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The Impact of Fluctuations in External Financing Sources on Gross National Income in Developing Countries Amid International Economic Crises (An Econometric Study of a Sample of Developing Countries for the Period between 1985-2021)

Mohamed Lahcene Allaoui[1], Saida Drid[2]

[1,2]Faculty of Economics, Management and Commercial Sciences, University of Kadi Merbah-Ouargla, Algeria.

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Abstract:

This study aims to elucidate the nature and magnitude of the relationship between Gross National Income (GNI) in developing countries and external sources of financing, in the context of successive international economic crises over the past three and a half decades, within an international economic system characterized by imbalances in safeguarding the interests of all parties equally. To achieve the objectives of the study, the descriptive methodology was employed to diagnose the phenomena under examination and clarify their manifestations, along with an analytical approach to identify the economic impact of the crises under study on GNI in developing countries, focusing on the effects on external financing sources. Additionally, an econometric study was conducted on a sample of 60 developing countries for the period 1985-2021, utilizing panel data through Quantile Regression (QR). The results of the study concluded that developing countries are typically in urgent need of external financing, which is negatively impacted by international economic crises, thereby influencing the GNI in these economies. The study's findings also indicated a disparity in the effects of external financing sources on developing economies during crises, where export revenues, official aid, and remittances exhibited positive effects, while foreign direct investment, indirect investment, and total loans had negative effects.

Keywords: Economic Crisis, External Financing, Developing Countries, Gross National Income.

I. Introduction: After World War II, there was an increasing international focus on economic development issues, as the advanced countries emerged from the war in ruins. They had to devise policies and strategies for reconstruction, while most developing countries were still colonies that had their resources and material and human capacities plundered to benefit the colonial powers. This situation left these developing economies in a state of economic and social backwardness. Over time, and with the evolution of economic thought, economic theorization began to develop models and theories that suited the specificities of developing countries, which, upon gaining independence, faced major challenges regarding economic development.

In the early 1980s, the debt crisis exploded, becoming one of the most significant challenges hindering development in the developing countries at that time. As a result, these countries resorted to borrowing, which forced them to adopt the policies and programs dictated by international financial and monetary institutions. These policies emphasized structural adjustment programs, privatization, trade and financial liberalization, and other strategies, with these institutions being recognized as tools of financial globalization, which further integrated developing countries into the global economy.

A historical review of the global economy reveals the repeated occurrence of economic crises, which have become a worrisome phenomenon that cannot be avoided, regardless of the adopted system. Each crisis has its own characteristics and transmission channels, often resulting in adverse effects on the economic and social conditions of countries, potentially leading to political problems, especially in poor countries. It is also notable that these crises tend to spread across countries both regionally and globally due to the increasing interconnection and intertwining of international economic relations. From the premise that international

economic crises have negative effects on external sources of financing for development in developing economies, the following research question arises:

I.1. Research Problem: While developing countries strive to meet the requirements of stimulating economic growth, reducing poverty, and developing infrastructure, external shocks caused by international economic crises impact their Gross National Income, especially through external financing sources. These sources are influenced by changes in international capital movements and their structure, compelling developing countries to reassess their policies and strategies to maintain internal and external balance. Thus, the main research question can be posed as follows: To what extent do fluctuations in external financing sources affect the Gross National Income of developing economies during international economic crises between 1985 and 2021?

This main research question leads to the following sub-questions:

- To what extent do economic crises affect external sources of development financing in developing countries?
- Is external financing for development entirely positive for developing countries during economic crises?
- Do developing countries have the ability to choose among external financing sources?

I.2. Objectives of the Study: The aim of this research is to highlight the impact of international economic crises on the external financing sources of developing countries and to clarify how these crises affect their Gross National Income, thus disrupting economic development. The study will assess the effectiveness of external financing for economic development in the study sample, both during normal conditions and the economic crises experienced during the study period. Additionally, it will explore the strategic importance of each external financing source for developing countries during crises, considering different income levels (low income, middle income, and high income countries). The issue will be addressed through three main axes: The first axis will define the sources of external financing for economic development; the second will explain the concept of international economic crises and their effects on developing countries; and the third will present an econometric model for the subject under discussion.

I.3. Significance of the Study: Financing is one of the most critical challenges faced by developing countries in their efforts to accelerate economic development. It enables increased investments of various types, strengthens infrastructure, combats poverty, improves living standards, achieves high growth rates, ensures fair income distribution, and enhances overall well-being, among other positive outcomes that developing countries strive for over decades. It is notable, however, that economic crises can reverse the developmental trajectories of developing economies by a whole decade, particularly through their impact on various sources of financing.

Thus, the proposed study holds significant importance as it highlights the grave impact that economic crises sweeping the global economy have on the development path of developing countries. These crises are often caused by advanced economies, and the study sheds light on how to prevent the collapse of development financing in developing countries during these crises. It also examines the key financing sources that need to be prioritized in order to support developing economies in such challenging times.

I.4. Previous Studies:

- **ECLAC Study (March 2021)**, titled *Financing for Development in the Era of COVID-19 and Beyond*: This study aimed to clarify the necessary political measures to address the challenges imposed by the COVID-19 pandemic and to focus on potential initiatives for better progress. The study highlighted how Latin America and the Caribbean were severely impacted by the crisis, with a greater contraction in investment relative to GDP compared to other developing regions. The pandemic's effects led to increased liquidity needs for the countries in the region to deal with the emergency, resulting in a significant rise in debt levels, making the region the most indebted in the developing world. The study employed a descriptive and analytical approach, using a range of tables and charts for analysis. The findings showed that the pandemic significantly widened the financing gap in the region and that the sharp decline in investment would constrain capital accumulation and the economic

capacity of the region for at least a decade. By the end of 2020, the per capita GDP was equal to the level of 2010.

- **OECD Study (June 2020)**, titled *Impact of the Coronavirus Crisis on Financing of Development*: This study aimed to clarify the major setbacks in sustainable development financing in emerging economies and developing countries due to the COVID-19 crisis. The study's core issue revolved around how to prevent the collapse of development financing, which could jeopardize the achievement of Sustainable Development Goals (SDGs). The study operated on the hypothesis that the global context during the COVID-19 crisis involved a significant risk of a reduction in available financing for developing economies. Using a descriptive and analytical approach, the study concluded that the COVID-19 pandemic caused severe setbacks in sustainable development financing due to the decline in economic activity within the countries, leading to a reduction in their domestic resources, as well as a decrease in various flows of external financing.

- **Bruno Gurtner Study (2011), titled: *Comment financer le développement après la crise économique et financière*:** This study aimed to shed light on how development financing was addressed after the global economic and financial crisis of 2008, with a return to global economic growth despite the varying recovery processes across different regions. The significance of the study lies in clarifying the various economic and social repercussions of the 2008 global financial crisis on countries around the world, whether industrial, emerging, developing, or those in transition. The study also discussed the need for reforming the global financial system and how such reforms failed to have a sufficient impact on developing countries, despite the increasing resources of international financial institutions. Furthermore, the study emphasized the importance of taxation as a tool for state-building, democracy, and good governance, highlighting it as one of the most significant sources used in financing development. The study also stressed the necessity of international cooperation in combating tax evasion and illicit capital flows. Utilizing an analytical approach, the study concluded that the global financial crisis had more devastating effects on growth rates in developing or emerging countries than on those in industrialized nations. Emerging economies found their way to recovery quickly and became key drivers of global economic growth, while some other countries lacked the resources to finance recovery measures adequately. Additionally, the crisis led to setbacks for the poorest developing countries, which fell behind in achieving the Millennium Development Goals, with aid from rich countries falling far short of promises. The study recommended reforming tax systems to ensure that under an improved and more efficient tax system, poor countries during crises would have greater means to mobilize their own resources for financing public tasks, thus enhancing government responsibility towards citizens and promoting good governance.

- **Stephany Griffith-Jones & José Antonio Ocampo Study (2009), titled: *The Financial Crisis and Its Impact on Developing Countries*:** This study aimed to identify the mechanisms through which the 2008 global financial crisis spread from advanced economies to developing countries, offering broad recommendations on public policy that should be followed at global, regional, and national levels. The study's core issue was to assess the impact of the 2008 financial crisis on developing countries. By employing a descriptive approach, the study identified three main mechanisms that played a crucial role in transmitting the effects of the global financial crisis to the developing world: remittances, capital flows, and trade. It found that the primary channel for transmitting the crisis to exporters of goods and services was a decrease in trade volume, particularly affecting developing countries reliant on primary commodities, especially in Africa, the Middle East and North Africa, and Latin America. These countries were advised to redesign their trade strategies in the future to reduce dependence on primary commodities. The study also noted that the impact of private capital flows was more severe in emerging markets than in low-income countries with less integration into international private capital markets. Finally, the study proposed long-term reforms to address the global financial crisis and recommended establishing stronger mechanisms for financial and tax coordination globally.

II. External Financing for Economic Development (International Financing):

Developing countries often face insufficient local savings to adequately fund the investments needed to propel economic development forward and achieve progress across different developmental stages. As a result, developing countries resort to foreign capital from various sources to bridge the gap between savings and

investment. This is done through cross-border financing and international relations, which brings us to the concept of "international financing."

II.1. Concept of International Financing: International financing refers to the gap between the supply of capital in its various forms and the demand for it at the international level, which results in the movement of capital across countries. This process is facilitated by financial intermediaries such as banks, financial institutions, international financial markets, international bodies, and governments. Capital moves internationally in search of the highest possible returns by investing surplus funds. It can also serve credit, humanitarian, or even political purposes. The term "international financing" represents the mechanisms provided by the international economic system and its institutions (multilateral, official, and private) to facilitate the movement of international capital, whether for balancing payment imbalances or for development financing.

The significance of international financing, from the perspective of international economic relations, lies in its role in financing international trade in goods and services. Any decrease in the level of international liquidity to finance trade movements will lead to a contraction in international economic relations. In many countries, the external sector is considered a key driver of growth, and thus, a decrease in the size and activity of this sector will negatively affect growth rates, reduce the volume of production dedicated to exports, and diminish the volume of imported goods used for investment and consumption.

II.2. Sources of International Financing: The sources of international financing are as follows:

- **II.2.1. Export Earnings:** Economic historians agree that trade in the 19th century was a key driver of growth, not only because it helped allocate resources efficiently within countries but also because it transferred development from one part of the world to another. Trade is of significant importance in financing development, and it can increase developmental resources in four main ways:

1. **Specialization in Producing Goods with Comparative Advantage:** Trade enables a country to specialize in producing primary goods in which it has a comparative advantage, thus providing resources that can be directed towards investment purposes. This is known as "static trade gains," which lead to continuous growth in resources through population growth and increased productivity, generating a need to allocate these resources among different uses based on comparative advantages, which contributes to development financing.
2. **Disposal of Surplus Goods:** Trade provides a means for selling surplus goods, which, if unsold, would constitute a waste of resources. This is referred to as the "surplus disposal gain" from trade, and such surplus can be used for developmental purposes.
3. **Expansion of Productive Capacity:** Trade has a dynamic impact on a country's productive capacity through its effects on factors such as competition, acquiring new knowledge, technologies, ideas, and technical know-how. These are known as "dynamic trade gains."
4. **Imports as a Means to Increase Local Resources:** Trade allows countries to import goods that are either unavailable locally or are more productive than domestic resources, which can help alleviate local production bottlenecks. This will increase savings and investment. Therefore, exports can affect supply and demand, and this relationship should be considered when examining the link between exports and growth.

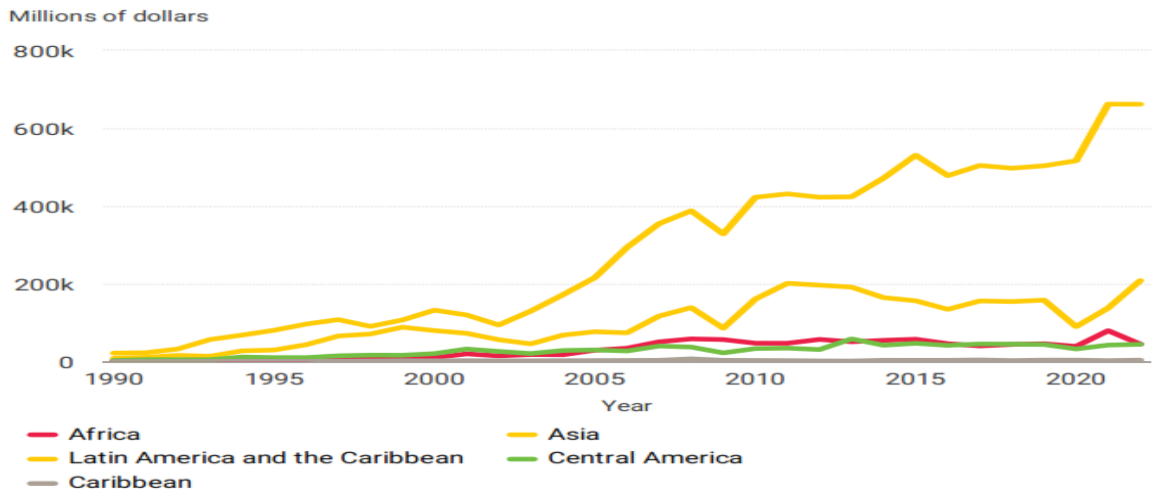
However, relying on exports to finance economic development in developing economies has some limitations due to the problem of declining terms of trade. Developing countries often trade on unfavorable terms, meaning the net benefits from international trade remain minimal. Over the long term, the terms of trade tend to work against developing countries, as demonstrated by studies like that of R. Prebisch. From 1953 through the 1950s and 1960s, policies of discrimination in international trade with developing countries were quite evident. The terms of trade remain volatile, influenced by global economic shocks. For example, in 2009, developing countries experienced a decline in terms of trade by 5.1% compared to 2008, a result of the 2008 global financial crisis.

II.2.2. Foreign Direct Investment (FDI): According to the standard set by the International Monetary Fund, foreign direct investment is defined as "when a foreign investor establishes a long-term relationship with a project and owns at least 10% or more of the project's capital shares," which grants the investor sufficient influence over the management of that project. The Organization for Economic Co-operation and Development (OECD) defines foreign direct investment as "involving the investor owning at least 10% of the total capital or voting power."

From the figure below, we observe that developing countries in Asia attract the largest share of incoming foreign direct investment, followed by Latin America, and then developing countries in Africa, Central America, and the Caribbean. The volume of these investments has been rising steadily from 1990 to 2022 across various regions worldwide, although some setbacks in investment flow were recorded in certain years, such as in 2009 and 2020, due to the financial and economic crises that occurred in those years.

"In 2022, the volume of foreign direct investment in developing countries amounted to $661,807 million in Asia, compared to $208,454 million in Latin America, $44,929 million in Africa, $44,480 million in Central America, and $3,916 million in the Caribbean region." This clearly shows that foreign direct investment is concentrated in the Asian region, rather than being spread evenly across the world. This concentration is attributed to the nature of the developing economies in each region, their ability to attract such investments, and the political stability present in each region.

Figure (1): Volume of Foreign Direct Investment Flowing to Developing Countries from 1990 to 2020



Source: https://unctad.org/data-visualization/global-foreign-direct-investment-flows-over-last-30-years, retrieved on: 2024/09/08 at 22:42

II.2.3. External Loans:

External loans refer to the funds that are borrowed by developing countries from various foreign lending sources based on prevailing financial and commercial rules in the market, with an agreement to repay them with interest. These loans are often sought due to the inadequacy of local funding to meet the financial needs of development projects, or when the revenue from exports, foreign direct investment, and aid is insufficient to cover these needs. External loans are also used to fill the balance of payments deficits or to facilitate international payments through international banks. These loans are often termed as "international loans" because they are transacted between countries, and the borrowing entity becomes liable for debt servicing.

II.2.4. External Aid:

External aid is defined as the total flow of capital from developed countries and international institutions to developing countries, following relaxed conditions compared to the standard financial and commercial rules in

international markets. This type of aid is designed to reduce the debt servicing burden on the recipient country. Economists define external aid as any capital flow to developing countries that meets two main characteristics:

1. The purpose of the aid should not be commercial from the donors' perspective.
2. It should be offered on preferential terms, such as lower interest rates and easier repayment terms than regular commercial financing.

External aid is considered one of the primary financial and economic relationships between developed industrialized nations and developing countries through what are called "development contracts" initiated by the United Nations in the 20th century. It is commonly referred to as Official Development Assistance (ODA), which includes grants and concessional loans, where the grant portion is no less than 25%. ODA also involves providing technical assistance and is based on the principle of supporting the economic development and welfare of developing countries. ODA plays a crucial role in providing funding to developing nations.

II.2.5. Remittances:

Remittances refer to the money or goods sent by migrants to their home countries to support their families. This process, known as migrant remittances, has grown rapidly and has become a major source of foreign income for many developing economies. According to the IMF's Balance of Payments Manual (5th edition), remittances are defined as the transfer of goods or financial assets from migrants or workers living abroad for a period of one year or more, to their families in their home country. These transfers fall under the category of income in the balance of payments.

Remittances are one of the most significant sources of external finance for developing countries, especially those with fragile or low-income economies. They contribute to supporting families, generating tax revenue (e.g., value-added tax, trade, and sales taxes), and financing trade balances. In this way, remittances help stabilize the economy of the recipient countries, providing a vital source of income and a cushion against external shocks.

III. International Economic Crises: Economic crises are considered one of the most significant phenomena that have characterized the history of the global economy. We will explain this concept as follows:

III.1. The Concept of Economic Crises: The term "economic crisis" has been used to describe a period of severe disruption in the business world, characterized by the collapse of credit and prices and the destruction of confidence. It refers to the simultaneous and overwhelming occurrence of the inability of independent entrepreneurs to repay their debts or fulfill their obligations. It is worth noting that Western economists use the term "cycle" instead of "crisis." The economic cycle is defined as "the regular movements in national economic activity measured by potential output based on productivity growth, or prices, or unemployment. The length of the cycle is measured from peak to peak, with an upward swing (upper turning point) or a downward swing (lower turning point). The types of cycles are classified based on their usual length and the type of investment that generated the cycle." Therefore, an economic crisis is a specific stage during which there is a violent upheaval in the economic situation, signaling the end of an expansion or growth phase. Short-term and long-term cycles can be distinguished. Short-term cycles are divided into major short cycles, which, according to French economist Clément Juglar, last between 8 and 11 years and are often referred to as "business cycles," and minor short cycles, which, according to American economist Joseph Kitchin, last between 3 and 5 years and are called "secondary cycles." As for long-term cycles, Russian economist Nikolai Kondratieff explained that these are long cycles lasting around half a century, known as the "long wave," ranging from 45 to 60 years. These cycles are usually associated with innovations that begin in a new industry. As such, the length of the cycle influences the type of investment associated with it, from inventories in the case of Kitchin's cycle, to fixed investments (such as factories and machinery) in Juglar's cycle, to major industries and infrastructure in Kondratieff's cycle.

The global economy has witnessed a considerable number of successive economic crises in various forms, which have been a noteworthy phenomenon deserving of attention and focus from researchers, especially during

the 1980s and 1990s. The economies of industrialized countries and emerging market economies (countries on the path of development and those transitioning to market economies) have been characterized by financial system liberalization, integration into the global market, and the reduction or elimination of restrictions on currency exchange rates and interest rates. This has led to destructive banking crises, with these crises taking on new characteristics, primarily caused by issues related to capital flows due to the liberalization of capital accounts without preparing systems for financial liberalization policies.

Currency crises were among the most widespread crises in the 1970s, with their occurrence increasing during the following two decades, followed by a decrease in the 2000s. The 1980s, however, were marked by the rise of various types of financial and economic crises, such as currency crises, banking crises, and balance of payments crises. This decade also saw the explosion of the external debt crisis. As a result of the adoption of various countries' policies to address external debt crises, the frequency of these crises decreased in the 1990s, a decade characterized by a sharp rise in banking crises, currency crises, and sudden expectations. This was due to the shift towards financial liberalization policies in many countries and the emergence of what is known as emerging economies. The 2000s, in turn, witnessed a noticeable increase in balance of payments crises (sudden expectations) compared to other types of crises.

III.2. Examples of Major Economic Crises with Global Impact on Developing Economies

III.2.1. The Global Debt Crisis: The main causes that contributed to the outbreak of the debt crisis in the 1980s can be attributed to the following:

- **Rising Oil Prices:** Global oil prices increased significantly during the 1970s, with several oil shocks occurring due to political and military reasons in 1973-1974 and 1979-1980. The real price of oil peaked in 1980, and as a result, large revenues from oil exports flowed into the Organization of Petroleum Exporting Countries (OPEC).
- **Recycling Oil Surpluses:** Oil-rich countries accumulated surpluses and were unable to immediately invest them in domestic industrial projects. Consequently, OPEC countries deposited their oil receipts, valued in US dollars, into accounts outside the United States. These massive deposits in euros and dollars became a major financial problem in the 1970s, known as the "recycling of oil dollars" or "petrodollar recycling."
- **Syndicated Loans:** Large international commercial banks that received OPEC funds decided to reinvest them in developing countries with promising growth prospects. They provided long-term syndicated (group) loans to developing countries rich in primary resources and promising industrial projects. During this time, commodity prices in countries like Brazil, Mexico, Korea, and Indonesia were continually rising, making investments seem highly profitable. Some developing countries were highly eager to take loans to support their development projects, assuming that oil prices would remain high for an extended period.
- **Misuse of Loans:** Loans were used to cover consumption costs rather than for productive investments, the mobilization of untapped resources, or maintaining a certain standard of living. Moreover, these loans were granted in an unstable global economic environment, as international economic relations worsened following the collapse of the Bretton Woods Agreement in 1971.
- **Global Recession:** The global economy entered a deep recession during 1981-1982, reducing demand for exports from developing countries. Coupled with rising interest rates during 1980-1982, it became impossible for developing countries to generate sufficient income to meet their loan repayments on time.
- **Policies of the U.S. Federal Reserve:** The U.S. Federal Reserve took measures to tighten the money supply, leading to a sharp rise in interest rates on the dollar, which reached 20% annually or higher. This caused severe economic slowdowns in both the U.S. and the global economy. The aim was to curb global inflation during the 1970s in the long term, but this process increased the pressure on debt-ridden developing countries in three ways: rising debt service payments due to higher dollar interest rates,

decreased demand for exports due to the global recession, and a deterioration in the terms of trade as commodity prices fell.

By 1981, the evidence of the error in lending expansion during the 1970s became clear. Interest rates rose, global demand for exports from developing countries dropped, and the world experienced a deep recession, making it impossible for developing nations to generate enough income to repay their loans on time. The crisis erupted when Mexico declared in August 1982, "We can no longer pay our debts," which sparked a global crisis. One by one, other debtor countries announced similar defaults.

The eruption of the debt crisis in the early 1980s led to several significant effects, including:

- **Deterioration of living standards** in debtor countries, exacerbated by large outflows of capital to service debt, with cumulative outflows since 1984 reaching nearly $120 billion.
- **The destruction of a decade of development** across debtor countries.
- **Increased political instability** and violence in debt-ridden countries, exacerbated by the decline in living standards.
- **Impact on developed countries**, particularly the United States, which saw a decline in imports from debtor countries (as these imports were also exports from developed countries). This led to a negative swing in their trade balances, with a $12 billion deficit from 1980 to 1986 in the U.S., $3 billion in Japan, $2.4 billion in Germany, and $1.6 billion in other European Economic Community countries.
- **Breakdown of the international financial system**, with deep crises of trust affecting banks in developed countries due to defaults by debtor nations.

III.2.2. The Global Financial Crisis of 2008:

The origins of the global financial crisis that the world witnessed in the third quarter of 2008 trace back several years before this date. It began with the expansion of American banks during the period from 2001 to 2006, which involved granting large-scale loans to individuals for purchasing real estate, with long repayment terms and interest rates that increased with the loan duration. Mortgage loans dominated housing finance in the United States and were considered a form of high credit due to their nature as traditional consumer loans. The immediate cause of the crisis was the expansion of subprime mortgage loans—loans granted to American households at high risk of default. These loans ignored the real income levels of the households (referred to as "bad loans").

As the value of real estate mortgages increased, this encouraged more borrowing, and banks began securitizing these loans, selling them to other investors. Lenders bet that rising property prices would allow them to sell properties and recover the loan amount and its interest. This led to the inflation of a real estate bubble, which grew steadily until, as the housing supply increased, prices began to fall, causing the bubble to burst.

Although the crisis originated in the U.S. housing market, it soon spread to the financial sector, leading to a financial crisis, and eventually affecting the real economy, transforming it into an economic crisis. What started as a U.S.-based crisis became a global financial crisis due to financial globalization and increased financial integration.

Developing countries were not responsible for the origin of the crisis, which emerged in the major financial centers of developed countries. However, these countries were gradually and severely affected, and the key impacts on them can be summarized as follows:

- Economic growth in developing and transitioning countries suffered more setbacks than in industrialized nations, which were the source of the crisis.
- The decline in economic growth led to a decrease in per capita income, especially in countries with high population growth rates. This had a direct impact on the living conditions of populations, as poverty

levels increased due to the decline in average income, particularly in developing, low-income, and southern countries.

- The crisis impacted the Millennium Development Goals in many developing countries.
- Social unrest occurred in some countries, such as Bulgaria, China, and Latvia.
- On a macroeconomic scale, the crisis manifested in increased trade and payments deficits, diminished currency reserves, currency devaluation, higher inflation rates, rising debt levels, and increasing budget deficits.
- The crisis formed a negative shock for investment in emerging markets, as portfolio investment decreased. The aversion to risk kept capital closer to home, and developing countries suffered from reduced trade exchange rates, particularly in commodity-exporting countries.
- Remittances sent to developing countries decreased due to the slowdown in labor markets, which negatively affected the earnings of foreign workers.
- Unlike previous major crises in developing countries, which were typically regional, the 2008 global financial crisis originated deep within the economies of developed countries. As a result, all developing regions around the world were adversely affected by these shocks, and this simultaneity increased the risks of a severe global recession at that time.

III.2.2. The COVID-19 Crisis of 2020:

The emergence of this crisis was linked to the COVID-19 disease caused by the SARS-CoV-2 virus, first discovered on December 31, 2019, after reports of viral pneumonia cases in Wuhan, China. The virus rapidly spread, and containing it presented numerous challenges. COVID-19 is an animal-origin virus that can spread easily, even if symptoms do not appear in infected individuals. It can lead to death, especially in the elderly and medically vulnerable populations. Consequently, social distancing measures were essential to save lives, and governments had to balance protecting citizens from the pandemic with ensuring access to income, food, and essential services. Immediate focus on an effective and swift strategy was critical, as failure to contain the virus would result in far higher health and economic costs. By March 2021, the death toll had reached approximately 1.3 million in the Americas, nearly 1 million in Europe, and 220,000 in Southeast Asia, with Africa recording the highest mortality rate.

Key Impacts of the COVID-19 Pandemic:

- **Impact on Global GDP:** The COVID-19 pandemic caused a sharp global recession, with 2020 seeing an unexpectedly deep contraction. Despite swift and varied policy responses in many countries, global GDP fell by 3.3% in 2020, three times the size of the contraction during the 2008 financial crisis, which was 2.8% in 2019.
- **Impact on Global Trade:** The World Trade Organization (WTO) estimated that global trade declined by 5.3% in 2020. However, trade started to recover in the first half of 2021. Some sectors were more affected than others, particularly fuel and metal products, which saw a 38% drop, while agricultural products decreased by 5%. The WTO also found that trade in services likely followed similar trends as trade in goods. By mid-May 2020, the WTO reported that 65 out of 93 trade-related measures taken due to the pandemic were aimed at facilitating trade, not restricting it.
- **Impact on International Financial Markets:** Financial markets were negatively impacted by the pandemic, as global stock indices plummeted. Countries temporarily closed their financial markets to control the atmosphere of uncertainty and fear and to prevent sharp declines. For example, the U.S. stock market lost $3.18 trillion in the first week of March 2020. European and Asian markets experienced losses ranging between $6 to $7 trillion. Fluctuations in the Dow Jones Industrial Average (DJIA) between February 14, 2020, and November 8, 2021, showed a loss of about one-third of its value from

February 14 to March 23, 2020, due to investor uncertainty and ambiguity. However, once expectations grew that the U.S. Congress would approve a $2 trillion spending package, the DJIA rebounded, gaining over 11% on March 24, 2020, and then experienced intermittent growth based on market responses to news about vaccine development.

- **Impact on Global Foreign Direct Investment (FDI):** The public policy measures implemented to control the spread of COVID-19 also had a negative effect on global FDI flows. According to UNCTAD, FDI flows plummeted by 40% in 2020, down from $1.54 trillion in 2019. This was the first time since 2005 that FDI fell below the $1 trillion mark. This decline was much worse than the 2008 financial crisis, when FDI fell to $1.2 trillion in 2009.

IV. Econometric Modeling of the Impact of International Economic Crises on Gross National Income (GNI) in Developing Economies (1985–2021)

In this section, we estimate the model that addresses the research question by using data from a sample of developing economies, analyzed with methods that combine time-series and cross-sectional data, known as **Panel Data**. Due to the limited availability of data for certain variables in some countries during the study period, **unbalanced panel models** are used, which help overcome the issue of missing data. To construct an accurate econometric model using one of the available estimation methods, the suitable models are described based on homogeneity testing, using models that allow for differing coefficients while considering data classification by income levels according to the 2021 World Bank classification for developing economies.

IV.1. Methodology and Tools:

In addition to the **descriptive** and **analytical** methods, an econometric study is conducted on a sample of 60 developing countries during the period (1985–2021) using panel data regression (QR). The variables used in the analysis include:

- **EXPT (Exports of goods and services)**
- **FDI (Foreign Direct Investment)**
- **NPI (Net Portfolio Investment)**
- **LOANS (Total loans)**
- **ODA (Official Development Assistance)**
- **REM (Remittances)**

The **Gross National Income (GNI)** is considered the dependent variable, while economic crises are modeled as binary (dummy) variables, assigned a value of **1** in the years when crises occurred and **0** in other years. The economic crises considered in the model are:

- Oil Crisis (1986)
- Wall Street Crisis (1987)
- Mexico Crisis (1994)
- Asian Tigers Crisis (1997)
- Russia Crisis (1998)
- Brazil Crisis (1999)
- Dot-com Bubble (2000)
- Turkey Crisis (2001)
- Global Financial Crisis (2008/2009)

- Eurozone Crisis (2010)
- Oil Crisis (2014/2015)
- COVID-19 Crisis (2020/2021)

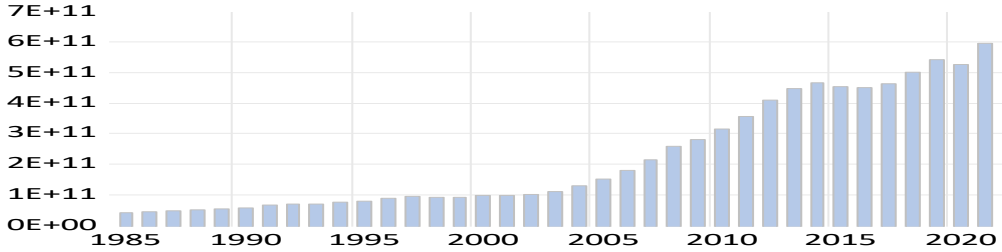
IV.2. Analytical and Statistical Study of the Variables:

IV.2.1. Analytical Study of the Variables:

This section focuses on analyzing the development of the **Gross National Income (GNI)**, which is the sum of the value added by all resident producers, plus any taxes on products (minus any subsidies not included in the product value) and net income from abroad (including compensation of employees and property income).

As shown in **Figure 02**, which represents the average changes in GNI for the study sample, there has been a general increase in average GNI during the study period. The total growth rate from 1985 to 2021 exceeded **1276%**, with considerable variation in income levels across developing countries.

Figure 2: Trends in the Average Gross National Income for the Period 1985–2021



Source: Prepared by the researchers using EViews 13.

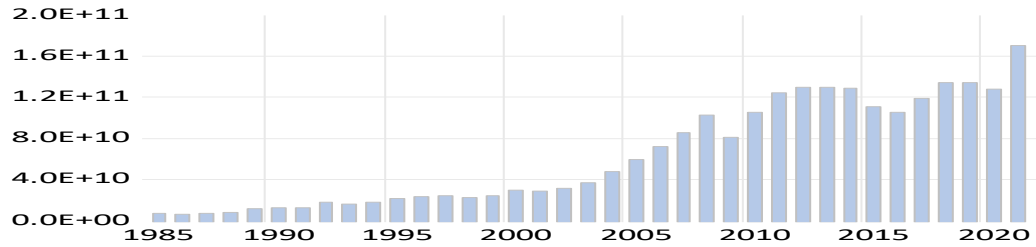
Analysis of Export Performance (Goods and Services):

As shown in **Figure 03**, which represents the average changes in exports of goods and services for the study sample, the average exports of these countries during the study period grew by **2210%** in USD. The data indicates a general upward trend with some minor fluctuations, particularly between **2008 and 2017**.

This increase suggests that developing countries experienced significant growth in international trade during this period. Looking ahead, this growth potential remains, especially considering the dynamic factors influencing export activity, such as:

- **Natural resources**
- **Human capital**
- **Infrastructure**
- **Government policies**
- **Geographic distribution**

Figure 3: **Trends in the Average Exports of Goods and Services for the Period 1985–2021**

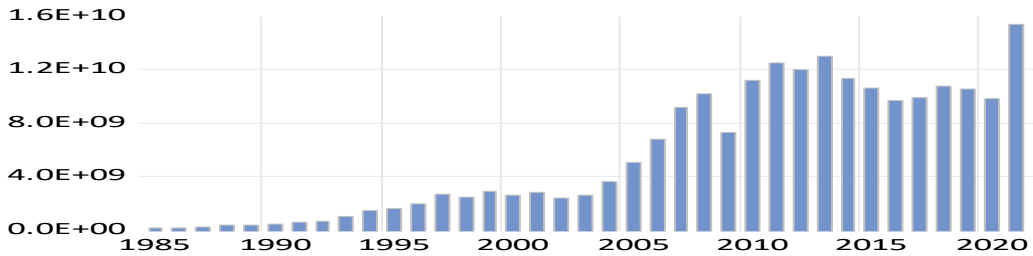


Source: Prepared by the researchers using EViews 13.

Analysis of Direct Foreign Investment (FDI) Trends:

As shown in **Figure 04**, which represents the average changes in the net direct foreign investment inflows for the study sample, the histogram reveals that the average foreign direct investment (FDI) in these countries increased by **7303%**. However, there is significant variation in the levels of FDI across developing countries.

Figure 4: Trends in the Average Net Direct Foreign Investment for the Period 1985–2021



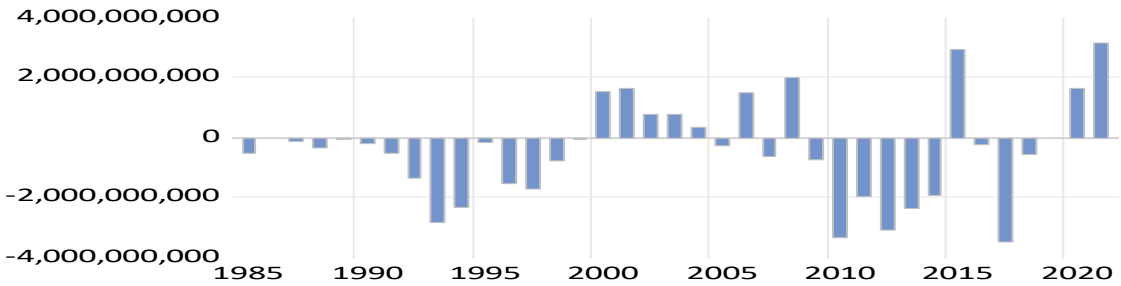
Source: Prepared by the researchers using EViews 13.

Analysis of Trends in Net Portfolio Investments:

As shown in **Figure 05**, which represents the average changes in net portfolio investments for the study sample, the data reveals that the average net portfolio investment in these countries grew by **714%** over the period from 1985 to 2021. However, this growth was marked by significant fluctuations at different times, suggesting that net portfolio investments are highly sensitive to financial and economic crises.

Figure 5: Trends in the Average Net Portfolio Investments for the Period 1985–2021

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Source: Prepared by the researchers using EViews 13.

Analysis of Trends in Total Loans:

As shown in **Figure 06**, which represents the average changes in total loans received by the study sample, the data indicates that the average total loans increased by **1001%** during the study period. However, this massive increase conceals significant variation across countries and years.

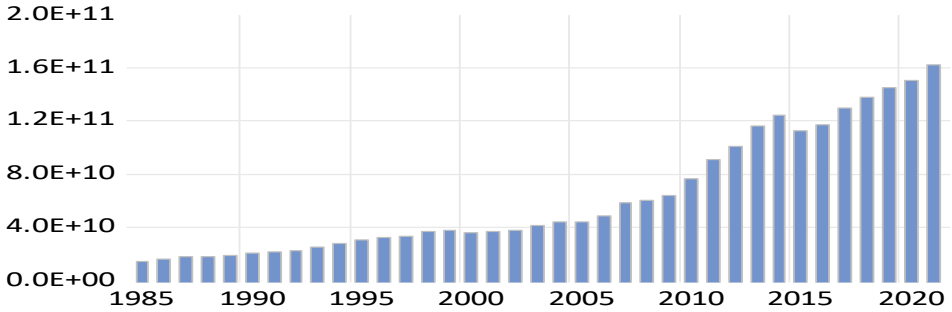
Figure 6: **Trends in the Average Total Loans Received for the Period 1985–2021**

(Visualization of the chart showing changes in loan amounts over time).

These results suggest that, despite the large overall increase in loans received by developing countries, there is considerable disparity in loan trends across different countries and years. The increase in loans could reflect efforts by these countries to boost their economies, particularly in periods of economic expansion, but it also highlights the vulnerability of developing countries to fluctuations in global financial conditions.

As observed in some periods, such as during the 1990s or the 2008 financial crisis, the availability and flow of loans may have been heavily influenced by global financial

instability, which can impact lending conditions and the willingness of financial institutions to provide credit.

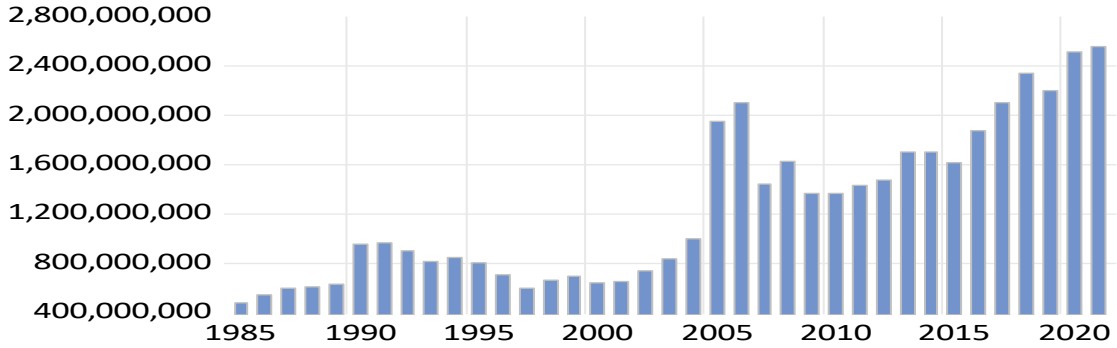


Source: Prepared by the researchers using EViews 13 software.

It is observed that the total received loans have consistently increased from 1985 to 2021, indicating that developing countries have relied more on external financing to meet their financial needs. However, there are some slight declines in certain years, such as 1990, 1999, 2009, and 2015. These years coincide with global or regional events, such as the end of the Cold War, the Asian financial crisis, the global financial crisis, and drops in oil prices. The total amount of received loans reached its highest level in 2021, with an average value of 163 billion US dollars, representing an increase of over 7% compared to 2020. This reflects the impact of the pandemic on the global economy and developing countries in particular.

- Analysis of Developments in Net Official Development Assistance: As shown in Figure 07, which represents the average changes in net official development assistance for the study sample, the average net official development assistance for these countries during the study period increased by 428%.

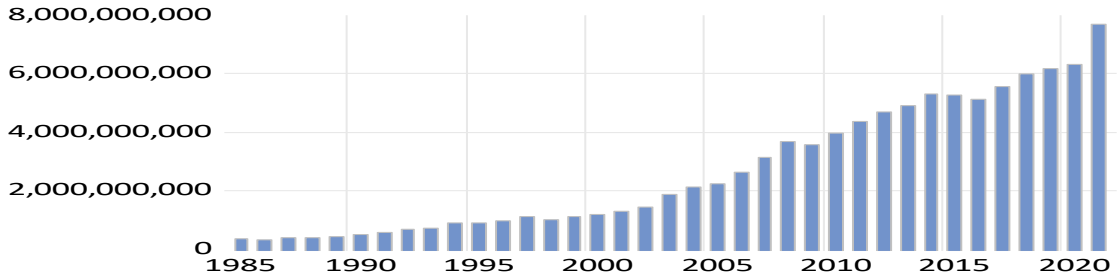
Figure (7): Developments in the cross-sectional average of net official development assistance for the period 1985-2021.



Source: Prepared by the researchers using EViews 13 software.

Net official development assistance has steadily increased from 1985 to 2021, with some minor fluctuations. We can conclude that developing countries have consistently received external support to achieve their development goals. However, there are some declines in certain years, such as 1992, 2000, 2010, and 2015. These years coincide with global crises that may have impacted this variable, such as the collapse of the Soviet Union, the September 11 attacks, the Arab Spring, and the United Kingdom's withdrawal from the European Union, among others. Net official development assistance reached its highest level in 2021, with an average of 2,560 million US dollars, reflecting the impact of the COVID-19 pandemic on the global economy and especially on developing countries. This increase is attributed to political commitment and global solidarity in addressing the challenges of the pandemic, as well as the humanitarian and development support provided by international institutions and donor countries to developing nations through relief and recovery programs.

- Analysis of Developments in Remittances: As shown in Figure 08, which represents the average changes in remittances for the study sample from 1985 to 2021, the average remittances for these countries during the study period increased by approximately 1,981%.



Source: Prepared by the researchers using EViews 13 software.

Remittances have significantly increased from 1985 to 2021, with developing countries receiving more financial support from their citizens residing abroad. However, there were some declines in certain years, such as 1990, 1998, 2009, and 2016, which coincide with global crises like the 2008 global financial crisis and the decline in oil prices in 2014 and 2015. Remittances reached their highest level in 2021 due to the impact of the COVID-19 pandemic on developing countries, where host economies reopened as the pandemic's effects began to decline, supporting the employment of migrant workers and their ability to continue helping their families back home.

IV.2.2. Statistical Study of the Study Variables: The statistical study of the relevant variables focuses on describing the means and standard deviations for each variable individually and comparing them. The results are shown in Appendix 01 and summarized as follows:

Table (01): Descriptive Statistics of the Study Variables

Variable	GNI	EXPT	FDI	NPI	LOANS	ODA	REM
Mean	3.39E+11	8.00E+10	8.02E+09	-2.04E+09	8.65E+10	1.42E+09	4.52E+09
Max Value	1.68E+13	3.55E+12	3.44E+11	6.84E+10	2.70E+12	2.31E+10	8.94E+10
Min Value	1.03E+09	3.00E+08	-7.57E+09	-1.07E+11	6.25E+08	-7.10E+08	349842.1
Standard Deviation	1.25E+12	2.73E+11	2.87E+10	1.03E+10	2.03E+11	1.54E+09	9.83E+09

Source: Prepared by the researchers using EViews 13 software.

From the statistics shown in Table 01, we generally observe that the means of the variables reflect the overall performance of the external financing variables for the economies of the study sample countries during the period 1985-2021, which includes 60 developing countries, along with their Gross National Income (GNI). It is noted that the average GNI for the listed countries is 339 billion USD, with the highest value recorded in China at 16,800 billion USD, and the lowest value in Mauritania at 1.03 billion USD. The standard deviation indicates significant variation between countries in this measure, which reflects the size of the national economy, where it reaches 1,250 billion USD.

The data also show that the average value of exports of goods and services in the listed countries is 80 billion USD, with the highest value recorded in China at 3,550 billion USD, and the lowest value at 300 million USD in Togo. The standard deviation indicates a significant disparity between countries in this variable, amounting to 273 billion USD, indicating large differences in the ability to export goods and services.

The figures also reveal that the average net inflows of Foreign Direct Investment (FDI) in the listed countries amount to 8.02 billion USD, with the highest value recorded in China at 344 billion USD, and the lowest recorded in Iraq in 2015 at a negative value of -7.57 billion USD. The standard deviation indicates significant differences between countries in this variable, reflecting their ability to attract foreign direct investment, with a

standard deviation of 28.7 billion USD. It is noteworthy that some countries attracted significant investments, while others recorded negative flows.

The statistics show that the average net portfolio investments in the listed countries were negative, amounting to -2.04 billion USD, with the highest value exceeding 68.4 billion USD in China in 2006, and the lowest negative value recorded in China in 2018 at -107 billion USD. The standard deviation indicates considerable fluctuations between countries in this indicator, reaching 10.3 billion USD.

The data indicate that the average total loans measured by the external debt balance in the listed countries is 86.5 billion USD, with a maximum value of 2,700 billion USD recorded in China in 2021 following the COVID-19 pandemic. The lowest value is 625 million USD in Togo in 2011. The standard deviation reflects significant variation between countries in this measure, with a value of 203 billion USD.

The statistics also show that the average net official development assistance (ODA) received by the listed countries is 1.42 billion USD, with the highest value exceeding 23.1 billion USD in Nigeria in 2006, and the lowest negative value recorded at -710 million USD in Thailand in 2003. The standard deviation indicates considerable fluctuations between countries in this indicator, reaching 1.54 billion USD.

The numbers also reveal that the average remittances for the listed countries amount to 4.52 billion USD, with the highest value recorded in India at 89.4 billion USD and the lowest value of 349,842.1 USD recorded in Zimbabwe in 1993. The standard deviation indicates significant variation between countries in this variable, amounting to 9.83 billion USD.

To study the linear relationship between the dependent variable and independent variables on the one hand, and then examine the relationship between the independent variables to avoid multicollinearity issues on the other hand, the correlation matrix in Appendix 02 shows strong correlations due to general trends in the macroeconomic indicators. The strongest positive correlations were between the independent variables EXPT, FDI, and LOANS, with correlation coefficients of 97%, 92%, and 94%, respectively. Additionally, there is a moderate positive correlation between the independent variable REM and the dependent variable GNI, with a correlation exceeding 36%. On the other hand, a moderate negative correlation was found between the independent variable NPI and the dependent variable GNI, with a correlation of 45%.

IV.3. Econometric Models: Including:

IV.3.1. Swamy (1970) Homogeneity Tests: To verify the homogeneity assumption of the regression slopes in panel models, homogeneity tests need to be performed, typically using Haseyo's (1986) or Swamy's (1970) test. We use the second test due to its ability to overcome the issue of missing data (unbalanced panel). The null hypothesis is: all individuals' slopes are homogeneous. The alternative hypothesis is: there is at least one slope (parameter) that differs from the others, meaning the panel data are heterogeneous.

The results of the homogeneity tests according to Swamy (1970) are shown in the following table and Appendix 03.

Table (02) : Results of Homogeneity Tests

Dependent Variable	**GNI**
Chi-Square Statistic	27,932.58
P-Value	0.0001

Source: Prepared by the researchers using Stata 17.

Given the chi-square statistic and its corresponding p-value, we reject the null hypothesis of homogeneity of regression coefficients among all six independent variables and the dependent variable GNI. Since the p-value is 0.0001, which is less than the 5% significance level, we accept the alternative hypothesis. Therefore, following

the homogeneity tests, we must perform estimates on models that allow for different parameters between countries, such as panel models with cross-sectional varying coefficients, or Quantile Regression, or by classifying the data based on regions or homogeneous income levels. This will be covered in the next section.

IV.3.2. Estimation of Quantile Regression Models: While most regression models analyze the conditional mean of the dependent variable, Quantile Regression models estimate the conditional quantiles of the dependent variable based on a set of independent variables, as proposed by Conquer and Bassett (1978). Quantile Regression models provide estimates of the linear relationship between the independent variables and specific quantiles (quantities) of the dependent variable. This regression is robust to the heterogeneity of regression slopes in panel models. In other words, dealing with multiple quantiles of the dependent variable allows for variations in slopes across categories. Quantile Regression models were estimated according to income levels as shown below.

Table (03): Results of Estimating the Three Models Before Improvement

Tests	Models	Statistic	GNI Variable
Goodness of Fit	Adjusted R-squared	73.49%	
Overall Significance	p-value for LR statistic	0.0001	
Autocorrelation of Errors	Q Statistic	0.0001	
Error Variance Stability	Brown-Forsythe Test	0.3511	

Source: Prepared by the researchers based on EViews 13 software.

Before presenting and discussing the results, we conduct diagnostic tests, and the results are shown in the table above and appendices (4-5-6). Overall, the results are acceptable, with a high determination coefficient for the GNI variable, which reached a rate of 73%. This indicates a strong explanation of the independent variables in the model. Regarding the LR statistic, the model was statistically significant with p-values less than 0.0001, which is less than 5%, indicating that the proposed model is accepted. The results of the other tests are as follows:

- **Autocorrelation Test of Errors**: To test for autocorrelation of errors, we conduct a graphical autocorrelation test where the null hypothesis for Q statistics states that there is no autocorrelation issue between the residuals. Based on the table above and appendix 5, we focus on the twelfth (12) lag representing one-third of the required sample for the test. The result shows that the p-value for Q statistics is less than 0.0001, which is less than 5%, indicating an autocorrelation problem between the errors, which requires addressing this issue.
- **Error Variance Stability Tests**: The Brown-Forsythe test shows the stability or heterogeneity of error variances, which do not follow a normal distribution. The null hypothesis assumes that the variance of errors is stable. Based on the table above and appendix 6, the error variance is homogenous over time with a p-value of 0.3511, which is greater than 5%, indicating that there is no problem with heteroscedasticity in the proposed model.
- **Estimation of Improved Models**: To address the identified issues, we re-estimate the model using the generalized least squares method, where we weight the errors by the inverse standard deviation of the residuals to stabilize the problems. The estimation results using the median (Quantile = 0.5) are shown in appendix 7. The following equation can be derived:

$$GNI=-378766986812+1.665\times EXPT+1.034\times FDI+7.696\times NPI+5.182\times LOANS+66.471\times ODA-10.914\times REM+0.391\times EXPT\times CRISIS-3.176\times FDI\times CRISIS-13.185\times NPI\times CRISIS-0.973\times LOANS\times CRISIS+15.592\times ODA\times CRI$$

SIS+1.160×REM×CRISISGNI = -378766986812 + 1.665 \times EXPT + 1.034 \times FDI + 7.696 \times NPI + 5.182 \times LOANS + 66.471 \times ODA - 10.914 \times REM + 0.391 \times EXPT \times CRISIS - 3.176 \times FDI \times CRISIS - 13.185 \times NPI \times CRISIS - 0.973 \times LOANS \times CRISIS + 15.592 \times ODA \times CRISIS + 1.160 \times REM \times CRISISGNI=−378766986812+1.665×EXPT+1.034×FDI+7.696×NPI+5.182×LOANS+66.471×ODA−10.914×REM+0.391×EXPT×CRISIS−3.176×FDI×CRISIS−13.185×NPI×CRISIS−0.973×LOANS×CRISIS+15.592×ODA×CRISIS+1.160×REM×CRISIS

- **First: Model Fit and Quality**: The estimated model after improvement has a very high fit quality, as 90% of the variation in the dependent variable, Gross National Income (GNI), is explained by the changes in the explanatory variables. This indicator is statistically significant, given the p-value for the LR statistic, which is 0.0001, significantly lower than the 5% significance level, indicating a very high significance of the model.
- **Second: Statistical Significance of the Parameters**: Regarding partial significance, the constant term suggests that the Gross National Income is expected to be 378,766 million USD as an average for the selected developing economies, assuming that the explanatory variables have no effect. This expectation is statistically significant, with the p-value for the Student's t-statistic being 0.0001, which is below the 5% significance level. Regarding the explanatory variables, it is observed that the effect of each independent variable on the dependent variable is statistically significant at the 5% significance level, which may be due to the overall macroeconomic indicators, which show a general trend among them.

We observe that an increase in exports by one billion USD leads to an increase in GNI in the selected sample of developing economies by 1.665 billion USD, assuming other factors remain constant. During crises, an increase in exports also positively contributes to GNI in the selected developing economies, but with a smaller value of 0.391 billion USD.

An increase in the Foreign Direct Investment (FDI) by one billion USD leads to an increase in GNI by 1.034 billion USD, assuming other factors remain constant. During crises, an increase in FDI negatively impacts GNI, with a decrease of 3.176 billion USD.

While an increase in financial portfolio investment by one billion USD leads to a larger increase in GNI, compared to direct investment, at 7.696 billion USD, assuming other factors remain constant, during crises, an increase in financial portfolio investment negatively impacts GNI by 13.185 billion USD, showing a similar behavior to FDI.

For the received loans variable, an increase by one billion USD leads to an increase in GNI by 5.182 billion USD, assuming other factors remain constant. During crises, an increase in foreign loans negatively impacts GNI by 0.973 billion USD.

Additionally, an increase in official development assistance (ODA) by one billion USD leads to a relatively large increase in GNI by 66.471 billion USD, assuming other factors remain constant. During crises, an increase in ODA positively contributes to GNI by 15.592 billion USD, which is the largest impact compared to other variables.

We observe that an increase in exports by one billion USD leads to an increase in GNI in the selected sample of developing economies by 1.665 billion USD, assuming other factors remain constant. During crises, an increase in exports also positively contributes to GNI in the selected developing economies, but with a smaller value of 0.391 billion USD.

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increase in financial portfolio investment negatively impacts GNI by 13.185 billion USD, showing a similar behavior to FDI.

For the received loans variable, an increase by one billion USD leads to an increase in GNI by 5.182 billion USD, assuming other factors remain constant. During crises, an increase in foreign loans negatively impacts GNI by 0.973 billion USD.

Additionally, an increase in official development assistance (ODA) by one billion USD leads to a relatively large increase in GNI by 66.471 billion USD, assuming other factors remain constant. During crises, an increase in ODA positively contributes to GNI by 15.592 billion USD, which is the largest impact compared to other variables.

An increase in remittances by one billion USD leads to a decrease in GNI in the selected sample of developing economies by 10.914 billion USD, assuming other factors remain constant. However, during crises, the effect of this variable is positive, with a value of 1.160 billion USD.

Third: Sensitivity Analysis: We perform a test for differences in regression slopes based on quantiles to see if there is any variation between each quantile, which would indicate heterogeneity. Appendix 08 shows that we performed a comparison test between the first quartile and the median, and then between the median and the third quartile. The p-value for the Chi-square statistic, which was all less than the 5% significance level, indicates that there are differences in the regression slopes for all variables when comparing the quartiles, except for the REM variable during crises. The statistical significance for the test was 0.114, which is greater than 5% in the comparison between the first quartile and the median. To confirm these results, we compare the estimation results for the variables in the first, second, and third quartiles, as shown in Appendix 09.

Therefore, we focus on the impact of the variables during crises, where we observe that the effect of the exports variable during crises is only positive in the median, i.e., for middle-income countries. The effect on middle-income developing countries was 0.391 billion USD. However, the effect was negative for low-income and high-income developing countries, with a larger negative effect in the low-income group of 1.772 billion USD, compared to 0.032 billion USD in the high-income group. These effects are all statistically significant at the 5% significance level.

Regarding the effect of the Foreign Direct Investment (FDI) variable during crises, it was negative for the median and third quartile, reaching the most negative effect in high-income countries, with a value of -3.428 billion USD. For middle-income developing countries, the negative effect was -3.176 billion USD. For low-income developing countries, however, the effect was positive, with a value of 15.543 billion USD. These effects are all statistically significant at the 5% significance level.

As for the effect of financial portfolio investment, it is the opposite of that of FDI. During crises, it has a positive effect only in high-income developing countries, with a value of 0.404 billion USD. In contrast, in low- and middle-income developing countries, the effect is negative, estimated at -7.280 billion USD and -13.185 billion USD, respectively. These effects are all statistically significant at the 5% significance level.

Regarding the effect of received loans during crises, it also has a positive effect only in high-income developing countries, with a value of 0.217 billion USD. For low- and middle-income developing countries, however, the effect is negative, with values of -0.273 billion USD and -0.973 billion USD, respectively. These effects are statistically significant at the 5% significance level.

It is notable that the effect of Official Development Assistance (ODA) during crises is positive for low- and middle-income developing countries, with values of 26.103 billion USD and 15.592 billion USD, respectively. However, in high-income developing countries, the effect is negative, amounting to -1.360 billion USD. These effects are statistically significant at the 5% significance level.

Finally, regarding remittances during crises, we find that it has a positive effect in low- and middle-income developing countries, with values of 1.453 billion USD and 1.160 billion USD, respectively. However, in high-

income developing countries, the effect is negative, with a value of -1.304 billion USD. All of these effects are statistically significant at the 5% significance level.

V. Conclusion:

This study aims to clarify the complex dynamics of the impact of economic crises on external development financing sources in developing economies over the past three and a half decades. Tracking the global economic scene from 1985 to 2021 reveals a complicated and multifaceted narrative of regional and global economic crises, which have had clear effects on the development trajectories of developing economies. Starting with the debt crisis in the early 1980s, followed by the global financial crisis that caused a recession, weakening various development financing initiatives, the study underscores the extent to which developing countries are affected by external shocks accompanying global economic fluctuations. The study also highlights the severe recession and supply and demand shocks caused by the COVID-19 crisis, which impeded a decade of development progress and exposed numerous flaws in the international economic system, emphasizing the need for international cooperation during economic crises. Furthermore, it illustrates the impact on significant financing sources for developing economies due to the economic downturns in the supporting countries.

V.1. Results:

The key findings of the study can be summarized as follows:

- The impact of export performance was positive during crises, leading to an increase in Gross National Income (GNI) for developing countries, especially for middle-income nations.
- The impact of remittances from abroad received by developing countries was positive during the crises, leading to an increase in GNI, particularly for low- and middle-income countries.
- Official Development Assistance (ODA) had a positive impact during the crises, leading to an increase in GNI, especially in low- and middle-income countries, demonstrating the effectiveness of official development finance during crises.
- The impact of total loans to developing countries was negative during crises, leading to a decrease in GNI, especially in low- and middle-income countries.
- Portfolio investments had a negative impact during crises on developing countries, resulting in a decline in GNI, particularly in low- and middle-income countries.
- Foreign Direct Investment (FDI) had a negative effect on GNI during crises, especially for middle- and high-income countries, while the positive effect of FDI on GNI was observed only in low-income countries during crises.
- The evolution of external financing sources over time and their exposure to economic crises has generally been negative, evolving in response to changes in the global financial system.

Thus, we conclude the following:

- Most external financing sources are negatively affected by economic crises, but their effectiveness during crises varies from one financing source to another, and from one developing country to another, depending on factors such as income level and efficiency in using it. The impact of economic crises on development finance differs by region and country, depending on the nature of the financing mix each country possesses.
- The results show that middle-income and emerging economies benefit the most from FDI due to better infrastructure, while low-income countries heavily rely on ODA and remittances due to their isolation from global financial and investment flows.
- Countries with high trade openness are more affected by fluctuations in exports and imports during crises, which significantly impact their development financing.

- The issue of external debt remains one of the most significant obstacles to development financing in various developing regions, reflecting imbalances in the international lending system.
- The recurring economic crises over time and their persistence expose the weaknesses of international monetary and financial institutions in managing these crises or even preventing them.
- Developing countries do not control external financing sources in a way that aligns with their interests during crises. Instead, developed countries control these financial flows, which stem from the continued accumulation of capital in the developed world due to an unequal international division of labor.

V.2. Recommendations:

Based on the study's findings, the following recommendations are proposed:

- External financing should be considered a complement to domestic financing, not a substitute.
- Strengthen governance, transparency, and sound management in developing economies to combat local and international financial and administrative corruption.
- Focus on steering developing economies inward rather than pursuing hasty opening to international trade and exposure to the harsh effects of economic crises.
- Strengthen South-South development financing as it is unconditional and free from geopolitical pressures.
- Enhance regional economic integration among developing economies.
- Establish hedging mechanisms against crises, especially for developing countries and their regional blocs.
- Achieve economic and financial justice in resource distribution and implement reform policies, particularly from international monetary and financial institutions.
- Strengthen the strategic importance and influence of developing countries in international decision-making to free them from dependence and control despite their political independence.

There is still a pressing need for more research, whether on the issue of financing in developing economies or the topic of economic crises. Therefore, the following research topics are suggested for those interested in this area:

- The importance of enhancing domestic resources in developing economies.
- The role of regional blocs in facing economic crises.

VI. Appendices :

Appendix 02 : matrix of relatedness	**Appendix 01:** descriptive statistics of the study variables

Probability	GNI	EXPT	FDI	NPI	LOANS	ODA	REM
GNI	1.000000						

EXPT	0.974742	1.000000					
	0.0000	-----					
FDI	0.922782	0.949543	1.000000				
	0.0000	0.0000	-----				
NPI	-0.459971	-0.435031	-0.425833	1.000000			
	0.0000	0.0000	0.0000	-----			
LOANS	0.946106	0.928337	0.878934	-0.495218	1.000000		
	0.0000	0.0000	0.0000	0.0000	-----		
ODA	-0.005646	-0.006040	-0.007172	-0.009949	-0.003921	1.000000	
	0.8490	0.8386	0.8089	0.7373	0.8948	-----	
REM	0.369335	0.385524	0.324577	-0.212622	0.428252	0.274929	1.000000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-----

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Date: 11/05/24 Time: 02:31 Sample: 1985 2021	GNP	EXPT	FDI	NPI	LOANS	ODA	REM
Mean	3.39E+11	8.00E+10	8.02E+09	-2.04E+09	8.65E+10	1.42E+09	4.52E+09
Median	5.09E+10	1.37E+10	9.73E+08	-16528961	2.53E+10	9.61E+08	1.17E+09
Maximum	1.68E+13	3.55E+12	3.44E+11	6.84E+10	2.70E+12	2.31E+10	8.94E+10
Minimum	1.03E+09	3.00E+08	-7.57E+09	-1.07E+11	6.25E+08	-7.10E+08	349842.1
Std. Dev.	1.25E+12	2.73E+11	2.87E+10	1.03E+10	2.03E+11	1.54E+09	9.83E+09
Skewness	8.857013	7.890471	7.251217	-2.996077	6.958353	4.176528	4.575259
Kurtosis	92.63246	73.69725	63.45319	32.85901	67.40253	43.28861	29.27844
Jarque-Bera	396171.0	249020.5	183422.1	44016.00	206033.7	80344.40	36746.44
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	3.86E+14	9.11E+13	9.13E+12	-2.32E+12	9.85E+13	1.62E+12	5.15E+12
Sum Sq. Dev.	1.78E+27	8.49E+25	9.38E+23	1.21E+23	4.68E+25	2.69E+21	1.10E+23
Observations	1139	1139	1139	1139	1139	1139	1139

source : exraction of programEViews 13

appendix 04 : chemical test resuls

Dependent Variable: GNI
Method: Quantile Regression (Median)
Date: 11/09/24 Time: 01:48
Sample: 1985 2021
Included observations: 1139
Huber Sandwich Standard Errors & Covariance
Sparsity method: Kernel (Epanechnikov) using residuals
Bandwidth method: Hall-Sheather, bw=0.093031
Estimation successfully identifies unique optimal solution

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.69E+09	1.72E+09	-5.626140	0.0000
EXPT	1.887407	0.120377	15.67917	0.0000
FDI	11.28250	0.934284	12.07610	0.0000
NPI	-2.524537	1.436004	-1.758030	0.0790
LOANS	0.888536	0.171689	5.175272	0.0000
ODA	2.282143	1.314736	1.735819	0.0829
REM	1.573264	0.855906	1.838128	0.0663
EXPT*CRISIS	0.423545	0.722316	0.586370	0.5577
FDI*CRISIS	-0.041118	5.355634	-0.007678	0.9939
NPI*CRISIS	-0.671146	2.955512	-0.227083	0.8204
LOANS*CRISIS	-0.188392	0.243958	-0.772231	0.4401
ODA*CRISIS	0.736871	1.460757	0.504445	0.6140
REM*CRISIS	-0.142223	1.537766	-0.092487	0.9263

Pseudo R-squared	0.737755	Mean dependent var	3.39E+11
Adjusted R-squared	0.734960	S.D. dependent var	1.25E+12
S.E. of regression	3.32E+11	Objective	4.76E+13
Quantile dependent var	5.09E+10	Restr. objective	1.81E+14
Sparsity	4.99E+10	Quasi-LR statistic	21458.45
Prob(Quasi-LR stat)	0.000000		

Source : extractions of the program EViews 13

Appendix 03 : similarity results

```
. xtrc GNP EXP FDI NPI LOANS ODA REM
note: 27 obs omitted (panels too small).

Random-coefficients regression                  Number of obs     =      1,112
Group variable: countrie                        Number of groups  =         39

Time variable: years                            Obs per group:
                                                              min =         11
                                                              avg =       28.5
                                                              max =         37

                                                Wald chi2(6)      =      78.24
                                                Prob > chi2       =     0.0000
```

GNP	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
EXP	1.711674	.3081693	5.55	0.000	1.107673	2.315675
FDI	.3419635	.9237373	0.37	0.711	-1.468528	2.152455
NPI	-1.831083	2.150558	-0.85	0.395	-6.046099	2.383933
LOANS	.9420861	.2160376	4.36	0.000	.5186602	1.365512
ODA	1.7386	10.227	0.17	0.865	-18.30594	21.78314
REM	.6953597	12.1022	0.06	0.954	-23.02452	24.41524
_cons	0	(omitted)				

Test of parameter constancy: chi2(266) = 27932.58 Prob > chi2 = 0.0000

source : extractions of the program Stata 17

Appendix 06 : difference exam results

Appendix 05 : exam results of inerconnectedness

Test for Equality of Variances of RESID03
Categorized by values of DATEID
Date: 11/09/24 Time: 01:49
Sample: 1985 2021
Included observations: 1139

Method	df	Value	Probability
Bartlett	36	1723.381	0.0000
Levene	(36, 1102)	2.034373	0.0003
Brown-Forsythe	(36, 1102)	1.075652	0.3511

source: exraction of programEViews 13

Sample: 1985 2021
Included observations: 1139

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.858	0.858	839.77	0.000
		2	0.709	-0.100	1414.2	0.000
		3	0.558	-0.095	1770.6	0.000
		4	0.370	-0.239	1927.7	0.000
		5	0.162	-0.223	1957.7	0.000
		6	0.022	0.104	1958.3	0.000
		7	-0.050	0.166	1961.2	0.000
		8	-0.123	-0.070	1978.4	0.000
		9	-0.166	-0.060	2009.9	0.000
		10	-0.152	0.025	2036.6	0.000
		11	-0.151	-0.105	2062.8	0.000
		12	-0.123	0.136	2080.3	0.000

source: exraction of programEViews 13

Appendix 08: Testing the differences between model tendencies for the GNI variable

Quantile Slope Equality Test
Equation: EQ02
Specification: GNP C EXPT FDI NPI LOANS ODA REM EXPT*CRISIS FDI *CRISIS NPI*CRISIS LOANS*CRISIS ODA*CRISIS REM*CRISIS
Estimated equation quantile tau = 0.5
Number of test quantiles: 4
Test statistic compares all coefficients

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test	1521673.	24	0.0000

Restriction Detail: b(tau_h) - b(tau_k) = 0

Quantiles	Variable	Restr. Value	Std. Error	Prob.
0.25, 0.5	EXPT	1.923555	0.008377	0.0000
	FDI	-14.42215	0.046335	0.0000
	NPI	-3.444363	0.026683	0.0000
	LOANS	-0.937629	0.007849	0.0000
	ODA	-12.86232	1.315270	0.0000
	REM	-19.43619	0.088446	0.0000
	EXPT*CRISIS	-2.164181	0.014674	0.0000
	FDI*CRISIS	18.71962	0.096493	0.0000
	NPI*CRISIS	5.905093	0.059265	0.0000
	LOANS*CRISIS	0.700564	0.011709	0.0000
	ODA*CRISIS	10.51041	2.223279	0.0000
	REM*CRISIS	0.292936	0.185807	0.1149
0.5, 0.75	EXPT	-0.508645	0.004490	0.0000
	FDI	0.636485	0.024832	0.0000
	NPI	-1.810552	0.014300	0.0000
	LOANS	0.674371	0.004206	0.0000
	ODA	17.18033	0.704880	0.0000
	REM	-3.126206	0.047400	0.0000
	EXPT*CRISIS	0.424647	0.007864	0.0000
	FDI*CRISIS	0.252571	0.051712	0.0000
	NPI*CRISIS	-13.58969	0.031761	0.0000
	LOANS*CRISIS	-1.191595	0.006275	0.0000
	ODA*CRISIS	16.95336	1.191501	0.0000
	REM*CRISIS	2.464495	0.099578	0.0000

source : exraction of programEViews 13

Appendix 7: Results of quantum regression estimation after optimization

Dependent Variable: GNI
Method: Quantile Regression (Median)
Date: 11/09/24 Time: 01:51
Sample: 1985 2021
Included observations: 1139
Weighting series: RESID03
Weight type: Inverse standard deviation (EViews default scaling)
Ordinary (IID) Standard Errors & Covariance
Sparsity method: Kernel (Epanechnikov) using residuals
Bandwidth method: Hall-Sheather, bw=0.093031
Estimation successfully identifies unique optimal solution

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.79E+11	2.11E+09	-179.7420	0.0000
EXPT	1.665207	0.005349	311.2828	0.0000
FDI	1.034668	0.029588	34.96914	0.0000
NPI	7.696586	0.017039	451.7076	0.0000
LOANS	5.182881	0.005012	1034.078	0.0000
ODA	66.47188	0.839892	79.14340	0.0000
REM	-10.91467	0.056479	-193.2515	0.0000
EXPT*CRISIS	0.391673	0.009371	41.79770	0.0000
FDI*CRISIS	-3.176244	0.061617	-51.54790	0.0000
NPI*CRISIS	-13.18540	0.037845	-348.4088	0.0000
LOANS*CRISIS	-0.973731	0.007477	-130.2303	0.0000
ODA*CRISIS	15.59270	1.419718	10.98296	0.0000
REM*CRISIS	1.160378	0.118651	9.779779	0.0000

Weighted Statistics

Mean dependent var	4.19E+13	S.D. dependent var	6.05E+14
S.E. of regression	2.81E+13	Weighted mean dep.	-6.61E+19
Pseudo R-squared	0.905209	Adjusted R-squared	0.904199
Objective	2.73E+15	Quantile dependent var	9.75E+11
Restr. Objective	2.88E+16	Sparsity	1.46E+12
Quasi-LR statistic	142498.0	Prob(Quasi-LR stat)	0.000000

Unweighted Statistics

Mean dependent var	3.39E+11	S.D. dependent var	1.25E+12
Quantile dependent var	5.09E+10		

source : exraction of programEViews 13

Appendix 09 : Shows the results of the estimation by quartiles of the variable GNI

Quantile Process Estimates					
Equation: EQ02					
Specification: GNP C EXPT FDI NPI LOANS ODA REM EXPT*CRISIS FDI*CRISIS NPI					
*CRISIS LOANS*CRISIS ODA*CRISIS REM*CRISIS					
Estimated equation quantile tau = 0.5					
Number of process quantiles: 4					
Display all coefficients					
	Quantile	Coefficient	Std. Error	t-Statistic	Prob.
C	0.250	-5.96E+11	4.03E+09	-147.8866	0.0000
	0.500	-3.79E+11	2.11E+09	-179.7420	0.0000
	0.750	-1.21E+11	8.08E+08	-150.0533	0.0000
EXPT	0.250	3.588762	0.010237	350.5659	0.0000
	0.500	1.665207	0.005349	311.2828	0.0000
	0.750	2.173852	0.002050	1060.326	0.0000
FDI	0.250	-13.38748	0.056621	-236.4400	0.0000
	0.500	1.034668	0.029588	34.96914	0.0000
	0.750	0.398184	0.011339	35.11477	0.0000
NPI	0.250	4.252223	0.032606	130.4107	0.0000
	0.500	7.696586	0.017039	451.7076	0.0000
	0.750	9.507138	0.006530	1455.900	0.0000
LOANS	0.250	4.245252	0.009591	442.6126	0.0000
	0.500	5.182881	0.005012	1034.078	0.0000
	0.750	4.508510	0.001921	2347.134	0.0000
ODA	0.250	53.60956	1.607256	33.35470	0.0000
	0.500	66.47188	0.839892	79.14340	0.0000
	0.750	49.29154	0.321885	153.1341	0.0000
REM	0.250	-30.35086	0.108081	-280.8156	0.0000
	0.500	-10.91467	0.056479	-193.2515	0.0000
	0.750	-7.788467	0.021645	-359.8213	0.0000
EXPT*CRISIS	0.250	-1.772508	0.017932	-98.84501	0.0000
	0.500	0.391673	0.009371	41.79770	0.0000

	0.750	-0.032974	0.003591	-9.181665	0.0000
FDI*CRISIS	0.250	15.54338	0.117914	131.8198	0.0000
	0.500	-3.176244	0.061617	-51.54790	0.0000
	0.750	-3.428814	0.023615	-145.1990	0.0000
NPI*CRISIS	0.250	-7.280309	0.072421	-100.5272	0.0000
	0.500	-13.18540	0.037845	-348.4088	0.0000
	0.750	0.404287	0.014504	27.87457	0.0000
LOANS*CRISIS	0.250	-0.273167	0.014308	-19.09148	0.0000
	0.500	-0.973731	0.007477	-130.2303	0.0000
	0.750	0.217864	0.002866	76.02936	0.0000
ODA*CRISIS	0.250	26.10312	2.716840	9.607897	0.0000
	0.500	15.59270	1.419718	10.98296	0.0000
	0.750	-1.360657	0.544101	-2.500744	0.0125
REM*CRISIS	0.250	1.453314	0.227056	6.400693	0.0000
	0.500	1.160378	0.118651	9.779779	0.0000
	0.750	-1.304117	0.045472	-28.67930	0.0000

Source: extractions of the program of EVIEW13

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