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# Key Factors in the Development of Capital Markets Globally

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**Abstract.** This research paper investigates the impact of macroeconomic and institutional factors on the development of capital markets, measured as the ratio of market capitalization to gross domestic product (GDP), on panel data from 47 stock exchanges, both mature and developing markets, from 2008 to 2020. Despite overall economic growth and an increase in market capitalization to GDP ratio between 2008 and 2020, nearly half of the markets experienced negative trends in the post-pandemic and wartime period of 2020. Key findings from regression and VAR models highlight the significant influence of local bank credit, political stability, and broad money on capital market development, with a positive long-term impact of lending interest rates, but a negative effect of foreign direct investment on market capitalization. Policy recommendations include focusing on political stability, promoting financial intermediation, improving SME access to credit, and maintaining moderate inflation and low-interest rates to foster a stable investment environment and encourage public participation in capital markets through education initiatives.

**Keywords:** Capital market development, Financial crisis, Global markets, Macroeconomic development, Stock markets.

## 1. INTRODUCTION

Capital markets are vital for facilitating capital flows, supporting investment projects, and contributing to economic growth. They channel funds from those with excess capital to those in need of funding. On the one hand, they serve to finance profitable investment projects and company growth, and on the other hand, they act as an engine of economic growth due to their spillover effect throughout the economy. A well-functioning market is characterized by numerous indicators, such as size, trading volume, and the ability to mediate capital flows, achieved through the issuance of shares or bonds by companies and offered to investors. A study published by the European Commission (2020) revealed a downward trend in new listings in Europe, showcasing a global downward trend in public equity markets. The average value of listed companies has increased, and firms take more time to become listed. Economic globalization has brought special attention to the interplay between economic conditions and the stability of financial markets, emphasizing the importance of understanding this relationship in today's ever-changing context. We will examine the impact of various macroeconomic and institutional indicators on the development of capital markets around the world, such as stock market capitalization in gross domestic product (GDP), using panel data for 47 stock exchanges between 2008 and 2020.

During this period, two global events occurred: the financial crisis and, later, the COVID-19 pandemic. We note that during this period, the total GDP increased by almost 39%, while the market capitalization of stock markets increased by almost 4 times. Markets in the United States of America further consolidated their global leadership, and markets in Asia grew rapidly. Smaller markets are generally more volatile.

The purpose of this study is to provide insight into how 15 macroeconomic and institutional indicators influence capital markets by identifying global determinants and testing new influencing factors. Although the study includes different stock markets, the results obtained at the global level provide a glimpse of the general trend of the influence of certain factors, for example, the positive impact of money supply on GDP and bank lending to local companies. The development of financial markets is often linked to the development of the capital market and to academic debates on substitution or complementarity effects. As a prerequisite for the development of the capital market, the financial system enabled the initial financing of viable projects, contributing to better corporate governance and providing professional services to both corporate clients and individuals.

This study helps to explain the cross-national factors affecting capital markets in Europe recently and helps to manage public policy with market implications, with a greater focus on unlocking savings and rebalancing credit and equity financing, with interest rates playing a key role.

This paper is structured as follows: the specific literature, the tested hypotheses, the detailed analysis of the evolution of the capital markets, the methodology, the results and the discussions obtained, and the macroeconomic and institutional factors that determine the development of the capital markets, and finally, the conclusions.

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## 2. SPECIFIC LITERATURE

The financial system is crucial for any economy, and its efficiency and dynamics support the development of a country (Schumpeter (1911), King and Levine (1993), Levine and Zervos (1998), Demirgüç-Kunt and Levine (1996, 2008), García and Liu (1999), Beck et al. (2000), Ergungor (2008)).

The financial sector and innovation are key elements influencing economic growth, playing an active role in evaluating, managing, and financing entrepreneurship by increasing productivity (King and Levine (1993)). The development of capital markets is positively associated with long-term economic growth, with a large part of the population's savings directed to productive investments through financial intermediaries and markets (Levine and Zervos (1998)). Beck et al. (2000, 2004, 2009) highlight the impact that a developed financial system has on GDP per capita and productivity growth, noting that country-specific elements are of great importance.

Demirgüç-Kunt and Levine (1996) show that most indicators describing capital markets are positively correlated with the development of financial intermediation; thus, countries with developed capital markets have more developed financial intermediaries. As a result, financial intermediation increases the productivity of capital and stimulates economic growth. Boyd and Smith (1996) suggest that stock markets and banks can act as complementary rather than substitute sources of capital. Pagano (1993) argues that corporate lending emerged first, followed by stock and bond markets and household and insurance lending. García and Liu (1999) describe the country's financial system as composed of financial intermediaries (banks, insurance companies, and pension funds) and markets (stocks and bonds). They analyzed the determinants of stock market capitalization and confirmed the complementarity of the development of financial intermediaries with capital markets. The complementary or substitution effect of financial markets versus capital markets has been included in overall research by Ho and Iyke (2017).

The term "capital markets development" has itself driven much research. Demirgüç-Kunt and Levine (1996) compared indicators of size, liquidity, concentration, volatility, institutional development, or integration with global markets using data from 44 developing and industrialized countries from 1986 to 1993. In their view, the concept of capital market development, such as economic development, is complex and different from one country to another.

In recent decades, the development of capital markets has been of great interest for research, with various approaches, given that globally large capital markets are becoming more developed, and medium and small markets have had moderate success (Obreja Braşoveanu et al. (2008), Caporale et al. (2009), Hondroyiannis et al. (2005)).

The period after the financial crisis is especially challenging to analyze because of quantitative easing (QE), or monetary policy in which a central bank purchases large-scale government bonds or other financial assets to inject money into the economy to expand business. Chovancová and Hudcovský (2016) state that the 2008 global financial crisis forced financial theory and practice to reassess old monetary policy instruments and look for new solutions to economic problems. Quantitative easing (QE) programs were first adopted in Japan and the US, with the Eurozone applying this unconventional monetary policy tool in 2015. Bhattarai and Chatterjee (2018) find that an expansionary US QE appreciates the local currency against the US dollar, lowers long-term bond yields, and raises equity prices in emerging market economies.

In recent decades, research has focused on specific countries, groups, or regions; for example, García and Liu (1999) used pooled data from 15 industrial and developing countries from 1980 to 1995, and Naceur, Ghazouni, and Omran (2007) studied the capital markets of 11 countries. in the Middle East and North Africa, 1979–2003; Yartey (2008) used panel data from 42 emerging economies in North Africa over the period 1990–2004; Şükrüoğlu and Nalin (2014) focused on 19 European countries in the period 1995–2011; and Draženović and Kusanović (2016) analyzed 6 Central and Eastern European countries between 1995 and 2010. They conclude that the monetization rate (broad) and inflation have negative effects, while income, stock market liquidity, and the savings rate have positive impacts on the development of capital markets. Evrim-Mandaci et al. (2013) analyze 30 countries over the period 1960-2007 and conclude that foreign direct investment (FDI), remittances, and loans to the private sector have a significant positive impact on the development of capital markets. Tsaurai (2018) noted that there is no unitary list of determinants of capital market development agreed upon by academia and that most studies analyze country-specific factors. Tsaurai analyzes the impact of macroeconomic indicators in emerging countries and concludes that foreign direct investment (FDI), savings rate, economic growth, trade openness, exchange rate, banking sector development, and market liquidity have a positive influence on the development of capital markets.

## 3. TESTED HYPOTHESES

The market capitalization of all listed companies, used individually or as a ratio of GDP, is the most used indicator for estimating the size of capital markets. García and Liu (1999), Şükrüoğlu and Nalin (2014), and Draženović and Kusanović (2016) used the market capitalization-to-GDP ratio to study the development of capital markets. The main argument is that capital markets can mobilize capital and reduce risk (Demirgüç-Kunt and Levine, 1996). The main reason for using such an indicator is its distortion by excessive price increases, without being the result of market operations and without impact on market development.

According to García and Liu (1999), the determinants of capital market development fall into two categories: macroeconomic and institutional factors. Macroeconomic factors include the development of the financial system, economic growth, savings, investment, inflation, and others. The authors broadly group macroeconomic indicators as follows: real income and the rate of income growth associated with better education and a better overall business environment; savings and investments of the population to be directed to investment projects; the development of financial intermediaries, as broad money (% GDP) and credit to the private sector divided by GDP, as both the banking sector and stock markets direct savings toward investment projects, which can be complementary or substitutive; stock market liquidity, i.e., the ease and speed with which market players can buy and sell financial instruments, as the ratio of total traded value to GDP, and the ratio of total traded value divided by market capitalization (velocity); and macroeconomic stability, to include the inflation rate and related indicators.

This study focuses on the impact of both macroeconomic and institutional variables on capital market development. The independent variables used include general economic conditions (GDP growth, inflation), monetary policy (interest rate, local bank credit to the private sector, money in general), and the attraction and use of money in the economy (savings rate, investment rates, industrial production, foreign direct investment) and institutional factors, calculated by the World Bank (Kaufmann and Kraay, 2023).

There are three indicators used in literature that reflect institutional quality (Yartey, 2008). The first is the quality of governance, which includes corruption, political rights, public sector efficiency, and regulatory constraints. The second category is legal protection of private property and law enforcement. The third includes the accountability and limits of executive and political power. Levine and Zervos (1998b) devote their entire study to several factors, such as capital account liberalization in 16 emerging countries, access to information about listed companies, international accounting standards, and shareholder protection. The study by Mihail et al. (2021) claims that the VEKTOR indicator, which measures the communication of listed companies with investors, calculated by the Romanian Investor Relations Association, has a positive correlation with the performance of listed companies, namely, the ROA indicator. Draženović and Kusanović (2016) analyzed the Heritage Index of Economic Freedom for 6 Central and Eastern European economies between 1995 and 2010, which was found to be significant but negative.

The analysis of the governance indicators of the World Bank (Kaufmann and Kraay, 2023) represents the novelty of this research and qualitatively reflects the institutional framework of the analyzed country based on 30 data sources.

The 6 governance indicators are Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Efficiency, Normative Quality, and Rule of Law Quality. *Voice and accountability* reflect perceptions of the extent to which a country's citizens can participate in choosing their government, freedom of speech, freedom of association, and freedom of the press. *Political stability and the absence of violence/terrorism* measure the perception of the likelihood of political instability and/or politically motivated violence, including terrorism. *Government efficiency* reflects the perception of the quality of public services, the quality of public service and the degree of independence from political pressure, the quality of policy making and implementation, and the credibility of the government's commitment to such policies. *Normative quality* reflects the perception of the government's ability to formulate and implement policies and regulations that enable and promote private sector development. *The rule of law* reflects perceptions of the extent to which agents trust and follow the rules of society, particularly the quality of contract enforcement, property rights, trust in the police and courts, and the likelihood of criminal activity and violence. *Control of corruption* reflects the perception of how much public power is exercised for private gain, including minor and large forms of corruption, and state "capture" by private elites and interests.

The following hypotheses were tested in line with previous research:

1. GDP growth has a positive impact on market capitalization in GDP
2. Inflation affects market capitalization in GDP
3. The savings rate has a positive impact on market capitalization in GDP
4. The investment rate has a positive impact on market capitalization in GDP
5. Money supply has a positive impact on market capitalization in GDP
6. Local bank lending to the private sector has a positive impact on market capitalization in GDP
7. Institutional factors have a positive impact on market capitalization in GDP

New variables and tested hypotheses:

1. Industrial production has a positive impact on market capitalization in GDP
2. Foreign direct investment has a positive impact on market capitalization in GDP
3. Lending interest rate has a positive impact on market capitalization in GDP

Compared to previous academic research, we have included 3 new indicators, one on monetary policy, such as the lending interest rate, and two on the use of money in the economy— industrial production and foreign direct investment. The three indicators were previously analyzed in conjunction with the capacity of stock markets to attract new financing for companies but not concerning market capitalization to GDP.

Related to industrial production, Tran and Jeon (2011), Angelini and Foglia (2018), and Meluzin and

Zinecker (2014) find that the variable significantly explains the activity of initial public offerings (IPOs), which are transactions through which companies attract financing and are listed. Thus, we wanted to test whether the indicator has an impact on the overall development of the capital markets, as this may reflect the development of listed manufacturing companies to capital market performance. Similar results are also obtained for FDI; thus, FDI was included in this research as a newly tested variable.

The interest rate is also a new variable included in the analysis in connection to the market capitalization-to-GDP ratio, as it was used concerning its impact on IPOs, as previously analyzed by Meluzin and Zinecker (2014), Breinlinger and Glogova (2002), who found it not significant, and Ameer (2012), who achieved a positive impact.

Newly analyzed indicators are also institutional indicators, mainly those calculated by the World Bank.

## 4. DATA

The collected data characterize 47 stock exchanges, the most important globally between 2008 and 2020, using databases from the World Bank (World Bank), the World Federation of Exchanges (WFE), the Federation of European Stock Exchanges (FESE), and individual stock exchange websites. The original database included 60 exchanges, but 13 exchanges and countries were removed due to missing data or operating in multiple countries. The Euronext and Nasdaq conglomerates, which operate in several countries, were removed from the analysis. Euronext N.V. is a European stock exchange headquartered in Amsterdam with operations in Brussels, London, Lisbon, Dublin, and Paris. The Nasdaq operates eight stock exchanges, mainly in the Nordic and Baltic countries. In the absence of data for all years, the Abu Dhabi Stock Exchange and the Moscow Stock Exchange were removed from the study. Countries with two stock exchanges—China (Shanghai Stock Exchange and Shenzhen Stock Exchange), India (BSE India Limited and National Stock Exchange of India Limited), and the United States of America (Nasdaq and NYSE)—were analyzed separately.

Researchers such as García and Liu (1999), Şükrüoğlu and Nalin (2014), and Draženović and Kusanović (2016) use the market capitalization to GDP ratio as the dependent variable to assess the development of capital markets.

The world's top 10 largest capital markets in 2020 are shown in Figure 1, along with their corresponding market capitalization sizes. More than 42% are attributed to the United States, with 40,719 billion USD, followed by China, with two exchanges—the Shanghai Stock Exchange and Hong Kong Stock Exchange—reaching almost half of the New York Stock Exchange.

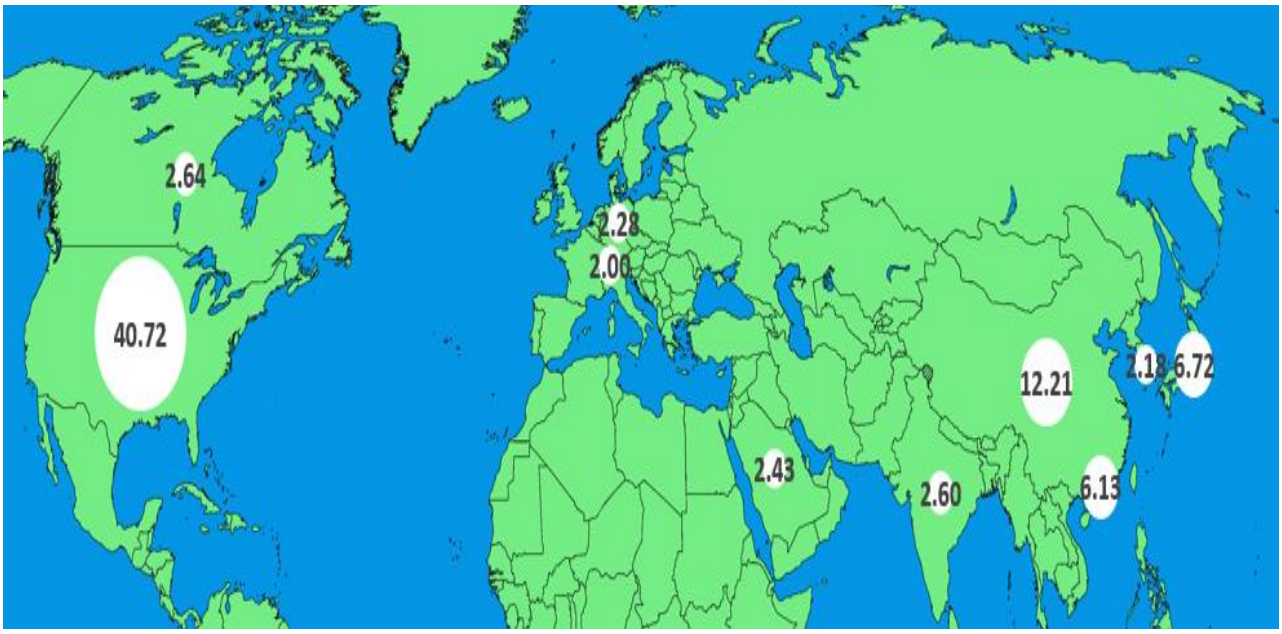



**Figure 1:** Largest Stock Markets by Capitalization, 2020, Trillion USD.

Table 1 includes the evolution of three key indicators in 2008, the start of the economic crisis, and 2020, the year of the global COVID-19 pandemic. During this period, the total GDP grew by 39% to $71.247 trillion. The United States of America has consolidated its leading position as an economy and as a capital market. However, accelerated growth has also taken place in Hong Kong, China, with a spectacular market capitalization of 1,777% of GDP in 2020, up from 606% in 2008. Romania, on the other hand, remained in last place in the stock market capitalization to GDP indicator, with the capital market registering a slower growth rate than the economy.

**Table 1:** Summary description of key indicators for 47 stock exchanges and related countries.

| Indicator<br>Year | Brust domestic product (GDP)<br>(USD million) | Market capitalization<br>(USD million) | Market capitalization in GDP (%) |
|---|---|---|---|
| Total 2008 | 51.336.674 | 29.486.063 | N/A |
| Total 2020 | 71.247.498 | 94.447.552 | N/A |
| Minimum 2008 | 9.090 | 3.567 | 7,07 |
| | Malta | Malta Stock Exchange | Romania |
| Minimum 2020 | 11.401 | 4.693 | 10,1 |
| | Mauritius | Cyprus Stock Exchange | Romania |
| Maximum 2008 | 14.769.900 | 11.590.277 | 606 |
| | United States America | New York Stock Exchange | Hong Kong Stock Exchange, China |
| Maximum 2020 | 21.060.500 | 40.719.661 | 1.777 |
| | United States America | New York Stock Exchange | Hong Kong Stock Exchange, China |
| Media 2008 | 1.092.270 | 641.001 | 60 |
| Media 2020 | 1.515.904 | 2.146.535 | 132 |

Most countries experienced economic growth between 2008 and 2020, with notable growth rates in countries such as China, India, Indonesia, and Sri Lanka exceeding 100%. In Europe, Malta has seen significant growth of more than 65%. The United States experienced economic growth of more than 42%. However, 13 countries experienced declines in GDP between 2008 and 2020, including Greece by more than 42% and Ireland, Spain, and Italy by more than 20%, due to various economic challenges and country-specific situations.

During the 2020 pandemic, declines in market capitalization were recorded in 22 of the 46 markets worldwide, with declines in European countries, Asia, or Latin America. In 2020, compared to 2019, the largest declines in market capitalization occurred in Mauritius, Colombia, and Brazil, and in Europe, it was Hungary, with a decrease of almost 15%.

Among the largest stock exchanges are the NYSE, Nasdaq, the USA, Japan Exchange Group Inc., the Shanghai Stock Exchange, and the London Stock Exchange Group. Small stock exchanges include the Colombo Stock Exchange, Mauritius Stock Exchange, Ljubljana Stock Exchange, Malta Stock Exchange, and Cyprus Stock Exchange. The largest stock exchanges in the world (Figure 2) constitute almost 80% of the total stock market capitalization, demonstrating the strength and degree of development of global financial centers, such as those in New York, Tokyo, London, and Shanghai.

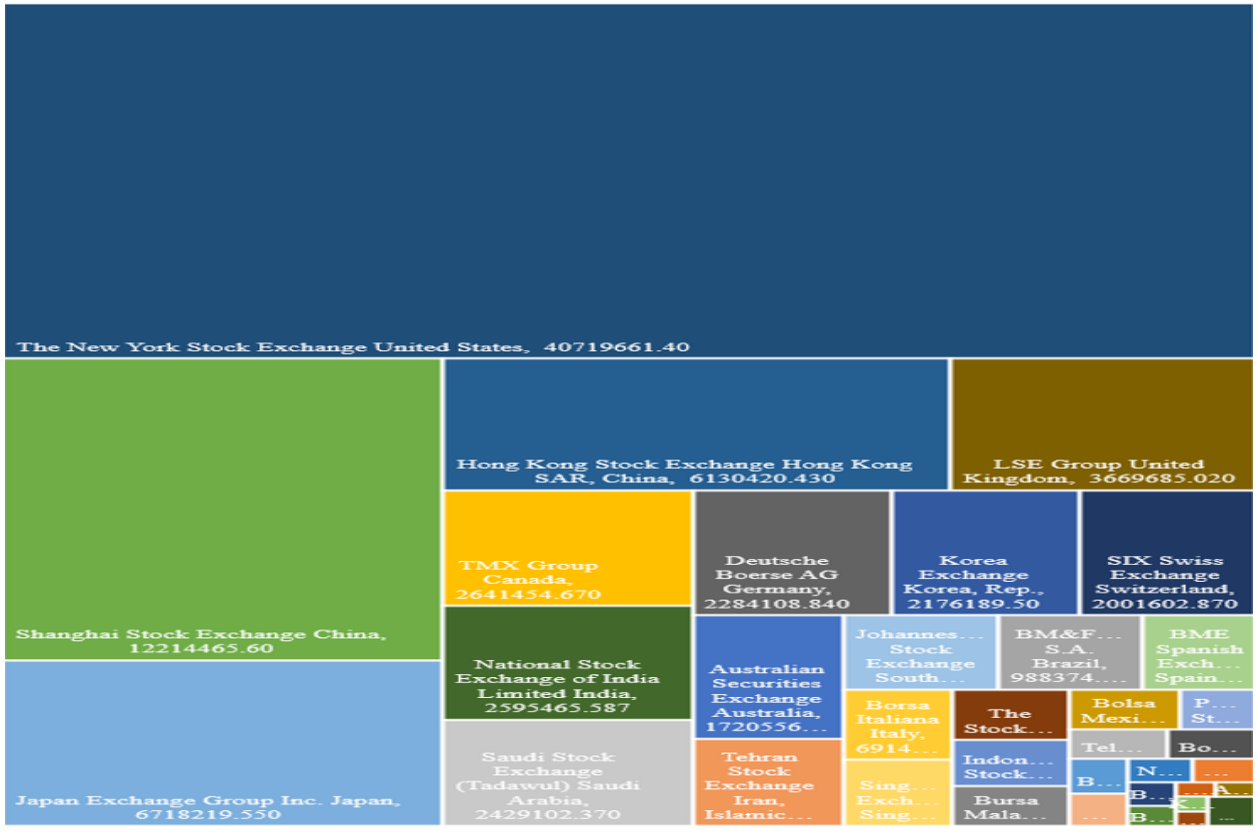



**Figure 2:** The largest stock exchanges in the world, in order of market capitalization (2020), mio. USD.

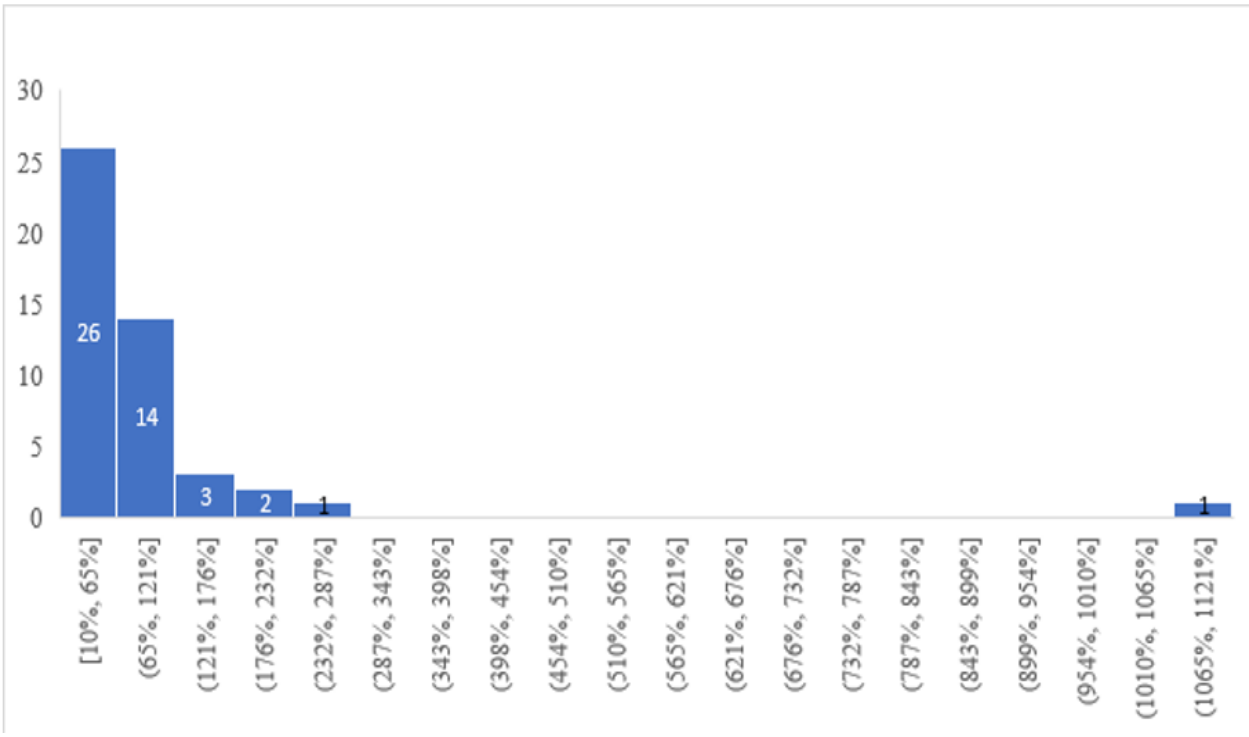



**Figure 3:** Average market capitalization to GDP split between 2008 and 2020.

Most stock exchanges, 26, have average values of stock market capitalization in GDP between 10% and 65%, 14 have average values between 65% and 121%, 3 have average values of stock market capitalization in GDP between 121% and 176%, and 4 have average values greater than 176% (Figure 3).

All the stock exchanges included in the study are presented in Table 2, with a summary of the indicators for the entire period. The table is ordered by the average indicator of stock market capitalization in GDP for 2008–2020.

Thus, the challenge of this study is to identify common stock exchange elements that serve small and medium stock exchanges in their development.

The independent variables include the state of the economy, financial intermediation, monetary policies, and stock exchanges, described in Table 3.

**Table 2:** List and main characteristics of the 47 analyzed stock exchanges, ordered by market capitalization indicator in GDP.

| No. | Stock exchange/ Country | Market capitalization in average GDP 2008-2020 | Market cap average 2008-2020 (million USD) | GDP 2020 (million USD) | MSCI Country Classification 2020 |
|---|---|---|---|---|---|
| 1 | Hong Kong Stock Exchange Hong Kong SAR, China | 1,121% | 3,334,347 | 344,943 | Developed |
| 2 | Johannesburg Stock Exchange, South Africa | 239% | 897,821 | 338,291 | Emerging |
| 3 | Singapore Exchange, Singapore | 216% | 642,986 | 348,392 | Developed |
| 4 | SIX Swiss Exchange, Switzerland | 207% | 1,416,903 | 741,999 | Developed |
| 5 | The New York Stock Exchange, United States of America | 135% | 24,477,903 | 21,060,474 | Developed |
| 6 | Malaysia Stock exchange, Malaysia | 131% | 395,831 | 337,456 | Emerging |
| 7 | LSE Group, United Kingdom | 127% | 3,493,404 | 2,697,807 | Developed |
| 8 | TMX Group, Canada | 120% | 2,000,523 | 1,647,598 | Developed |
| 9 | Luxembourg Stock Exchange, Luxembourg | 108% | 67,272 | 73,699 | Developed |
| 10 | Saudi Stock Exchange (Tadawul), Saudi Arabia | 103% | 749,035 | 734,271 | Emerging |
| 11 | Australian Securities Exchange, Australia | 101% | 1,313,461 | 1,330,382 | Developed |
| 12 | Bolsa de Comercio de Santiago, Chile | 98% | 240,226 | 254,258 | Emerging |
| 13 | Japan Exchange Group Inc., Japan | 90% | 4,634,938 | 5,048,790 | Developed |
| 14 | The Stock Exchange of Thailand, Thailand | 90% | 380,349 | 500,457 | Emerging |
| 15 | Korea Exchange, Korea, Rep. | 89% | 1,257,879 | 1,644,313 | Emerging |
| 16 | National Stock Exchange of India Limited, India | 84% | 1,747,694 | 2,671,595 | Emerging |
| 17 | Amman Stock Exchange, Jordan | 81% | 26,156 | 43,700 | Frontier |
| 18 | Philippine Stock Exchange, Philippines | 72% | 211,112 | 361,751 | Emerging |
| 19 | Tehran Stock Exchange Iran, Islamic Rep. | 69% | 218,032 | 239,735 | Emerging |
| 20 | BME Spanish Exchanges, Spain | 69% | 950,124 | 1,278,129 | Developed |
| 21 | Tel-Aviv Stock Exchange, Israel | 67% | 201,732 | 413,268 | Developed |
| 22 | Stock Exchange of Mauritius, Mauritius | 64% | 7,761 | 11,408 | Frontier |
| 23 | Shanghai Stock Exchange, China | 58% | 5,978,325 | 14,687,744 | Emerging |
| 24 | Oslo Bors, Norway | 55% | 241,013 | 367,633 | Developed |
| 25 | BM&FBOVESPA S.A., Brazil | 50% | 1,007,068 | 1,476,107 | Emerging |
| 26 | Bolsa de Valores de Colombia, Colombia | 47% | 146,387 | 270,151 | Emerging |
| 27 | Deutsche Boerse AG, Germany | 46% | 1,693,202 | 3,887,727 | Developed |
| 28 | Bolsa de Valores de Lima, Peru | 45% | 82,577 | 201,948 | Emerging |
| 29 | Indonesia Stock Exchange, Indonesia | 43% | 389,778 | 1,059,055 | Emerging |
| 30 | Irish Stock Exchange, Ireland | 41% | 109,697 | 428,609 | Developed |
| 31 | NZX Limited, New Zealand | 39% | 75,297 | 212,570 | Developed |
| 32 | Malta Stock Exchange, Malta | 38% | 4,328 | 15,253 | Frontier |
| 33 | Bolsa Mexicana de Valores, Mexico | 34% | 411,448 | 1,120,741 | Emerging |
| 34 | Muscat Securities Market, Oman | 34% | 26,247 | 75,909 | Frontier |
| 35 | Warsaw Stock Exchange, Poland | 31% | 160,862 | 599,443 | Emerging |
| 36 | Borsa Italiana, Italy | 30% | 611,811 | 1,897,462 | Developed |
| 37 | Wiener Borse, Austria | 27% | 113,219 | 435,049 | Developed |
| 38 | Borsa Istanbul, Türkiye | 26% | 210,717 | 720,338 | Emerging |
| 39 | The Egyptian Exchange Egypt, Arab Rep. | 24% | 58,756 | 383,818 | Frontier |
| 40 | Athens Stock Exchange (ATHEX), Greece | 24% | 58,440 | 188,480 | Emerging |

| | | | | | |
|---|---|---|---|---|---|
| 41 | Colombo Stock Exchange, Sri Lanka | 22% | 16,797 | 84,441 | Frontier |
| 42 | Kazakhstan Stock Exchange, Kazakhstan | 19% | 32,381 | 171,082 | Frontier |
| 43 | Cyprus Stock Exchange, Cyprus | 17% | 4,338 | 25,227 | Developed |
| 44 | Budapest Stock Exchange, Hungary | 17% | 23,997 | 157,227 | Emerging |
| 45 | Ljubljana Stock Exchange, Slovenia | 16% | 7,852 | 53,735 | Frontier |
| 46 | Bolsa de Comercio de Buenos Aires, Argentina | 11% | 54,537 | 385,741 | Frontier |
| 47 | Bucharest Stock Exchange, Romania | 10% | 19,381 | 251,363 | Frontier |

**Table 3.** Description of variables used in the analysis of macroeconomic and institutional determinants of global stock market development.

| Variable | Symbol | Description or Definition |
|---|---|---|
| Market capitalization relative to GDP | *MKTCAPGDP dependent variable* | Market capitalization at the end of the year relative to the country's GDP at the end of the year. Data: World Bank for market capitalization and GDP, in million USD, own processing, percentage |
| Money supply in the broad sense, share of GDP | M3GDP | Amount of currency outside banks; demand deposits other than central government deposits; fixed, savings, and foreign currency deposits of resident sectors other than central government; other. The indicator is included as a share of GDP. Data: World Bank, percentage |
| Household savings, share of GDP | ECONLOCGDP | Gross domestic savings are calculated as GDP minus final consumption expenditure (total consumption). The indicator is included as a share of GDP. Data: World Bank, percentage |
| Total banking credit to local companies, share of GDP | *LOCCREDGDP* | Domestic credit to the private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, trade credit, and other accounts receivable, which establish a repayment receivable. The indicator is included as a share of GDP. Data: World Bank, percentage |
| Inflation | INFL | Inflation, as measured by the consumer price index, reflects the annual percentage change in the cost for the average consumer to purchase a basket of goods and services. Data: World Bank, percentage |
| Investment rate, share of GDP | *INVRATEGDP* | The investment rate is calculated as the ratio of gross fixed capital to gross disposable income. The indicator is included as a share of GDP. Data: World Bank, percentage |
| Industrial production, share of GDP | *INDPRODGDP* | Manufacturing as a share of GDP refers to industries belonging to the International Standard Industrial Classification (ISIC). Value added is the net output of a sector after adding all outputs together and subtracting intermediate inputs. The indicator is included as a share of GDP. Data: World Bank, percentage |
| Foreign direct investment, share of GDP | FDIGDP | Foreign direct investment is net investment inflows to acquire a controlling interest (10 percent or more of voting shares) in an enterprise operating in an economy different from that of the investor. Net inflows include new investment inflows minus disinvestment in the reporting economy by foreign investors and are divided by GDP. Data: World Bank, percentage |
| Annual change in GDP | GDPGR | The annual percentage growth rate of GDP at market prices is based on constant local currency. GDP is the sum of gross value added by all resident producers in the economy, plus any taxes on products and minus any subsidies not included in the value of products. Data: World Bank, percentage |
| Voice and responsibility | GVOC | The perception of the extent to which citizens of a country can participate in the election of the Government, as well as freedom of expression, freedom of association, and freedom of the press. Data: World Bank, points |
| Political stability and absence of violence/terrorism | GSTAB | Perception of the likelihood of political instability and/or politically motivated violence, including terrorism. Data: World Bank, points |
| Government efficiency | GGUV | The perception of the quality of public services, the quality of public service and the degree of independence from political pressure, the quality of policymaking and implementation, and the credibility of government commitment to such policies. Data: World Bank, points |
| Normative quality | GNORM | Perception of the Government's ability to formulate and implement policies and regulations that enable and promote private sector development. Data: World Bank, points |
| Rule of law | GSTAT | The perception of how much agents trust society's rules and abide by them, particularly the quality of contract performance, property rights, trust in the police and courts, and the likelihood of crime and violence. Data: World Bank, points |
| Control of corruption | GCORR | The perception of how much public power is exercised for private gain, including minor and large forms of corruption, and state "capture" by private elites and interests. Data: World Bank, points |

The summary data of all analyzed variables are included in Table 4. The dependent variable used is Market capitalization as a ratio to GDP, which allows a comparison between countries and is calculated based on two data series, Market capitalization, in million USD, and GDP, in million USD.

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**Table 4:** Summary values of variables used in the analysis of macroeconomic and institutional determinants for the development of global stock exchanges.

| No. | Indicator | U.M | Average | Median | Minimum | Maximum | Standard deviation | No. obs. |
|---|---|---|---|---|---|---|---|---|
| A | MKTCAP | Mil. USD | 1,293,438 | 22,846 | 1,995 | 40,719,661 | 3,892,064 | 604 |
| B | GDP (GDP) | Mil. USD | 1,334,908 | 376,838 | 8,696 | 21,380,976 | 2,996,636 | 611 |
| 1 | MKTCAPGDP | % | 91.701 | 50.538 | 6.274 | 1777.22 | 168.406 | 604 |
| 2 | M3GDP | % | 93.632 | 78.000 | 23.000 | 454.000 | 63.833 | 487 |
| 3 | ECONLOCGDP | % | 24.589 | 23.633 | 4.661 | 52.75227 | 8.936 | 591 |
| 4 | LOCCREDGDP | % | 82.767 | 72.977 | 11.822 | 258.9028 | 48.438 | 585 |
| 5 | LENDINATE | % | 7.617 | 5.330 | 67.250 | 0.500 | 7.414 | 603 |
| 6 | INFL | % | 4.158 | 2.275 | (25.128) | 49.195 | 7.098 | 611 |
| 7 | INVRATEGDP | % | 24.221 | 23.404 | 11.892 | 54.955 | 6.375 | 603 |
| 8 | INDPRODGDP | % | 14.940 | 14.911 | 0.953 | 34.651 | 6.325 | 610 |
| 9 | FDIGDP | % | 8.143 | 2.386 | (104.060) | 279.361 | 26.635 | 611 |
| 10 | GDPGR | % | 2.296 | 2.496 | (14.597) | 24.370 | 3.851 | 611 |
| 11 | GVOC | Pts | 0.372 | 0.596 | (2.270) | 1.738 | 0.985 | 602 |
| 12 | GSTAB | Pts | 0.154 | 0.268 | (2.009) | 1.595 | 0.873 | 602 |
| 13 | GGUV | Pts | 0.749 | 0.674 | (0.993) | 2.437 | 0.784 | 602 |
| 14 | GNORM | Pts | 0.686 | 0.694 | (2.529) | 2.260 | 0.914 | 602 |
| 15 | GSTAT | Pts | 0.612 | 0.523 | (1.714) | 2.036 | 0.920 | 602 |
| 16 | GCORR | Pts | 0.568 | 0.325 | (1.090) | 2.391 | 0.964 | 602 |

In annual GDP changes, the largest economies had the lowest volatility of the indicator. The average annual change in GDP (GDPGR) is 2.3% for all countries and all years, with a standard deviation of 3.85%. In 2020, during the outbreak of the war in Ukraine, the largest decline occurred in the entire sample, followed by 2009, the first year after the global financial crisis.

Inflation (INFL), which includes a measure of broad-based price growth, averages 4.1% and has a standard deviation of 7.1%. In most years, negative inflation occurred in Oman, reaching 19% in 2015 and 25% in 2009. Other countries with negative inflation are Saudi Arabia (2009, 2015, 2020), Malaysia, Norway, Ireland, Singapore, and Canada, most of which experienced negative inflation in 2009.

In terms of savings as a share of GDP (ECONLOCGDP), countries had, on average, a rate of 24.6% and a standard deviation of 8.9%.

The investment ratio to GDP (INVRATEGDP) has a mean of 24.2% and a standard deviation of 6.3%. China dominated by far, with values above 18% in almost all years, followed by Ireland in 2019 and 2020, with 55% and 43.6%, respectively. Iran, India, and Sri Lanka followed, with rates above 30% in most years.

Industrial production to GDP (INDPRODGDP) averages 14.9% and deviates by 6.3%. The highest rates are in Ireland, with more than 32% in recent years, followed by China, Korea, and Thailand, with more than 20% in most years. The lowest figures are in Hong Kong, below 2%, in the context of massive growth in services at the expense of manufacturing.

Foreign domestic investment to GDP (FDIGDP) has a mean of 8.1% and a standard deviation of 26.6%. Negative values of this indicator were recorded in Cyprus, at over 104%, followed by Luxembourg, at 41% in 2017, and Hungary in 2018, at 40%, when the state bought back foreign investors' stakes in areas such as telecommunications and banks.

The lending interest rate (LENDINRATE) is 7.6%, and the standard deviation is 7.41%. Peaks were recorded in Argentina and Brazil, with more than 30% in most years, followed by Peru, with an average of 17%.

The total bank credit granted to local companies in GDP (LOCCREDGDP), which illustrates the degree of development of banking intermediation, averaged 82.7% in the analyzed period, with an average standard deviation of 48.4%.

Institutional factors allow the analysis of the qualitative dimension of the general framework in which stock exchanges operate. We used 6 governance indicators, calculated by the World Bank based on 30 data sources, to determine the perception of the governance system. A higher value of these indicators is expected to contribute positively to the development of the capital market. They are calculated based on 3 criteria: they are calculated by credible organizations, they provide comparisons between countries, and they have been continuously updated since 1996. The analyzed values range from -2.5 to 2.5, with the highest corresponding to better governance.

The means of most indicators exceed 0.5 for Government Efficiency (GGUV), Normative Quality (GNORM), Rule of Law (GSTAT), and Corruption Control (GCORR), with mean deviations greater than 0.9.

Regarding Voice and Accountability (GVOC), the mean is 0.4, and the standard deviation is close to 1.

Political stability and absence of violence/terrorism (GSTAB) stood out with a mean of 0.15 and a standard deviation of 0.8.

The USA recorded decreases in all indicators, especially in the second part of the analyzed period; for example, the GVOC decreased from 1.1 (2011) to 0.9 (2020), and the GSTAB decreased from 0.59 (2011) to 0.03

(2020). The year 2011 was the first year for which data were available.

## 5. METHODOLOGY

According to Gujarati (2004), panel data can more easily detect and measure the effects of indicators than can time series, especially in terms of the dynamics of change. We estimated an econometric model using the ordinary least squares (OLS) method. This method is used to estimate the unknown parameters in a linear regression model and minimizes the sum of the squares of the vertical differences between the reactions observed in the data set and the reactions predicted by linear approximation.

According to Baltagi, B. H. (1995), two models are distinguished for solving the equation related to a series of panel data: the fixed effects regression model and random effects model, depending on the results obtained from testing the hypotheses related to the coefficients or the term error. In the fixed effect model, the parameters are assumed to vary between individuals, while in random effects model, the parameters are assumed to take the mean of all values, and the error or random variable takes the differences of the individual parameters from the mean. To determine which model is suitable for panel data analysis, the Hausman test is used, with the null hypothesis that there are no statistically significant differences between the coefficient estimates from the fixed-effect model and the coefficient estimates from the random model-model effect. After applying the Hausman test, the null hypothesis was rejected; thus, the fixed effects model, which accepts heterogeneity between countries, was used.

To analyze the dynamic impact of macroeconomic factors on market capitalization in GDP, we analyze the stationarity of the variables through the unit root test. In the case of stationary data, we use the VAR model of Brooks (2008) and Necula (2010). In the case of nonstationary and cointegrated data, we use the VEC model, which is a specific case of VAR. Econometric tools are then applied to identify the response to various impulses, the effects of macroeconomic factors and the market context on the development of capital markets and adjustment mechanisms.

To use the Granger causality test (1969), we use the stationary data of all variables to observe whether certain historical data of some data series contribute to the prediction of future data for the observed data series.

The VAR (vector autoregressive) model is an analysis model that treats each variable in the system as a function of lags, past values, of all variables and allows the integration of the presence of a long-term relationship between several variables in the model. The analysis of the dynamic impact of innovations on the system of variables is used, which has the advantage of inferring how the variables used respond to shocks, is widely used in macroeconomic modeling and is included in most econometric programs, but it also has the disadvantage of lacking theoretical foundations. The VAR model assumes that all variables depend on their own lags and the lags of other variables.

The first part of the eViews output for the VAR model shows standard OLS regression statistics for each equation. The results are calculated separately for each equation using its residuals and are displayed in the appropriate column. The numbers shown at the bottom of the output table in eViews are summaries of the statistics of the VAR system as a whole. eViews reports the estimated coefficient, its standard error, and t test statistics.

In the case of VAR, the analysis of coefficients in each equation provides only partial information, so we can analyze the synthetic picture of the dynamic behavior of the VAR model using impulse response functions, which describe how each variable reacts to its shock or shocks in the other variables, according to Necula (2010). A shock in the equation of variable i directly affects variable i and is transmitted to all other endogenous variables through the dynamic structure of the VAR model. Variance decomposition reveals the relative importance of each innovation in terms of its effect on the variation and dynamics of the variables in the model. In VAR models, the causal relationships between variables can be established using the Granger causality that exists between variables.

A series of additional tests is required to validate the VEC model:

1. Testing the residuals for unit root analysis showed that all residual series are stationary.
2. Inverse roots of the characteristic AR polynomial, all values up to 1.
3. The residual LM serial correlation VAR accepts the null hypothesis that there is no serial correlation of the errors up to lag 2.
4. Autocorrelations of residuals were not detected because all the data were included in the interval $[-1; 1]$.

## 6. RESULTS

Variables related to 47 stock exchanges for 13 years (2008–2020) and 15 independent indicators were pooled into a panel database. Thus, we obtain 604 data points for the dependent variable, stock market capitalization in GDP. The analysis of preliminary correlations described in Table 5 indicates a positive correlation of market capitalization in GDP with local lending in GDP, broad money, foreign direct investment, local economies, and all institutional factors, as well as a negative correlation with interest rate, GDP growth, inflation, industrial production, and investment rate.

**Table 5:** Correlations and statistical significance of the linkages between market capitalization in GDP and macroeconomic and institutional variables.

| **Correlation p=Probability** | **Mktcapgdp** |
|---|---|
| MKTCAPGDP | 1,000000 |
| M3GDP | 0,760502 |
| p | 0,0000 |
| LOCCREDGDP | 0,549433 |
| p | 0,0000 |
| LENDINRATE | -0,134779 |
| p | 0,0041 |
| INVRATEGDP | -0,061372 |
| p | 0,1928 |
| INFL | -0,113699 |
| p | 0,0156 |
| INDPRODGDP | -0,322048 |
| p | 0,0000 |
| FDIGDP | 0,490925 |
| p | 0,0000 |
| ECONLOCGDP | 0,074579 |
| p | 0,1133 |
| GDPGR | -0,072646 |
| p | 0,1230 |
| GGUV | 0,363320 |
| p | 0,0000 |
| GCORR | 0,318643 |
| p | 0,0000 |
| GNORM | 0,321206 |
| p | 0,0000 |
| GSTAB | 0,184795 |
| p | 0,0001 |
| GSTAT | 0,307239 |
| p | 0,0000 |
| GVOC | 0,071882 |
| p | 0,1270 |

source: eViews, own processing

Following the stationarity analysis, market capitalization (dependent variable), savings, total local bank credit, inflation, investment, industrial production to GDP, foreign direct investment, political stability, the absence of violence/ terrorism, and lending interest rate were found to be stationary.

**Table 6:** Results of the Granger test for the market capitalization to GDP indicator to macroeconomic and institutional variables.

| **Macroeconomic factor** | **MKTCAPGDP There is no Granger-type cause for the macroeconomic factor** | **The macro factor is not a Granger-type cause for MKTCAPGDP** |
|---|---|---|
| Diff_M3GDP | 13,205*** | 12,358*** |
| ECONLOCGDP | 0,399 | 0,830 |
| LOCCREDGDP | 12,510*** | 0,126 |
| LENDINRATE | 0,297 | 0,507 |
| INFL | 0,216 | 4,837*** |
| INVRATEGDP | 2,812* | 2,419* |
| INDPRODGDP | 0,512 | 0,597 |
| FDIGDP | 0,757 | 0,715 |
| Diff_GDPGR | 0,405 | 9,935*** |
| DIFF_GVOC | 2,196 | 1,679 |
| GSTAB | 6,733*** | 14,402*** |
| DIFF_GGUV | 0,195 | 2,664* |
| DIFF_GNORM | 1,612 | 0,950 |
| DIFF_GSTAT | 0,641 | 0,526 |
| DIFF_GCORR | 0,032 | 0,159 |

**Note:** The F statistics come from the F test for the null hypothesis that MKTCAPGDP variables do not cause Granger macroeconomic variables in the first column and vice versa in the second column., **, * indicates the rejection of the null hypothesis at materiality levels of 0.1%, 1%, 5%.

Table 6 shows that M3GDP, INFL, GDPGR, and GGUV Granger influence the dependent variable MKTCAPGDP. The dependent variable Granger influences M3GDP, political stability, and the absence of

violence/terrorism, so we observe a bidirectional relationship between these variables. In addition, we observe that MKTCAPGDP Granger influences INVRATEGDP and LOCCREDGDP.

As a first step, we analyzed all stationary variables with the Ordinary Least Squares (OLS) methodology. We obtained only 2 valid simple regressions involving 3 variables. The first regression shows that LOCCREDGDP is statistically significant variable and has a positive impact on the ratio of market capitalization to GDP.

**Table 7:** Regressions obtained to determine the impact of local bank lending on market capitalization in GDP for 47 global stock exchanges.

| **Dependent variable MKTCAPGDP** | **Pooled OLS Model 1** | ***Fixed Effect Model 2*** | **Random Effect Model 3** |
|---|---|---|---|
| LOCCREDGDP | 1,570*** | 0,583*** | 0,645*** |
| c | -41,272*** | 40,625*** | 33,757 |
| Remarks (number) | 579 | 579 | 579 |
| R2 | 0,199 | 0,940 | 0,05 |
| F | 143,974 | 178,700 | 30,549 |
| Prob (F-State) | 0,000 | 0,000 | 0,000 |

**Note:** ***, **, *, materiality levels of 0.1%, 1%, 5%.

Using the Hausman test, the null hypothesis was rejected; thus, the fixed effects model, which accepts heterogeneity between countries, was used. According to Model 2 in Table 7, for a 1-unit increase in LOCCREDGDP, the ratio of stock market capitalization to GDP (MKTCAPGDP) increases by 0.58 units on average. Moreover, LOCCREDGDP explains 94% of the effect of the dependent variable MKTCAPGDP on global capital markets.

The second regression, presented in Table 8, includes broad money, used at the first difference, which has a positive impact, and Political stability and the absence of violence/terrorism, which have negative impacts. In the event of political instability, markets have an associated high volatility, which attracts new investors and thus transactions, which can cause increased activity in the capital market. Increasing broad money can generate new liquidity that can potentially be redirected to the capital market by investors and companies.

**Table 8.** Regressions obtained for the impact of money supply and political stability on market capitalization in GDP on global stock markets.

| **Dependent variable MKTCAPGDP** | **Pooled OLS Model 1** | **Fixed Effect Model 2** | **Random Effect Model 3** |
|---|---|---|---|
| DIFF_M3GDP | 7,507*** | 1,748*** | 1,817*** |
| GSTAB | 37,033*** | -30,026*** | -22,662 |
| t-statistic | 3,883 | -3,815 | -3,024 |
| c | 80,005<br>(0,000) | 92,425<br>(0,000) | 94,429<br>(0,000) |
| Observations | 437 | 437 | 437 |
| R2 | 0,125 | 0,957 | 0,092 |
| F | 31,017 | 216,319 | 22,172 |
| Prob (F-State) | 0,000 | 0,000 | 0,000 |

**Note:** ***, **, *, significance levels of 0.1%, 1%, 5%.

Using the Hausman test, the null hypothesis was rejected; thus, the fixed effects model, which accepts heterogeneity between countries, was used. According to Model 2 in Table 8, when political stability (GSTAB) decreases by 1 unit, MKTCAPGDP increases by an average of 30 units. Once the GSTAB values oscillate between -2.5 and 2.5, the increase of one unit is a significant increase; hence, the impact on MKTCAPGD. When DIFF_M3GDP increases by 1 unit, MKTCAPGDP increases, on average, by 1.74 units. The econometric model consisting of broad money and political stability explains 96% of the dependent variable MKTCAPGDP.

Additional tests were performed to confirm the validity of the regressions, particularly the Wald test, where the null hypotheses were rejected, and the regression coefficients were zero. We can conclude that all the coefficients are different from zero and are statistically significant.

In addition to the classic regression model, we analyze the long-term relationships and impacts of the 9 stationary variables using the autoregressive VAR model. The VAR lag order selection criteria test was performed on level variables, with tests indicating 2 lags.

We note the valid long-run equilibrium relationship obtained using the 2-lagged variables model with an adjusted $R^2$ of 0.96, as presented in Annex 1. In addition, Figure 4 presents the results of the innovations of the variables analyzed on MKTCAPGDP, and Table 9 includes the variance decomposition of the dependent variable.

The GSTAB indicator explained most of the variance in MKTCAPGDP, averaging more than 3%. Although we observe from the VAR model, in Annex 1, a positive coefficient for observations with 1 lag indicates that the long-term impact is negative. The indicator is relevant in the context of the analyzed database, where we noticed

extremes in the case of economies with a more volatile political and civic sphere. Even though volatility may generate greater interest and trading in the short term, in the long term, political instability cannot be associated with the development of capital markets. Trust-based capital markets need an efficient operating framework and a predictable legislative framework, which an unstable political regime cannot support.

INVRATEGDP has the second largest weight in the variance of MKTCAPGDP and has negative coefficients in the VAR model. Figure 4 also shows a long-term negative impact. We can estimate that although the countries make investments, they are disconnected from the stock exchange activity, either because companies are not listed on the stock exchange or because they are not companies that rely on capital market financing through IPOs.

According to Figure 4, LOCCREDGDP has a positive coefficient with a lag of 1 and a positive increasing long-run impact. Financial intermediation growth positively impacts the development of the capital market, which is pursuing a complementary role. Given the structure of the database, with most markets in the frontier and emerging category, many markets are in the initial stages of development, so the involvement of the banking sector is crucial.

FDIGDP shows small coefficients and slight oscillations in the early years but in the negative territory in the long term. Foreign investments are in closed companies that remain so, or if they are made in listed companies, they risk being delisted.

LENDINRATE has a maximum positive impact in the second year, remaining above zero in the long run. The impact of rising interest rates on market capitalization to GDP is positive in the long term, as rising credit prices drive companies to look for alternative financing options through the stock market, and investors seek profitable investments that are above inflation.

Among the other indicators, we see a low but positive impact of INFL and a negative impact of ECONLOCGDP on MKTCAPGDP. In the short term, moderate inflation may be beneficial to the capital market without significantly impacting the stability of the economic environment and investment prospects. However, over the long term, inflation can negatively influence market capitalization to GDP, as it can reduce asset values and generate economic uncertainty, explaining much of the change in market capitalization to GDP.

According to Figure 4, INDPRODGDP has small coefficients and a low but positive long-term impact. The situation can be like that of the INVRATEGDP indicator, with the mention that there are manufacturing companies that are listed on the stock market or resort to the capital market, thus contributing to the increase in the MKTCAPGDP and implicitly to the development of the capital market.

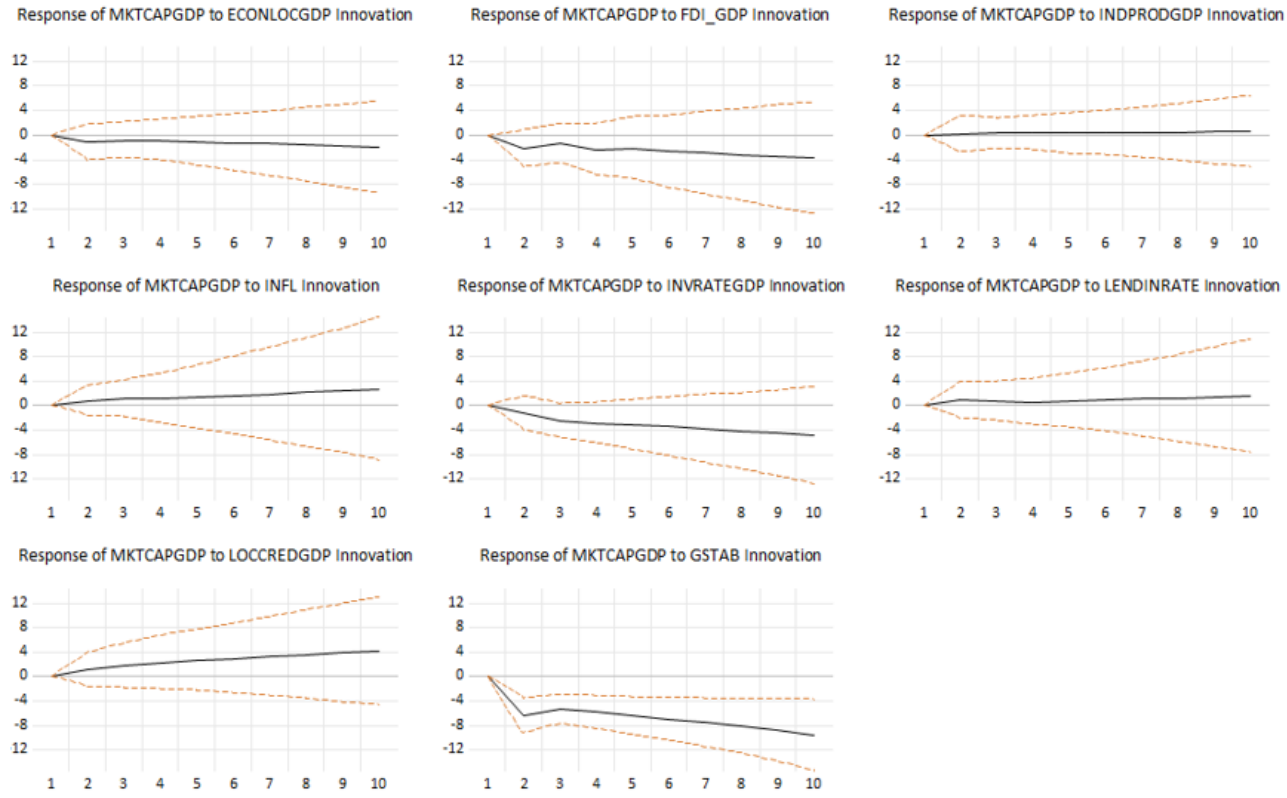



**Figure 4:** Long-term impact of macroeconomic and institutional variable impositions on global market capitalization in GDP: 10-year effects.

**Table 9:** MKTCAPGDP variance decomposition of the impact of macroeconomic and institutional factors over 10 years.

| Period | MKTCAPGDP | ECONLOCGDP | FDIGDP | INDPRODGDP | INFL | INVRATEGDP | LENDINRATE | LOCCREDGDP | GSTAB |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 100,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
| 2 | 96,932 | 0,084 | 0,292 | 0,001 | 0,039 | 0,094 | 0,052 | 0,088 | 2,380 |
| 3 | 95,837 | 0,086 | 0,264 | 0,004 | 0,081 | 0,309 | 0,052 | 0,198 | 2,733 |
| 4 | 95,175 | 0,082 | 0,343 | 0,006 | 0,102 | 0,459 | 0,048 | 0,300 | 2,950 |
| 5 | 94,736 | 0,086 | 0,361 | 0,007 | 0,121 | 0,559 | 0,050 | 0,382 | 3,149 |
| 6 | 94,326 | 0,095 | 0,405 | 0,008 | 0,141 | 0,645 | 0,054 | 0,450 | 3,301 |
| 7 | 93,976 | 0,104 | 0,435 | 0,008 | 0,162 | 0,718 | 0,058 | 0,509 | 3,430 |
| 8 | 93,668 | 0,114 | 0,467 | 0,009 | 0,184 | 0,782 | 0,064 | 0,558 | 3,543 |
| 9 | 93,396 | 0,125 | 0,494 | 0,010 | 0,207 | 0,836 | 0,069 | 0,599 | 3,644 |
| 10 | 93,150 | 0,136 | 0,519 | 0,011 | 0,231 | 0,882 | 0,076 | 0,633 | 3,735 |

In the case of the 7 nonstationary variables, we performed a cointegration test to determine whether the group of nonstationary series is cointegrated. Despite cointegration being present, using the VEC model did not generate statistically significant results. Thus, the following variables could not be confirmed as significant: GDPGR - Annual GDP change, GVOC - Voice and accountability, GGUV - Government efficiency, GNORM - Normative quality, GSTAT - Rule of law, and GCORR - Control of corruption. Thus, out of the 6 governance indicators, only one proved relevant and statistically significant, namely, political stability and absence of violence/terrorism (GSTAB).

## 7. CONCLUSIONS

This study analyzed how capital markets and the countries in which they operate reacted to the last two major events of the past decades, the 2008 global financial crisis and the COVID-19 pandemic, as well as the impact of 15 independent variables on market capitalization in GDP. This research explored the evolution of 47 selected global stock markets, including mature and emerging markets, from 2008 to 2020. By analyzing the ratio between stock market capitalization and GDP as an indicator of capital market development, we can conclude that political stability—the absence of violence or terrorism—along with monetary policy are determinants of capital market development.

Most countries experienced economic growth between 2008 and 2020, an average of 38%, with three times increase in the average market capitalization. Despite turbulent times, we have witnessed both economic and capital market development, doubling the indicator of market capitalization to GDP from 60% in 2008, to 132% in 2020. Almost half of the markets, though, recorded negative market capitalization in the 2020 post-pandemic year and the start of the war in Ukraine, with declines in European countries, Asia or Latin America.

Analyzing a broad range of macroeconomic and institutional variables using pooled OLS regression and VAR model brought significant results on common factors influencing stock markets globally. Key results show that local bank credit, political stability, and broad money can play a significant role in capital market development. One unit increase in local bank credit could increase market capitalization to GDP on average by 0.58 units. The one unit increase in the difference broad money to GDP indicator could increase market capitalization to GDP on average by 1.74 units. Thus, banking activity and monetary policy has a complementary effect on the capital markets. Out of the institutional factors, a drop in political stability can increase market capitalization to GDP, most probably in the short term, as in the long run, it may have a negative effect.

Among the newly tested variables, we observe relevant results in connection to the lending interest rate, a component of monetary policy, as well.

The newly analyzed lending interest rates may have a positive impact on market capitalization to GDP in the long run, with a two year delay, confirming the hypothesis tested. A higher interest rate can attract investors to capital markets in search of higher returns, especially if they are linked to higher inflation, as well as companies may seek more accessible financing, at lower costs.

Industrial production was proven significant, with a reduced positive impact on the market capitalization to GDP, as more and more companies present on the stock markets are not necessarily industrial or production companies, but also originating from services, or IT&C sectors, etc.

Foreign direct investment to GDP, a newly analyzed indicator, proved significant, and estimated to have a negative impact on market capitalization in GDP in the long run, rejecting the tested hypothesis. This may be influenced by the fact that foreign direct investment may be directed to sectors do not present on the stock market or even associated with risks of delistings, in the case of strategic investors.

Among other results, we note the negative impact of the investment rate to GDP, as most companies probably realize the investments are not necessarily listed or do not use capital markets financing. Inflation is a significant variable, highlighting a reduced, but positive impact. Savings were proven to be significant but with a negative impact. In the long run, the savings can be attracted to the stock exchange through financial education campaigns and attractive investment opportunities.

GDP growth and other institutional factors were not proven to be significant.

In terms of public policy suggestions, political and institutional stability could be given attention. Investors and companies tend to avoid markets characterized by political instability and conflicts, so maintaining a predictable political environment can stimulate the development of capital markets in the long run. Promoting financial intermediation, especially in less developed markets, can support the development of the banking sector and the financial system in general. Improving access to credit for SMEs and local businesses is the first step in supporting the expansion of companies with long-term listing potential. Monitoring inflation and interest rates is proving important, as is keeping them at levels that stimulate investment and support growth. Moderate inflation and low-interest rates can create a stable and predictable investment environment that can boost investor confidence in capital markets. Promoting financial and investment education among the population could increase awareness and understanding of capital markets, and more private companies could become public and traded on the stock exchange.

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**Annex 1:** Results of the VAR analysis on macroeconomic determinants of market capitalization in GDP.

Vector Autoregression Estimates
Date: 03/03/24 Time: 12:41
Sample (adjusted): 2010 2020
Included observations: 452 after adjustments
Standard errors in ( ) & t-statistics in [ ]

| | MKTCAPGDP | ECONLOCGDP | FDI_GDP | INDPRODGDP | INFL | INVRATEGDP | LENDINRATE | LOCCREDGDP | GSTAB |
|---|---|---|---|---|---|---|---|---|---|
| MKTCAPGDP(-1) | 0.833548 | 0.000434 | 0.013451 | -0.000739 | -0.007185 | 0.001514 | 0.001151 | -0.008559 | 0.000858 |
| | (0.05584) | (0.00380) | (0.03729) | (0.00173) | (0.00690) | (0.00310) | (0.00360) | (0.00991) | (0.00029) |
| | [ 14.9282] | [ 0.11420] | [ 0.36068] | [-0.42728] | [-1.04127] | [ 0.48774] | [ 0.31995] | [-0.86377] | [ 2.92977] |
| MKTCAPGDP(-2) | 0.242979 | -0.000208 | -0.015347 | 0.000758 | 0.006673 | -0.002455 | -0.001941 | 0.017436 | -0.001073 |
| | (0.05800) | (0.00394) | (0.03874) | (0.00180) | (0.00717) | (0.00323) | (0.00374) | (0.01029) | (0.00030) |
| | [ 4.18927] | [-0.05271] | [-0.39616] | [ 0.42202] | [ 0.93104] | [-0.76133] | [-0.51976] | [ 1.69411] | [-3.52613] |
| ECONLOCGDP(-1) | -0.426060 | 0.882912 | -0.215818 | -0.001008 | -0.270672 | 0.070463 | -0.084943 | 0.085298 | 0.001355 |
| | (0.71513) | (0.04864) | (0.47765) | (0.02215) | (0.08837) | (0.03977) | (0.04605) | (0.12690) | (0.00375) |
| | [-0.59578] | [ 18.1517] | [-0.45183] | [-0.04551] | [-3.06293] | [ 1.77197] | [-1.84442] | [ 0.67216] | [ 0.36113] |
| ECONLOCGDP(-2) | 0.575051 | 0.063225 | 0.299007 | 0.004340 | 0.168949 | 0.010314 | 0.065874 | -0.001584 | -0.000327 |
| | (0.71361) | (0.04854) | (0.47663) | (0.02211) | (0.08818) | (0.03968) | (0.04596) | (0.12663) | (0.00374) |
| | [ 0.80584] | [ 1.30262] | [ 0.62733] | [ 0.19635] | [ 1.91591] | [ 0.25993] | [ 1.43341] | [-0.01251] | [-0.08728] |
| FDI_GDP(-1) | -0.096272 | -0.006355 | 0.227546 | 0.001916 | -0.003299 | -0.002372 | -0.001909 | 0.021398 | -0.000383 |
| | (0.07010) | (0.00477) | (0.04682) | (0.00217) | (0.00866) | (0.00390) | (0.00451) | (0.01244) | (0.00037) |
| | [-1.37328] | [-1.33282] | [ 4.85966] | [ 0.88245] | [-0.38081] | [-0.60840] | [-0.42291] | [ 1.72010] | [-1.04089] |
| FDI_GDP(-2) | 0.009555 | 0.011373 | 0.404026 | -0.000188 | 0.007970 | 0.003833 | 0.000584 | -0.029663 | 0.000276 |
| | (0.07134) | (0.00485) | (0.04765) | (0.00221) | (0.00882) | (0.00397) | (0.00459) | (0.01266) | (0.00037) |
| | [ 0.13394] | [ 2.34396] | [ 8.47960] | [-0.08515] | [ 0.90409] | [ 0.96627] | [ 0.12706] | [-2.34325] | [ 0.73635] |
| INDPRODGDP(-1) | -0.095664 | 0.169315 | -0.197621 | 0.904526 | 0.220550 | 0.197709 | 0.079537 | -0.200933 | -0.005373 |
| | (1.53333) | (0.10429) | (1.02415) | (0.04750) | (0.18948) | (0.08526) | (0.09875) | (0.27209) | (0.00804) |
| | [-0.06239] | [ 1.62347] | [-0.19296] | [ 19.0426] | [ 1.16399] | [ 2.31883] | [ 0.80547] | [-0.73847] | [-0.66811] |
| INDPRODGDP(-2) | 0.291389 | -0.108347 | 0.000617 | 0.089428 | -0.207115 | -0.191161 | -0.083396 | 0.174892 | 0.005960 |
| | (1.54673) | (0.10520) | (1.03309) | (0.04791) | (0.19113) | (0.08601) | (0.09961) | (0.27447) | (0.00811) |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | [ 0.18839] | [-1.02989] | [ 0.00060] | [ 1.86638] | [-1.08362] | [-2.22262] | [-0.83724] | [ 0.63720] | [ 0.73467] |
| INFL(-1) | 0.086027 | -0.000177 | 0.154022 | -0.015142 | 0.484856 | 0.024393 | 0.076256 | 0.097511 | -0.002201 |
| | (0.38472) | (0.02617) | (0.25697) | (0.01192) | (0.04754) | (0.02139) | (0.02478) | (0.06827) | (0.00202) |
| | [ 0.22361] | [-0.00676] | [ 0.59939] | [-1.27055] | [ 10.1987] | [ 1.14025] | [ 3.07782] | [ 1.42832] | [-1.09099] |
| INFL(-2) | 0.047777 | -0.044312 | 0.095198 | -0.009453 | 0.266140 | -0.029184 | 0.063820 | -0.056449 | 1.13E-06 |
| | (0.32168) | (0.02188) | (0.21486) | (0.00997) | (0.03975) | (0.01789) | (0.02072) | (0.05708) | (0.00169) |
| | [ 0.14852] | [-2.02526] | [ 0.44308] | [-0.94861] | [ 6.69525] | [-1.63157] | [ 3.08070] | [-0.98889] | [ 0.00067] |
| INVRATEGDP(-1) | -0.502593 | 0.008649 | -0.348082 | -0.029758 | -0.034432 | 0.859538 | 0.063927 | 0.053173 | 0.005772 |
| | (0.81287) | (0.05529) | (0.54293) | (0.02518) | (0.10045) | (0.04520) | (0.05235) | (0.14425) | (0.00426) |
| | [-0.61830] | [ 0.15643] | [-0.64111] | [-1.18175] | [-0.34278] | [ 19.0162] | [ 1.22119] | [ 0.36863] | [-1.35388] |
| INVRATEGDP(-2) | -0.074211 | -0.009542 | 0.295386 | 0.021372 | 0.094830 | 0.010764 | -0.058277 | 0.015079 | -0.008718 |
| | (0.78512) | (0.05340) | (0.52440) | (0.02432) | (0.09702) | (0.04366) | (0.05056) | (0.13932) | (0.00412) |
| | [-0.09452] | [-0.17869] | [ 0.56329] | [ 0.87871] | [ 0.97744] | [ 0.24656] | [-1.15260] | [ 0.10823] | [-2.11712] |
| LENDINRATE(-1) | 0.422492 | 0.043063 | 0.024373 | 0.021498 | 0.271613 | -0.062752 | 1.139119 | -0.080311 | 0.002132 |
| | (0.77820) | (0.05293) | (0.51978) | (0.02411) | (0.09616) | (0.04327) | (0.05012) | (0.13809) | (0.00408) |
| | [ 0.54291] | [ 0.81359] | [ 0.04689] | [ 0.89176] | [ 2.82450] | [-1.45017] | [ 22.7298] | [-0.58157] | [ 0.52226] |
| LENDINRATE(-2) | -0.441118 | -0.045291 | -0.033809 | -0.023095 | -0.242155 | 0.055049 | -0.203028 | 0.091361 | -0.003582 |
| | (0.76249) | (0.05186) | (0.50928) | (0.02362) | (0.09422) | (0.04240) | (0.04910) | (0.13531) | (0.00400) |
| | [-0.57852] | [-0.87330] | [-0.06639] | [-0.97773] | [-2.57003] | [ 1.29836] | [-4.13463] | [ 0.67522] | [-0.89572] |
| LOCCREDGDP(-1) | 0.210472 | -0.008826 | -0.051599 | -0.026230 | 0.056152 | -0.032307 | 0.036255 | 1.462784 | 0.002854 |
| | (0.27007) | (0.01837) | (0.18039) | (0.00837) | (0.03337) | (0.01502) | (0.01739) | (0.04792) | (0.00142) |
| | [ 0.77932] | [-0.48048] | [-0.28604] | [-3.13514] | [ 1.68255] | [-2.15129] | [ 2.08450] | [ 30.5225] | [ 2.01516] |
| LOCCREDGDP(-2) | -0.170864 | 0.009739 | 0.103121 | 0.025032 | -0.058811 | 0.031795 | -0.032324 | -0.482046 | -0.002276 |
| | (0.26517) | (0.01804) | (0.17711) | (0.00821) | (0.03277) | (0.01475) | (0.01708) | (0.04706) | (0.00139) |
| | [-0.64435] | [ 0.53995] | [ 0.58223] | [ 3.04724] | [-1.79479] | [ 2.15633] | [-1.89281] | [-10.2443] | [-1.63676] |
| GSTAB(-1) | -38.77623 | -0.590578 | 3.665173 | -0.262887 | -0.285064 | -0.663036 | -0.243729 | -1.240106 | 0.889282 |
| | (8.68470) | (0.59070) | (5.80069) | (0.26904) | (1.07318) | (0.48292) | (0.55929) | (1.54112) | (0.04555) |
| | [-4.46489] | [-0.99979] | [ | [-0.97714] | [- | [-1.37297] | [-0.43578] | [-0.80468] | [ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0.63185] | | 0.26562] | | | | 19.5230] |
| GSTAB(-2) | 35.80781 | 0.797184 | -2.832595 | 0.303236 | -0.465920 | 0.536381 | 0.269181 | 1.057262 | 0.057168 |
| | (8.50997) | (0.57882) | (5.68399) | (0.26362) | (1.05159) | (0.47320) | (0.54804) | (1.51011) | (0.04463) |
| | [ 4.20775] | [ 1.37727] | [-0.49835] | [ 1.15026] | [-0.44306] | [ 1.13351] | [ 0.49117] | [ 0.70012] | [ 1.28082] |
| C | 0.820927 | 0.206710 | 0.532784 | 0.227365 | 1.239177 | 0.985773 | 0.003615 | -2.345883 | 0.033905 |
| | (8.36979) | (0.56928) | (5.59036) | (0.25928) | (1.03427) | (0.46541) | (0.53901) | (1.48523) | (0.04390) |
| | [ 0.09808] | [ 0.36311] | [ 0.09530] | [ 0.87690] | [ 1.19812] | [ 2.11808] | [ 0.00671] | [-1.57947] | [ 0.77234] |
| R-squared | 0.965677 | 0.944478 | 0.440702 | 0.977549 | 0.624757 | 0.918440 | 0.932946 | 0.987457 | 0.963068 |
| Adj. R-squared | 0.964084 | 0.941901 | 0.414748 | 0.976507 | 0.607344 | 0.914655 | 0.929834 | 0.986875 | 0.961354 |
| Sum sq. resids | 419064.1 | 1938.678 | 186952.3 | 402.1569 | 6399.096 | 1295.753 | 1737.992 | 13195.98 | 11.52801 |
| S.E. equation | 31.18183 | 2.120871 | 20.82700 | 0.965960 | 3.853192 | 1.733894 | 2.008100 | 5.533273 | 0.163545 |
| F-statistic | 606.3080 | 366.5824 | 16.98043 | 938.3203 | 35.87943 | 242.6717 | 299.8313 | 1696.586 | 561.9544 |
| Log likelihood | -2185.414 | -970.4341 | -2002.994 | -614.9544 | -1240.312 | -879.3756 | -945.7378 | -1403.881 | 187.8117 |
| Akaike AIC | 9.762894 | 4.386877 | 8.955724 | 2.813958 | 5.581027 | 3.983963 | 4.277601 | 6.304782 | -0.738105 |
| Schwarz SC | 9.954017 | 4.577999 | 9.146846 | 3.005080 | 5.772150 | 4.175085 | 4.468723 | 6.495905 | -0.546983 |
| Mean dependent | 87.60584 | 24.24369 | 8.575054 | 14.78581 | 3.649564 | 23.51920 | 7.335111 | 83.22640 | 0.159213 |
| S.D. dependent | 164.5353 | 8.798951 | 27.22421 | 6.302199 | 6.149144 | 5.935174 | 7.580926 | 48.29894 | 0.831931 |

| | |
|---|---|
| Determinant resid covariance (dof adj.) | 3.70E+10 |
| Determinant resid covariance | 2.30E+10 |
| Log likelihood | -11805.81 |
| Akaike information criterion | 53.16730 |
| Schwarz criterion | 55.07852 |
| Number of coefficients | 210 |