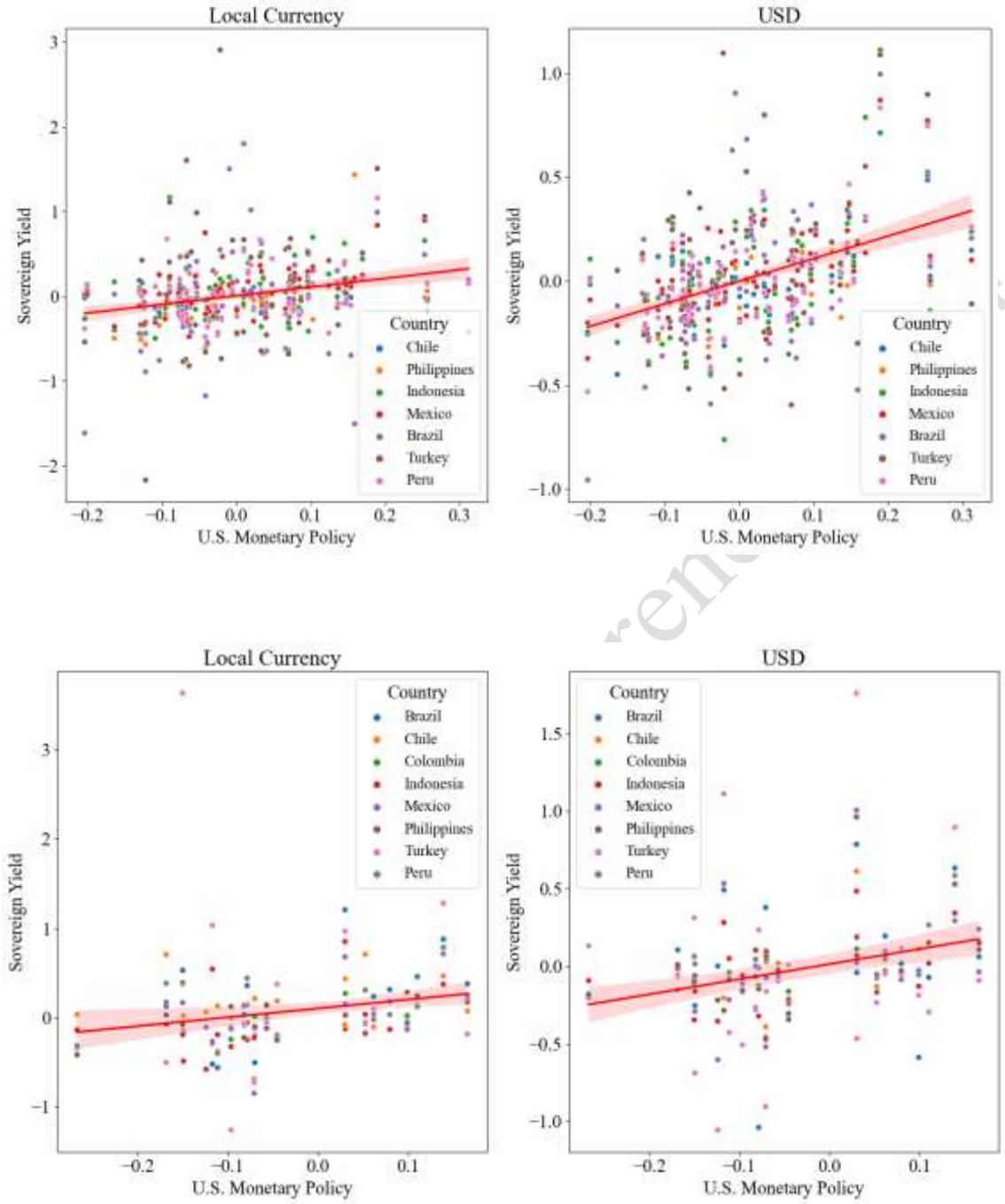

Figure 3: Monthly Change of 10-year Sovereign Yield and U.S. Monetary Policy (%). Ordered by the 4 monetary periods QE08, QT13, QE19, QT21 respectively. (Cont.)

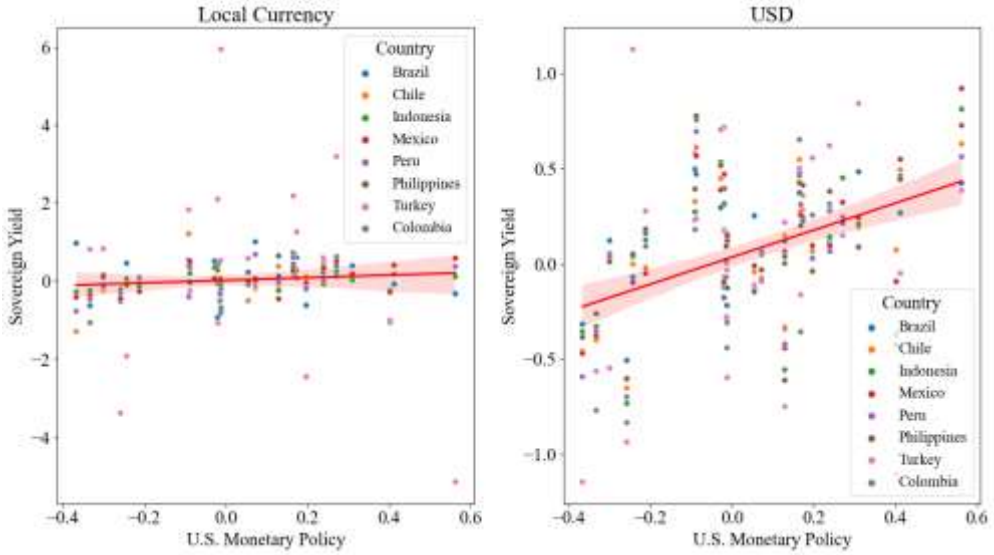

Figure 3: Monthly Change of 10-year Sovereign Yield and U.S. Monetary Policy (%). Ordered by the 4 monetary periods QE08, QT13, QE19, QT21 respectively. (Cont.)

The dot graphs depicting monthly changes in 10-year sovereign yields of emerging countries and the decomposed changes in 10-year U.S. treasury yields elucidate the relationship between these variables across distinct monetary policy regimes. The linear regression lines indicate a weaker correlation between local currency sovereign yields and U.S. monetary policy compared to that of USD-denominated sovereign yields. Additionally, the graphs suggest that the correlation between USD-denominated sovereign yields and U.S. monetary policy seems more pronounced during periods of monetary tightening. In contrast, this correlation is less discernible in yields denominated in local currencies. These preliminary observations are consistent with the documented impacts of U.S. monetary policy on emerging market bond prices.

The final notable observation from the dot graphs is the clear positive relationship between local currency sovereign yields and U.S. monetary policy from 2008 to 2013. However, this correlation weakens progressively over time. By the period from 2021 to 2023, the slope of the regression trend line approaches zero, indicating a near disappearance of this correlation. This implies that the borrowing costs in local currency for emerging countries are no longer influenced by shifts in U.S. monetary policy. This change can be attributed to evolving market structures and the increasing resilience of emerging economies to external financial shocks. The trend suggests that emerging markets are possibly developing deeper, more robust local financial markets that are less susceptible to the direct spillover effects of U.S. monetary policies (Burger et al., 2017). Moreover, domestic factors such as the quality of regulatory frameworks and the credibility of central banks in the emerging markets themselves are becoming more influential, suggesting a diminishing direct impact from U.S. policy shifts on these markets (Shaghil et al., 2021).

Table 3: The Regression Results of the impact on sovereign yields

(a) Local currency-denominated 10-year sovereign yield

	Brazil	Chile	Colombia	Indonesia	Mexico	Peru	Philippines	Turkey
MP	0.803***	0.871***	0.937***	0.600***	0.819***	0.676***	0.854***	0.588**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.024)
VIX	-0.046***	-0.013***	-0.003	-0.000	-0.034	0.007	-0.054**	-0.013***
	(0.003)	(0.002)	(0.837)	(0.990)	(0.186)	(0.722)	(0.030)	(0.002)
Bid-Ask LC 10Y	0.000	2.097	0.015	0.043**	0.014	0.041**	0.036	2.170
	(0.991)	(0.299)	(0.304)	(0.021)	(0.451)	(0.028)	(0.135)	(0.119)
SovSpread LC 10Y	0.517***	0.009***	0.276***	0.182***	0.212***	0.224***	0.289***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
XR	-0.022	-0.009	-0.024	-0.032	0.028	-0.012	-0.019	-0.003
	(0.301)	(0.419)	(0.196)	(0.105)	(0.433)	(0.526)	(0.427)	(0.779)
XR_VOL	0.027*	0.030	-0.008	-0.016	-0.016	-0.008	0.005	0.009
	(0.050)	(0.389)	(0.538)	(0.388)	(0.518)	(0.676)	(0.788)	(0.414)
CPI	0.009	-0.001	0.013	-0.021	0.009	0.017	-0.018	0.003
	(0.653)	(0.918)	(0.507)	(0.189)	(0.699)	(0.466)	(0.583)	(0.436)
Unemployment	0.006	-0.005	0.004	-0.025	-0.023	0.018	0.023	0.025
	(0.715)	(0.931)	(0.746)	(0.147)	(0.288)	(0.416)	(0.280)	(0.318)
PolicyRate	-0.005	0.132*	-0.017	0.037**	-0.011	-0.001	0.020	0.005
	(0.793)	(0.072)	(0.280)	(0.018)	(0.608)	(0.979)	(0.568)	(0.780)
FXReserve	0.004	0.141	-0.015	-0.003	-0.035	0.016	0.022	0.154
	(0.827)	(0.200)	(0.373)	(0.885)	(0.113)	(0.611)	(0.329)	(0.138)
GeoPolRisk	0.000	-0.669	0.013	0.026*	0.012	-0.019	0.004	0.047
	(0.990)	(0.645)	(0.327)	(0.067)	(0.381)	(0.272)	(0.839)	(0.692)
GDP	-0.005	-0.003	0.011	-0.032	-0.023	0.016	-0.015	0.008
	(0.840)	(0.472)	(0.573)	(0.275)	(0.295)	(0.592)	(0.616)	(0.246)
Debt-to-GDP	-0.051**	-0.064	-0.028*	-0.025	0.029*	0.007	-0.035	0.060
	(0.026)	(0.163)	(0.065)	(0.316)	(0.066)	(0.795)	(0.209)	(0.553)
CABalance	-0.004	0.007	0.014	0.007	-0.015	-0.003	-0.026	-0.060**
	(0.796)	(0.725)	(0.326)	(0.663)	(0.208)	(0.894)	(0.163)	(0.016)
Lag1	-0.005	0.108	0.030**	0.013	0.047**	0.036*	0.025	-0.031
	(0.742)	(0.182)	(0.030)	(0.399)	(0.031)	(0.069)	(0.243)	(0.571)
Lag2		-0.066						
		(0.433)						
const	-0.018	0.013	-0.033**	-0.021	0.009	0.018	-0.028	-0.086*
	(0.183)	(0.785)	(0.012)	(0.124)	(0.513)	(0.269)	(0.112)	(0.089)
Observations	127	71	104	101	151	93	39	128
Adjusted R-squared	0.924	0.767	0.86	0.757	0.717	0.74	0.915	0.969

*** p<0.1, ** p<0.05, *** p<0.01**

(b) USD-denominated 10-year sovereign yield

	Brazil	Chile	Colombia	Indonesia	Mexico	Peru	Philippines	Turkey
MP	0.793***	0.872***	0.778***	0.786***	0.674***	0.697***	0.868***	0.654***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VIX	-0.037**	-0.007	-0.037	-0.038	-0.018	-0.004	-0.023	-0.012***
	(0.015)	(0.128)	(0.187)	(0.604)	(0.337)	(0.897)	(0.660)	(0.007)
Bid-Ask USD 10Y	0.028*	3.013**	0.010	0.026	0.007	0.047**	0.004	2.312
	(0.057)	(0.024)	(0.523)	(0.492)	(0.580)	(0.021)	(0.927)	(0.196)
SovSpread USD 10Y	0.246***	0.007***	0.187***	0.195***	0.170***	0.130***	0.302***	0.009***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
XR	-0.004	-0.010	-0.033*	0.015	-0.009	0.008	0.013	-0.007
	(0.803)	(0.153)	(0.057)	(0.703)	(0.614)	(0.757)	(0.650)	(0.180)
XR_VOL	0.025*	-0.015	-0.010	0.011	-0.027*	0.000	-0.031	0.006
	(0.055)	(0.516)	(0.528)	(0.753)	(0.071)	(0.991)	(0.284)	(0.424)
CPI	-0.004	-0.001	0.008	-0.023	0.016	0.007	0.042	0.001
	(0.800)	(0.909)	(0.744)	(0.366)	(0.309)	(0.804)	(0.208)	(0.211)
Unemployment	0.003	0.006	0.012	-0.038	-0.018	-0.011	-0.109***	0.003
	(0.849)	(0.912)	(0.344)	(0.201)	(0.158)	(0.608)	(0.001)	(0.882)
PolicyRate	-0.000	0.056	-0.046**	0.035	-0.002	0.003	-0.049	0.004
	(0.999)	(0.234)	(0.023)	(0.206)	(0.903)	(0.908)	(0.163)	(0.639)
FXReserve	-0.002	0.030	-0.007	0.017	-0.043**	0.008	0.024	0.027
	(0.928)	(0.641)	(0.643)	(0.522)	(0.024)	(0.781)	(0.550)	(0.662)
GeoPolRisk	0.002	0.085	0.001	0.020	0.007	-0.006	-0.040	0.018
	(0.895)	(0.929)	(0.924)	(0.562)	(0.551)	(0.800)	(0.122)	(0.794)
GDP	-0.019	0.003	-0.003	-0.029	-0.025	-0.011	0.016	0.001
	(0.392)	(0.556)	(0.890)	(0.600)	(0.206)	(0.718)	(0.763)	(0.897)
Debt-to-GDP	-0.041*	-0.054	-0.022	-0.015	0.028*	0.001	0.010	0.003
	(0.081)	(0.114)	(0.116)	(0.727)	(0.085)	(0.982)	(0.814)	(0.941)
CABalance	0.001	0.020	0.023	0.006	-0.010	-0.011	-0.020	-0.024*
	(0.952)	(0.153)	(0.174)	(0.744)	(0.427)	(0.580)	(0.443)	(0.093)
Lag1	0.025*	0.280***	0.017	0.016	0.035**	0.076***	0.071**	0.001
	(0.067)	(0.000)	(0.410)	(0.491)	(0.012)	(0.001)	(0.023)	(0.991)
Lag2			-0.011		-0.028**	-0.027		-0.083**
			(0.482)		(0.037)	(0.112)		(0.046)
const	0.015	-0.006	-0.035**	0.005	-0.003	0.015	0.034	-0.034
	(0.231)	(0.860)	(0.013)	(0.813)	(0.823)	(0.392)	(0.144)	(0.270)
Observations	140	124	132	98	169	92	51	174
Adjusted R-squared	0.774	0.6	0.682	0.68	0.651	0.684	0.748	0.858

*** p<0.1, ** p<0.05, *** p<0.01**

(c) Local currency-denominated 2-year sovereign yield

	Brazil	Chile	Colombia	Indonesia	Mexico	Philippines	Turkey
MP	0.453***	0.456***	0.408***	0.567***	0.513***	0.660***	0.331***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.003)
VIX	-0.057	-0.012	-0.004	-0.045**	-0.027	-0.086***	-0.001
	(0.222)	(0.259)	(0.710)	(0.037)	(0.359)	(0.001)	(0.811)
Bid-Ask LC 2Y	0.009	3.784*	0.034**	0.067***	0.010	0.147***	1.048***
	(0.574)	(0.080)	(0.011)	(0.000)	(0.472)	(0.000)	(0.001)
SovSpread LC 2Y	0.490***	0.009***	0.239***	0.278***	0.190***	0.242***	0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
XR	0.014	-0.002	-0.005	-0.004	0.013	-0.051**	-0.002
	(0.445)	(0.791)	(0.788)	(0.854)	(0.702)	(0.025)	(0.822)
XR_VOL	0.015	0.008	0.001	-0.001	-0.011	-0.006	-0.004
	(0.227)	(0.728)	(0.920)	(0.977)	(0.593)	(0.757)	(0.586)
CPI	0.039**	0.013	-0.010	0.017	0.043**	-0.001	0.004*
	(0.036)	(0.157)	(0.714)	(0.337)	(0.046)	(0.967)	(0.062)
Unemployment	-0.024	-0.021	-0.002	-0.023	-0.015	0.000	-0.002
	(0.169)	(0.570)	(0.901)	(0.288)	(0.326)	(0.991)	(0.872)
PolicyRate	0.012	0.092	-0.002	0.059***	0.023	-0.027	0.000
	(0.537)	(0.311)	(0.874)	(0.002)	(0.273)	(0.449)	(0.973)
FXReserve	-0.016	0.038	-0.019	-0.021	0.001	0.003	-0.020
	(0.379)	(0.647)	(0.280)	(0.271)	(0.957)	(0.929)	(0.738)
GeoPolRisk	-0.006	-0.383	-0.005	0.050***	0.000	0.006	-0.040
	(0.742)	(0.706)	(0.623)	(0.003)	(0.979)	(0.764)	(0.689)
GDP	0.011	-0.000	-0.009	-0.038	0.012	0.109***	0.001
	(0.635)	(0.966)	(0.579)	(0.263)	(0.477)	(0.008)	(0.862)
Debt-to-GDP	0.004	-0.018	-0.016	-0.044*	0.013	0.046*	0.005
	(0.861)	(0.666)	(0.143)	(0.090)	(0.300)	(0.084)	(0.945)
CABalance	-0.011	-0.011	0.004	0.009	0.001	-0.069***	-0.018
	(0.494)	(0.542)	(0.724)	(0.604)	(0.946)	(0.003)	(0.303)
Lag1	-0.018	0.092	0.012	-0.029	0.024	0.049**	0.014
	(0.315)	(0.109)	(0.493)	(0.107)	(0.219)	(0.028)	(0.439)
Lag2				-0.001			
				(0.939)			
const	0.000	-0.057	-0.045***	-0.017	0.030**	0.029	-0.037
	(0.994)	(0.111)	(0.000)	(0.238)	(0.011)	(0.100)	(0.241)
Observations	140	116	88	92	151	51	122
Adjusted R-squared	0.935	0.909	0.91	0.816	0.779	0.868	0.99

*** p<0.1, ** p<0.05, *** p<0.01**

(d) USD-denominated 2-year sovereign yield

	Brazil	Chile	Indonesia	Mexico	Philippines	Turkey
MP	0.455***	0.689***	0.518***	0.291***	0.466**	0.583***
	(0.000)	(0.001)	(0.000)	(0.009)	(0.017)	(0.000)
VIX	-0.044***	-0.004	-0.013	-0.025	-0.005	-0.010
	(0.008)	(0.544)	(0.564)	(0.404)	(0.886)	(0.370)
Bid-Ask USD 2Y	0.113***	-0.256	0.010	5.174***	0.031	0.813**
	(0.000)	(0.706)	(0.591)	(0.000)	(0.289)	(0.012)
SovSpread USD 2Y	0.293***	0.006***	0.170***	0.754***	0.224***	0.009***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
XR	0.041**	0.009	0.001	0.017	0.025	-0.010*
	(0.011)	(0.478)	(0.976)	(0.424)	(0.340)	(0.072)
XR_VOL	0.023*	0.051	0.013	-0.024	0.022	-0.001
	(0.100)	(0.162)	(0.460)	(0.160)	(0.335)	(0.904)
CPI	0.063***	0.012	0.017	0.032	0.054	0.002*
	(0.001)	(0.274)	(0.346)	(0.198)	(0.127)	(0.080)
Unemployment	-0.014	-0.041	-0.027	-0.020*	0.014	0.014
	(0.406)	(0.500)	(0.140)	(0.069)	(0.524)	(0.503)
PolicyRate	-0.011	0.095	0.029*	0.011	-0.025	-0.005
	(0.521)	(0.376)	(0.081)	(0.604)	(0.506)	(0.580)
FXReserve	-0.026	0.151	-0.036**	-0.017	-0.044	-0.068
	(0.196)	(0.279)	(0.050)	(0.379)	(0.194)	(0.239)
GeoPolRisk	-0.017	0.163	0.018	-0.003	-0.005	0.079
	(0.198)	(0.904)	(0.270)	(0.854)	(0.820)	(0.282)
GDP	-0.024	0.001	-0.041	0.006	0.041	0.007*
	(0.313)	(0.796)	(0.206)	(0.737)	(0.119)	(0.086)
Debt-to-GDP	-0.003	-0.037	-0.053*	0.005	0.025	-0.031
	(0.899)	(0.453)	(0.071)	(0.718)	(0.345)	(0.444)
CABalance	-0.009	-0.029	0.008	0.001	-0.010	-0.010
	(0.495)	(0.300)	(0.637)	(0.970)	(0.702)	(0.491)
Lag1	0.007	0.165	0.060***	-0.010	0.073***	0.019
	(0.619)	(0.218)	(0.007)	(0.742)	(0.004)	(0.582)
Lag2			-0.049***			
			(0.008)			
const	0.012	-0.049	0.033**	0.493***	0.058***	-0.064**
	(0.359)	(0.335)	(0.019)	(0.000)	(0.007)	(0.043)
Observations	104	46	101	139	57	119
Adjusted R-squared	0.792	0.676	0.731	1	0.728	0.959

*** p<0.1, ** p<0.05, *** p<0.01**

The coefficient on U.S. monetary policy expectations, after controlling for currency, inflation, liquidity, and other relative indicators, provides a clear indication of how anticipated changes in U.S. monetary policy stance influence EM sovereign yields. It primarily reflects the impact of U.S. monetary policy through an information channel. A positive coefficient suggests that higher expected U.S. rates, or tightening monetary policy, lead to higher EM yields, reflecting increased risk premiums, capital outflows, and potential tightening of domestic monetary policy in EMs to stabilize their currencies and control inflation.

The regression analysis assessing the effects of changes in U.S. monetary policies on both 10-year and 2-year sovereign yields in various emerging countries reveals significant findings. The results indicate a notable positive impact on sovereign yields of different durations, denominated in both USD and local currencies, for all countries in the sample. Remarkably, the magnitude of this impact is consistently higher on 10-year sovereign yields compared to 2-year yields across all countries studied. This observation aligns with the findings of Gilchrist et al. (2016), who examined the spillover effects of U.S. monetary policy on advanced economies. They found that U.S. monetary policy has a mixed effect on short-term interest rates in advanced foreign economies but a significantly larger effect on long-term foreign bond yields, resulting in a flattening of the yield curve in those countries. Similarly, the regression results suggest that U.S. monetary policy can also have a flattening effect on the yield curve in emerging economies. This highlights the pervasive influence of U.S. monetary policy across global financial markets, affecting both advanced and emerging economies in terms of their sovereign yield structures.

When analyzing the influence of U.S. monetary policy on 10-year and 2-year sovereign bond yields denominated in both USD and local currencies, the differences become quite apparent across various emerging market economies. For 10-year sovereign yields, U.S. monetary policy exerts a more substantial influence on USD-denominated yields compared to local currency-denominated yields in Indonesia and Turkey. Conversely, for Colombia and Mexico, the impact is more pronounced on local currency-denominated yields. For other countries in the sample, the impact remains relatively similar between USD and local currency-denominated yields.

In the case of 2-year sovereign yields, the pattern of influence shifts somewhat. The U.S. monetary policy has a significantly higher impact on USD-denominated 2-year yields for Chile and Turkey. In contrast, Indonesia, Mexico, and the Philippines experience a greater influence on their local currency-denominated yields. Brazil, however, exhibits a similar impact on both USD and local currency-denominated yields. This differentiation underscores the varying degrees of sensitivity that emerging market economies have to U.S. monetary policy, contingent upon the denomination of the yields. There is no evidence that the local currency-denominated bond yield is less susceptible to the change of the U.S. monetary policy compared with the USD-denominated sovereign yield.

Emerging markets are more susceptible to U.S. monetary policy changes compared to advanced economies due to the pronounced impact on global investors' risk perceptions (Kalemli-Özcan, 2019). Gilchrist et al. (2018) find that the sensitivity of USD-denominated borrowing cost is determined by the relative amount of U.S. dollars held in the emerging economies' foreign exchange reserves. Another research indicates that the vulnerability of emerging economies to global financial shocks is linked to the specific structural characteristics of the countries and markets involved (Özker, 2021). Zehri et al. (2024) argue that emerging market economies with strong GDP growth rates and positive trade balances are less vulnerable to the spillover effects of U.S. monetary policy changes.

The regression result also indicates that the sovereign spread is a significant determinant of sovereign yields across all countries studied, irrespective of the currency denomination (USD or local currency) and bond duration (2-year or 10-year). This significance suggests that the sovereign spread effectively captures the risk premiums associated with each

country, reflecting the varying degrees of perceived credit risk by investors. The sovereign spread, as a control variable, significantly affects borrowing costs by incorporating the risk premium investors demand for holding a country's debt. Higher sovereign spreads indicate higher risk premiums, leading to increased borrowing costs for governments.

Another significant control variable is liquidity, measured by the bid-ask spread, in determining sovereign yields. Liquidity is a critical factor for bond markets, and the bid-ask spread serves as a proxy for liquidity costs. A higher bid-ask spread indicates lower liquidity, meaning that it is more costly and difficult to trade the bond without affecting its price. The results show that for some countries, the bid-ask spread is a significant determinant of sovereign yields. Specifically, higher bid-ask spreads are associated with higher sovereign yields. This relationship indicates that as liquidity decreases (i.e., the bid-ask spread increases), the yield on sovereign bonds rises to compensate investors for the additional liquidity risk.

Conclusion

This research applied high-frequency data to assess the effects of U.S. monetary policy on the sovereign bond prices of emerging economies. Furthermore, autocorrelated regression models were employed to evaluate the impact on sovereign bond yields with 2-year and 10-year maturities, denominated in both USD and local currencies, for selected emerging countries. The findings suggest that U.S. monetary policy significantly influences emerging market bond prices and sovereign yields.

For bond prices, the impact of U.S. monetary policy is more pronounced on USD-denominated sovereign bonds compared to local currency bonds, with the effects being particularly strong during periods of tightening monetary policy. However, when examining sovereign yields across different countries, the impact varies, and there is no consistent evidence that local currency sovereign bond yields are less affected. A notable finding is that the impact on 2-year sovereign yields is relatively lower compared to 10-year yields, suggesting that tightening U.S. monetary policy flattens the yield curve of emerging economies. The dot plot analysis indicates a potential trend of decreasing the impact of U.S. monetary policy stance on local currency-denominated bond yields in emerging markets, though this observation requires further research with more comprehensive data.

The findings of this study highlight the critical need for market participants to diversify their bond portfolios, balancing between USD-denominated and local currency bonds to mitigate the sensitivity to U.S. monetary policy, especially during tightening cycles. For EMEs, strengthening domestic financial markets to reduce reliance on foreign-denominated debt can enhance financial market stability and resilience. Additionally, enhanced monitoring and forecasting capabilities using high-frequency data and advanced econometric models are crucial for anticipating and mitigating the adverse impacts of U.S. monetary policy shifts. Furthermore, international coordination and support from financial institutions can provide a safety net during periods of significant U.S. monetary tightening. Governments should also consider diversifying their debt issuance strategies to balance short-term and long-term financing needs, leveraging the relative stability of short-term yields while managing the risks associated with long-term debt. Enhanced communication and transparency in monetary policy can further insulate emerging markets from the spillover effects of U.S. monetary policy changes, ensuring more predictable and stable economic environments. Lastly, focusing on

long-term economic policies that improve creditworthiness and reduce risk premiums is essential for sustaining financial stability and sustainable growth amidst global financial interdependencies.

Future research should focus on the evolving patterns of U.S. monetary policy impacts on sovereign yields in emerging markets. A particular emphasis on the decreasing sensitivity of local currency-denominated bonds, as suggested by preliminary findings, could provide deeper insights. Additionally, expanding the dataset and incorporating more countries could enhance the robustness and generalizability of the results.

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