Developed and Emerging Countries Risk Analysis form an Investment Perspective

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Abstract: *This report offers a comprehensive analysis of risk factors influencing investment decisions in Developed (DMs) and Emerging Markets (EMs). By focusing on macroeconomic, political, and external vulnerabilities, it aims at distinguishing the relative stability and potential of the former categories. Developed markets present a lower risk profile due to their strong governance, stable inflation, and robust political environments. On the other hand, despite their larger potential for growth, developing economies are more vulnerable to exchange rate fluctuations, political instability, liquidity constraints, and inflation volatility.*

The analysis incorporates key metrics like inflation rates, interest rates, liquidity indicators, sovereign debt risk, and macroeconomic stability. A novel Country Risk Index (CRI) is developed to quantify risks across different countries and time horizons, incorporating factors like governance quality and external financing. Empirical results highlight significant discrepancies between emerging and developed markets, especially in short-term risk profiles. Case studies, such as Argentina and Brazil, underscore the impact of external shocks and policy responses on market stability. Investment implications are explored, emphasizing diversification strategies to optimize risk-return profiles.

The report concludes with policy recommendations for improving governance and reducing vulnerabilities in emerging economies while stressing the importance of CRI as a predictive tool for investors managing global portfolios.

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1. Introduction

In the current global economy, investors seek to strike a balance between maximizing returns and reducing the emotional burden associated with their portfolio fluctuations. Fundamentally, the variance and risk of a portfolio may be addressed by selecting a suitable strategic asset allocation. The most reasonable approach to guarantee steady returns over the long run and mitigate exposure to significant drawdowns has traditionally been to diversify investment in terms of the number of assets and asset classes, such as stocks, bonds, and commodities. Nevertheless, geographic diversification becomes just as essential. Retailers and institutional investors alike, therefore, must face a crucial decision: choosing between developed (DMs) and emerging markets (Ems).

Developed markets, notably those in the United States or Western Europe, are distinguished by well-developed and trustworthy financial systems, stable political contexts, and moderate volatility. Emerging markets, on the other hand, have greater development potential but turbulent political and economic environments. Making the differences between these two realities clear is therefore essential for investing purposes. Economic classification of markets relies on several variables, such as industrialization, income levels, and financial system integration. According to the World Bank, the main indicator of economic clustering is the Gross National Income (GNI). While emerging markets are typically middle-income nations (GNI per capita between $1,146 and $14,005) experiencing rapid economic growth, developed markets are typically high-income economies (GNI per capita > $14,005) with well-established infrastructure and institutional frameworks [1]. Market accessibility, liquidity, and general economic stability are further factors used by MSCI to categorize markets. While developing markets have prospects for long-term growth, MSCI emphasizes in its Market Classification Report 2023 that these markets also present significant challenges because of their inconsistent regulatory frameworks and increased vulnerability to external shocks [2].

In summary, there is a large upside potential when investing in emerging markets. But this possibility also comes with threats. These risks are especially relevant when considering worldwide events that can disproportionately affect emerging countries, such as trade conflicts or swings in commodity prices. Developed markets, on the other hand, have predictable returns but offer more stable regulatory frameworks and are less vulnerable to systemic cost-pushed shocks.

To give a comparative risk analysis of developed and emerging economies from the standpoint of investments, this project will concentrate on important risk characteristics such as external vulnerabilities, political risk, market volatility, and macroeconomic stability.

2. Macroeconomic Risks.

In the macro context, inflation is a crucial indicator that directly affects investment returns. In developed markets, inflation tends to be more stable and predictable due to mature monetary systems and stronger policy frameworks. Central banks (CBs) like the Federal Reserve (FED) or the European Central Bank (ECB) aim to keep inflation within a specific target range, generally around 2% [3]. This provides a relatively low-risk environment for investors, as price stability ensures that real returns on investments are less eroded by inflation. In contrast, inflation rates in emerging markets are subjected to higher volatility. Factors like political instability and untrustworthiness, supply chain constraints, and reliance on commodity exports contribute to this scenario. For instance, countries like Argentina and Turkey have experienced periods of hyperinflation (In 2022, Argentina faced inflation rates above 90%, while Turkey saw inflation spike to over 85%, eroding returns on domestic products), leading to diminished purchasing power and undermining the real value of investments. In contrast, despite the post-COVID-19 shock, the U.S. and the Eurozone managed to keep inflation “under control” (7-8%). As a result, investors in emerging markets require a risk premium to compensate for this uncertainty.

Interest rates are closely tied to inflation and are a key lever in monetary policy. Developed economies CBs (like the Federal Reserve or the ECB) typically adjust interest rates to control inflation and stimulate economic growth. Low interest rates can boost investment flows by making borrowing cheaper for companies and consumers, encouraging economic expansion.

Emerging market central banks, however, often face more pressure to raise interest rates due to inflation and currency depreciation. Higher rates attract foreign capital looking for higher yields, but they also increase the cost of local borrowing, potentially hampering growth. For instance, in 2023, Brazil’s CB maintained one of the highest policy rates in the world, which attracted foreign investment in local bonds but increased the cost of borrowing for local companies.

The divergence in interest rates between developed and emerging markets affects the flow of capital. Lower interest rates in developed markets, combined with higher rates in emerging markets, can lead to "carry trades," where investors borrow in low-interest-rate currencies (like USD or EUR) and invest in higher-yielding emerging market assets. However, this exposes investors to significant risks if inflation spirals out of control or if emerging market currencies depreciate suddenly.

Even though investing in emerging markets might seem attractive due to their high potential for returns, it does not come without risks. Emerging markets offer high growth prospects, but they also carry unique challenges. Investors face a variety of risks, including market volatility, liquidity risks, and sovereign debt risks, all of which must be carefully evaluated. By analysing historical data, we will explore how investors can assess the risks involved in both developed and emerging markets, and how they might better balance the risk-reward ratio when diversifying their portfolios.

2.1. Liquidity Risk

The first risk to consider is liquidity risk, which refers to the ease with which investors can enter or exit a position with minimal fees. Typically, EMs tend to have lower liquidity, making it more challenging to buy or sell assets. This is due to factors such as the smaller size of the market, fewer regulations, and a lower number of participants. In contrast, developed markets are generally more liquid, benefiting from more regulations, higher levels of trading activity, and greater transparency, all of which contribute to a more sophisticated and stable environment.

For investors, lower liquidity in emerging markets translates to higher transaction fees, primarily due to wider bid-ask spreads. This is less appealing for those seeking efficient markets and adds an additional layer of risk, especially when market access becomes more difficult during times of crisis. Consequently, developed markets may be seen as more attractive due to their stability and efficiency. However, lower liquidity in emerging markets can also imply the potential for higher returns, as investors expect a greater reward for taking on additional risk.

This concept is supported by Bekaert, Harvey, and Lundblad (2007) in their study on "Liquidity and Expected Returns: Lessons from Emerging Markets." [4]. They found that liquidity is a significant determinant of expected returns in emerging markets. Lower liquidity leads to higher expected returns, as investors demand a premium for bearing liquidity risk. Two liquidity measures are calculated: the weekly average log volume (showing short-term fluctuations) and an 8-week rolling average (highlighting sustained, medium-term trends).

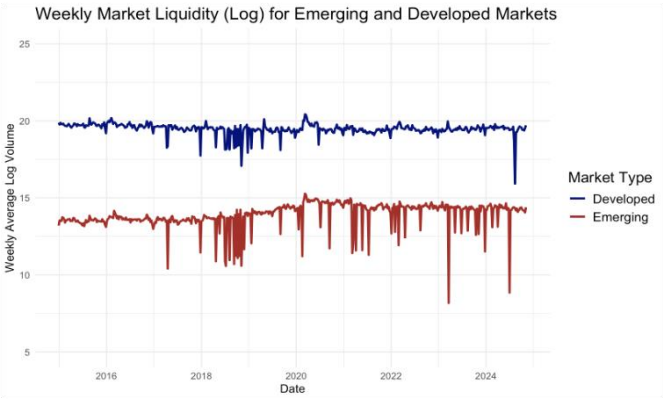


Fig. 1: Illustrates weekly liquidity changes for Emerging (Brazil, India) and Developed (USA, Germany, Japan) markets, capturing peaks and troughs in trading activity that may relate to economic events or shifts in market sentiment. Higher volatility in EMs on this plot would imply greater sensitivity to short-term events.

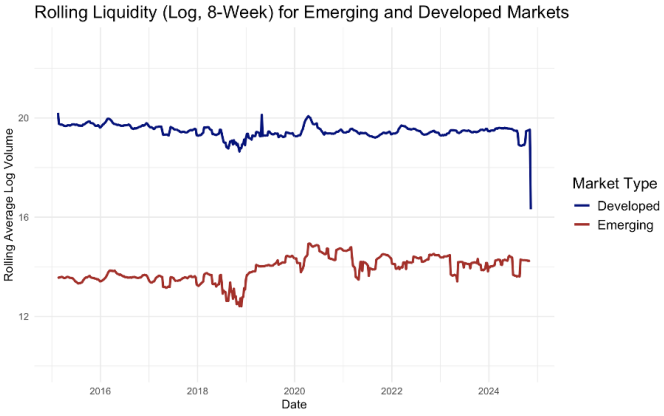


Fig. 2: Smooths this view by plotting the rolling average, which emphasizes more stable, enduring trends. A steady increase might indicate growing investor interest, while a decline suggests reduced participation

The data, spanning from 2015 to the present, is retrieved from Yahoo Finance, log-transformed to handle variance, and aggregated weekly

2.2. Market Volatility

The second risk to consider is market volatility, which refers to the rate at which prices can suddenly increase or decrease for a given set of returns. Essentially, it reflects how unpredictably prices can vary over a certain period. A market with high volatility is considered riskier because of the uncertainty surrounding price movements over time. This is one of the major differences between DMs and EMs. Developed markets, due to their stable framework, tend to experience lower volatility and more stable prices. On the other hand, emerging markets are more prone to it, largely

because of less stable economic systems. EMs are therefore more susceptible to external shocks, such as fluctuations in commodity prices.

For investors, market volatility is a critical factor when considering portfolio diversification. Higher volatility may offer the potential for higher returns, but it also demands more robust strategies and effective risk management to hedge against greater chances of significant losses. This is why risk management and portfolio diversification are essential for investing in emerging markets. Developed markets, although they may offer lower potential returns, present lower risks of large losses and provide more stable portfolio fluctuations, though they still carry their own risks.

In their recent paper titled “Feverish Stock Price Reactions to COVID-19” (2020), Ramelli and Wagner [5] analyse the differing impacts of the COVID-19 crisis on market volatility in emerging and developed markets. Their findings indicate that developed markets, benefiting from coordinated policy responses, were able to stabilize more swiftly and effectively than emerging markets. Consequently, the COVID-19 pandemic had a relatively milder impact on market volatility in developed economies, while emerging markets experienced more pronounced turbulence. The coordinated interventions in developed markets facilitated a faster recovery, underscoring the importance of structured policy responses in mitigating crisis-driven market instability.

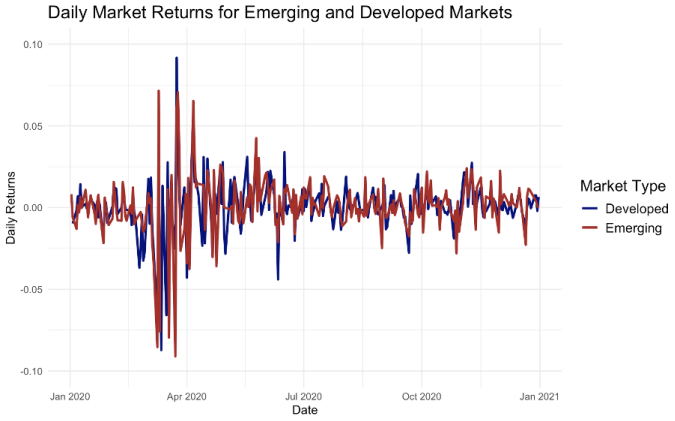


Fig. 3: Shows the average daily returns for Emerging (Brazil, India) and Developed (USA, Germany, Japan) markets, capturing how each reacts to short-term events. Peaks and troughs reveal how sensitive each market type is, with Emerging markets often showing larger fluctuations, implying higher sensitivity to immediate changes.

One year of daily data (2020) from Yahoo Finance, calculates daily returns for each country, and then computes a 30-day rolling standard deviation to observe medium-term volatility trends.

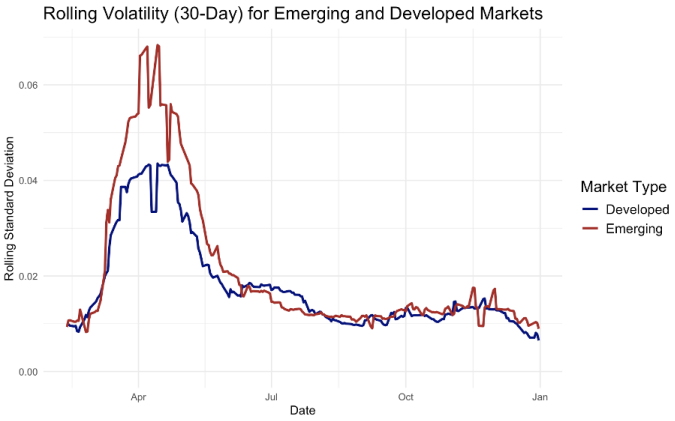


Fig. 4: Illustrates the 30-day rolling volatility, providing a smoothed view of volatility trends. Higher rolling volatility in Emerging markets (0.0206 avg) suggests they’re generally more unstable and reactive compared to the steadier Developed markets (0.0179 avg). This analysis highlights Emerging markets as more volatile and sensitive, while Developed markets show relative stability, offering insight into risk for investment strategies.

2.3. Sovereign Debt Risk

The final risk to consider is sovereign debt risk, which is the risk that a government may default on its debt obligations. This risk can reduce a country’s attractiveness to investors, as a high risk of default discourages foreign capital. Consequently, this can negatively impact the country's economy by limiting the inflow of capital.

This issue is particularly prevalent in EMs, which typically carry higher sovereign debt risks. These countries often have high debt levels relative to their GDP because they need substantial investments to drive economic growth, leading to increased borrowing. This reliance on debt, combined with less diversified economies, political instability, and weaker institutions, heightens their risk of default. In contrast, DMs tend to be more attractive due to their low risk of default.

To assess the risk associated with each country, indicators like Credit Default Swap (CDS) spreads are useful. CDS spreads serve as a gauge of a country's perceived default risk: wider spreads indicate higher default risk. EMs often show higher CDS spreads. For investors, this translates to higher yields on fixed income products but also an increased risk of significant losses in case of defaults. Furthermore, foreign exchange risk can compound these challenges, as local currency depreciation may erode returns in foreign currencies, making these markets less appealing.

In How Sovereign Is Sovereign Credit Risk? (2011), Longstaff et al. [6] examine the determinants of sovereign credit risk in emerging markets, finding it significantly shaped by both global factors and local economic conditions. Their analysis shows that Credit Default Swap (CDS) spreads in these markets reflect vulnerabilities linked to global economic shifts and domestic instability. This reliance on external market dynamics makes emerging markets more susceptible to international volatility. Longstaff et al.'s findings underscore the usefulness of CDS spreads as a measure of sovereign risk in markets where economic fundamentals are often less stable and financial systems less developed.

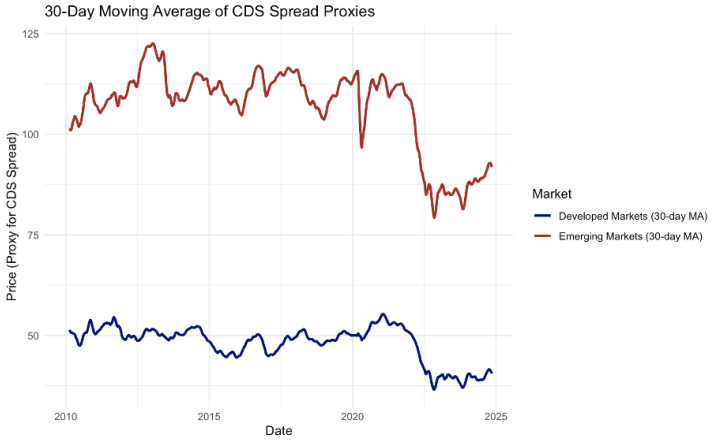


Fig. 5: Compares CDS spread proxies for Ems and DMs. Emerging markets exhibit significantly higher and more volatile spreads, reflecting greater credit risk, whereas developed markets maintain lower, more stable spreads, indicating stronger creditworthiness and reduced risk perceptions. EMB and IGOV (Bond ETFs) used as proxy for CDS (data retrieved from Yahoo Finance by examining ETFs closing prices and calculating 30-day moving averages, we identified general trends, volatility, and relative risk).

The results showed that emerging markets (EMB) consistently have higher and more volatile spreads than developed markets (IGOV), suggesting greater perceived risk. The spread difference between these ETFs highlights periods where emerging markets face heightened risk, particularly during global instability. This approach underscores emerging markets' vulnerability to global shocks, offering insights into credit risk dynamics across regions. During crises, the prices of riskier assets, such as emerging market bonds, tend to drop as yields (and perceived risk of default) increase. This pattern was evident during the COVID-19 pandemic, when emerging market bond prices fell sharply due to heightened risk perception, before gradually returning to normal levels as stability improved. In contrast, bond prices in developed markets largely remained stable or moved upward, reflecting their resilience. A similar trend occurred after the onset of the Ukraine war, with emerging market prices once again declining due to increased uncertainty, while developed market bonds showed minimal impact.

3. Political Risk

Political risks are a pivotal consideration for investors, encompassing factors like political stability and the regulatory environment, which can significantly influence market dynamics and investor confidence. We divided it into two sub-categories: Political stability and Regulatory Risks, then for each one we developed a hypothetical graph.

3.1. Political Stability

Political Stability is crucial for maintaining investor confidence. While developed markets generally exhibit lower political risk due to robust governance frameworks, emerging markets often contend with unpredictable political environments. This disparity is highlighted through various indices and case studies. As a Political Stability Index, we chose the World Bank’s Political Stability (and Absence of Violence/Terrorism) one [7], which provides a useful measure. This index ranges from -2.5 (high instability) to 2.5 (high stability). Below is a graphical comparison of selected developed and emerging markets.

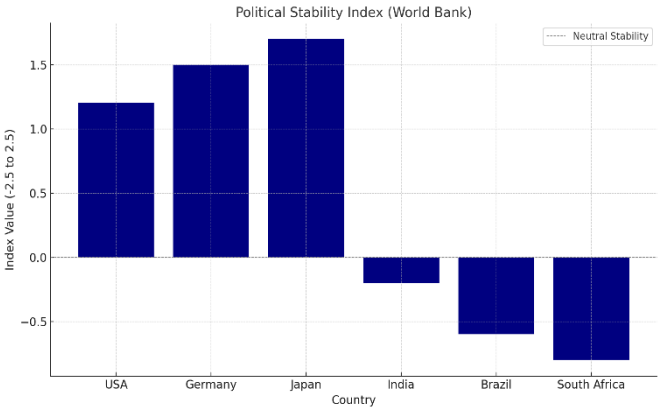


Fig. 6: Countries like Germany and Japan (Developed Markets) score above 1, indicating high political stability, driven by established democratic institutions and consistent policies, while Emerging Markets like India and Brazil show negative scores, reflecting challenges like policy inconsistency, corruption, and political unrest.

Two case studies applicable to the current date are: Malaysia and Argentina. In the Asian country, Political stability has been a catalyst for foreign investment. In 2024, foreign inflows into Malaysian debt reached $1.75 billion, driven by stable governance and economic recovery post-pandemic. While in Argentina, persistent political instability, coupled with economic mismanagement, led to inflation exceedingly well above 100% in 2024, deterring foreign investments. [8]

3.2. Regulatory Risks

Regulatory Risks stem from the legal and institutional frameworks that govern business and investment activities. Investors consider these risks in terms of: Transparency of regulations, Enforcement of investor rights, Risks of arbitrary policy changes. The World Governance Indicators (WGI) regulatory quality measure evaluates the government's ability to formulate and implement sound policies. Below is a comparison between selected developed and emerging markets.

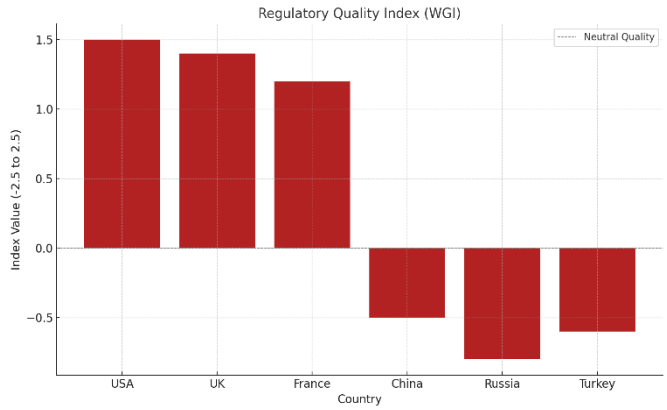


Fig. 7: Regulatory quality scores are consistently high, with the U.S., U.K., and France (Developed Markets) leading in transparency and investor protection mechanisms. While Emerging Markets countries like China and Russia have lower scores reflecting risks such as regulatory opacity, lack of property rights enforcement, and ad hoc government interventions.

Two current case studies here are India and China. The first one is seen as a relatively stable investment destination due to reforms improving investor rights and economic liberalization. However, bureaucratic red tape remains a challenge. In China, on the other hand, Regulatory risks have heightened with government crackdowns in sectors like technology and education. In October 2024, foreign outflows from Chinese equities reached $9 billion, a reflection of diminished investor confidence. [8]

4. External Risk

4.1. Global Trade Dependence

Emerging markets are significantly exposed to global trade due to their reliance on exports, particularly in industries like manufacturing and agriculture. The scarcity of diversification within these countries' industrial framework made them highly vulnerable to shocks such as changes in global demand for goods, fluctuations in foreign investment, and trade policy shifts (i.e. tariffs or protectionism).

While developed countries face risks from global trade shocks, their capacity to weather such disruptions is more robust, partly due to stronger institutional frameworks and financial reserves. Emerging markets, such as Brazil, China, and India, experienced amplified volatility in their equity markets during trade disruptions (Prasad, Grant & Suk-Joong Kim, 2018). [9]

For instance, during the COVID-19 pandemic, the disruption of global supply chains caused significant economic downturns in emerging markets that rely on exports (Harjoto et al., 2020) [10]; like in Mexico, where the economy is

highly integrated into global supply chains, particularly through its exports to the United States in sectors like automotive, electronics and manufacturing. When the pandemic disrupted global supply chains and reduced demand, Mexico's export-oriented industries were severely impacted, causing a sharp contraction in GDP (-8,63% in 2020).

We can also look up to the change in openness indicator throughout the pandemic years: in 2020 registered at 76.87%, while in 2022, concurrently with the stable re-opening of many US manufacturing factories, it registered at 88.45%, denoting the sensitivity of Mexico economy to the global market.

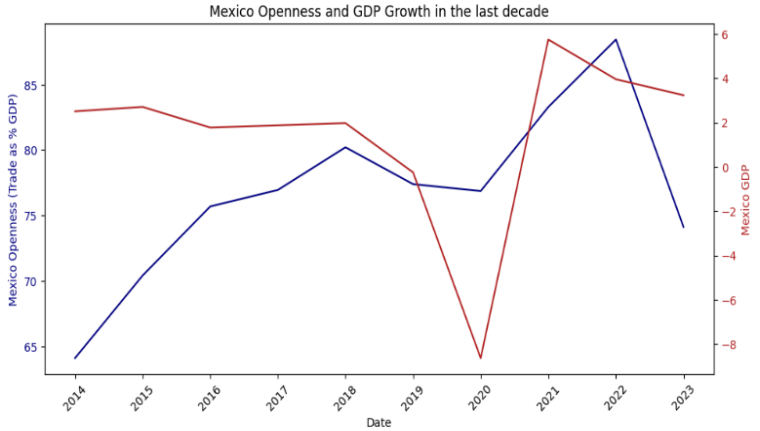


Fig. 9: Mexico Openness and GDP Growth in the decade 2012-2022 (WB and IMF Data).

Another emerging economy that during the COVID-19 pandemic suffered the disruptions in global supply chains and reduced demand from major trading partners was Brazil: a drop in orders for both industrial raw materials (especially iron ore from China) and soybeans determined an obvious decline in export revenues, this consecutively caused an widespread economic contraction, an increase in unemployment and a depreciation of the BRL (USD/BRL in 2019=3,94; USD/BRL in 2021=5,39).

Analyzing the CRI most relevant indicators for the LATAM powerhouse, we can see that in 2020 the GDP registered a 3,28% decrease and a 32,30% level of openness; while the following two years it showed an increase in both indicators: 37,76% in 2021 and 38,82% in 2022 for openness, +4,76% in 2021 and +3,02 in 2022 for GDP. Thanks to this correlation, we can see another time how emerging economies depend heavily on the foreign demand for local products to foster their GDP.

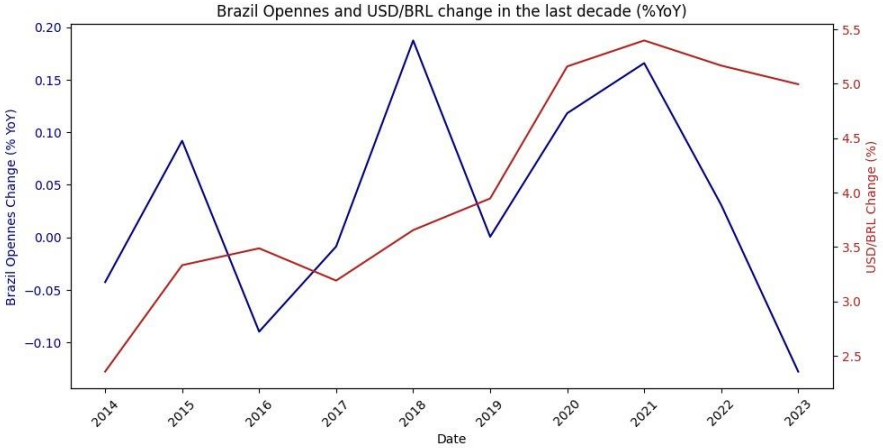


Fig. 10: Brazil Openness and USD/BRL Changes (% YoY) in the decade 2013-2023 (WB and IMF Data).

4.2. Commodity Price Dependence

Emerging markets often depend heavily on the export of commodities like oil, metals and agricultural products. As a result, fluctuations in commodity prices have a more pronounced effect on their economies compared to developed nations, where the more diversified economic structures act as a hedge.

Commodity price volatility often leads to increased market uncertainty, reducing investor confidence in emerging markets and therefore increasing risk premiums. Salomons and Grootveld (2003) found that the equity risk premium in

emerging markets is significantly higher than in developed markets, reflecting the greater risks investors face, including commodity price volatility. [11]

Many emerging economies are extremely sensible to oil price changes, as their export earnings are closely related to oil exports. A study by Basher and Sadorsky (2006) highlighted that oil price volatility has a disproportionately larger impact on emerging stock markets compared to developed markets. In addition, excessively high oil prices tend to negatively impact emerging markets because they increase production costs, reduce profit margins, and raise inflation, which in turn depresses stock prices and investment. [12]

An example about the impact of oil price volatility on an emerging market is Nigeria. As one of the largest oil producers in Africa, Nigeria and its economy are heavily dependent on oil exports, as they represent a significant share of government revenues and foreign exchange earnings. When oil prices dropped sharply during the COVID-19 pandemic, the government's ability to fund public services and infrastructure projects was severely limited, however, the government score apparently did not suffer these revenue cuts and kept its already existing negativity stable (2019:-1,08657; 2020:-1,09582; 2021:-1,10086). Additionally, lower oil prices reduced foreign investment in the country's oil sector and caused a decline in Nigeria's stock market, as investor confidence dropped. Inflation also rose to very severe levels due to higher production costs and the currency has dramatically lost value in the last 5 year (USD/NGN in 2019= 361,11; USD/NGN November 2024=1645; 355.54% depreciation for the Nigerian Naira).

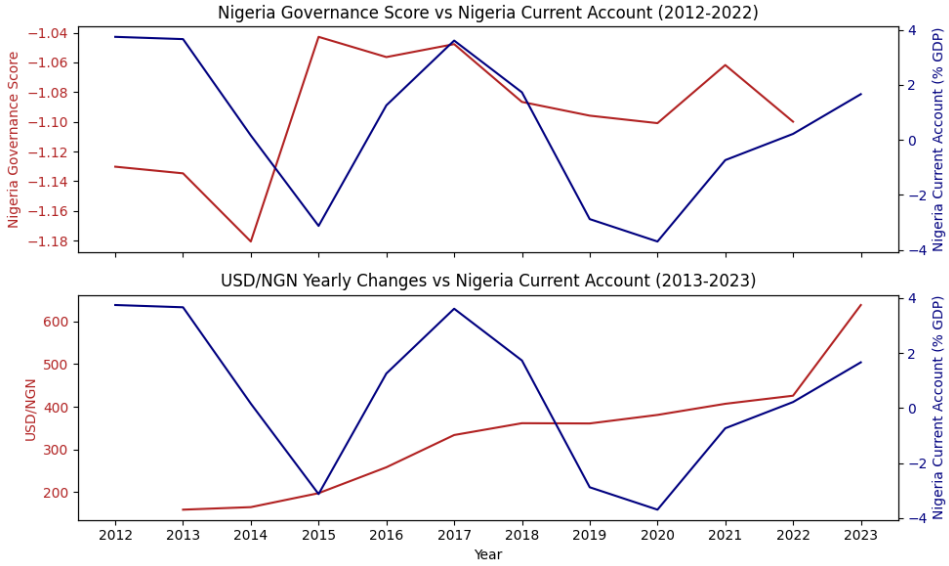


Fig. 11: Top chart reports Nigeria Governance Score (red) and Current Account (blue) while the bottom chart reports the Exchange rate USD/NGN and Nigeria Current account. Both refers to decade 2013-2023 (WB and IMF Data).

4.3. Investment Implications

The external risks posed by global trade dependency and commodity price fluctuations are key factors differentiating emerging and developed markets from an investment perspective, these risks present both challenges and opportunities. While emerging markets can provide higher returns during periods of economic growth, their vulnerability to external shocks like global trade disruptions and commodity price fluctuations makes them riskier investments compared to developed markets Salomons and Grootveld (2003). [11]

5. Country Risk Analysis

5.1. Definition of the Main Indicators

Key macroeconomic and sociopolitical components are integrated to create the Country Risk Index (CRI), an aggregate indicator. A quantitative assessment of the risk of investing in both established and emerging markets is provided by the CRI. Five main categories have been chosen to build the above-mentioned index:

- **Macroeconomic Stability**: The difference between the most recent data point (2022) and the data averages for the preceding 10, 5, and 3 years is used to evaluate variables such as GDP growth, inflation, and exchange rates. The influence of recent short-term changes is lessened, and a balanced viewpoint is provided by using the delta rather than punctual numbers, which highlight trends rather than yearly outliers. Because economic

stability indices may vary from year to year but generally exhibit meaningful trends over longer time periods, it is advisable to examine longer historical comparisons here. This is especially crucial when assessing investment risk.

- **Public Finance Health**: These category indexes are calculated similarly to macro indexes to reflect the long-, medium-, and short-term changes in fiscal policies that governments commonly implement. These adjustments may impact debt and deficit levels more directly.
- **External Financing and Strength**: These two categories focus on a country's debt levels and current account position as a percentage of GDP and are essential for assessing how much economic growth depends on outside funding and the potential vulnerabilities it may bring.
- **Governance Quality**: By calculating an equally weighted average, the six World Bank governance indicators [13], voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption, have been combined into a single governance index. These governance indices are crucial because a stable regulatory environment is generally linked to lower perceived risk, and institutional stability and quality often differentiate the investment environments of developed and emerging countries.

The World Bank Databank (WB) and the International Monetary Fund (IMF) offer all the data required to create such an index [14]. The final indicator was constructed using a total of 16 data frames comprising annual data for 155 nations between 1999 and 2022. Lastly, to create an equally weighted aggregated indicator (CRI), all sub-indicators have been normalised (min-max normalisation) and added together. This method offers an overall more complete and all-encompassing risk. It must be stated before the data is presented that the final CRI values have been standardised between 0 and 1, with 0 denoting the lowest risk. Appendix 1 provides further details on the specific techniques utilised to create the CRI.

DMs typically display a lower CRI than Emerging Markets EMs, as seen in Fig. 11. It should be highlighted that, especially in the long run, most of the nations falling within the top spots are developed. When looking at the short-term CRI, where annual swings are given more weight on averages, this DMs dominance is partially dumped. Finally, even though 68.75% (11 out of 16 indicators) of the results are timeframe independent, the time dependent indicators have a significant impact on other relative rankings.

When grouping by developed and emerging markets in terms of MSCI classification [2], it is possible to observe how the time frame influences the results. For developed markets the long-term risk is higher in most of the countries excluding high-risk nations such as Japan, Italy, Ireland which increased their debt-to-GDP in the last few years. Emerging Markets are instead much riskier in the shortest time frame. This can be explained by the fact that EMs present unstable conditions and are more exposed to external shocks such as Covid-19 and the oil crisis due to the Russian-Ukrainian conflict

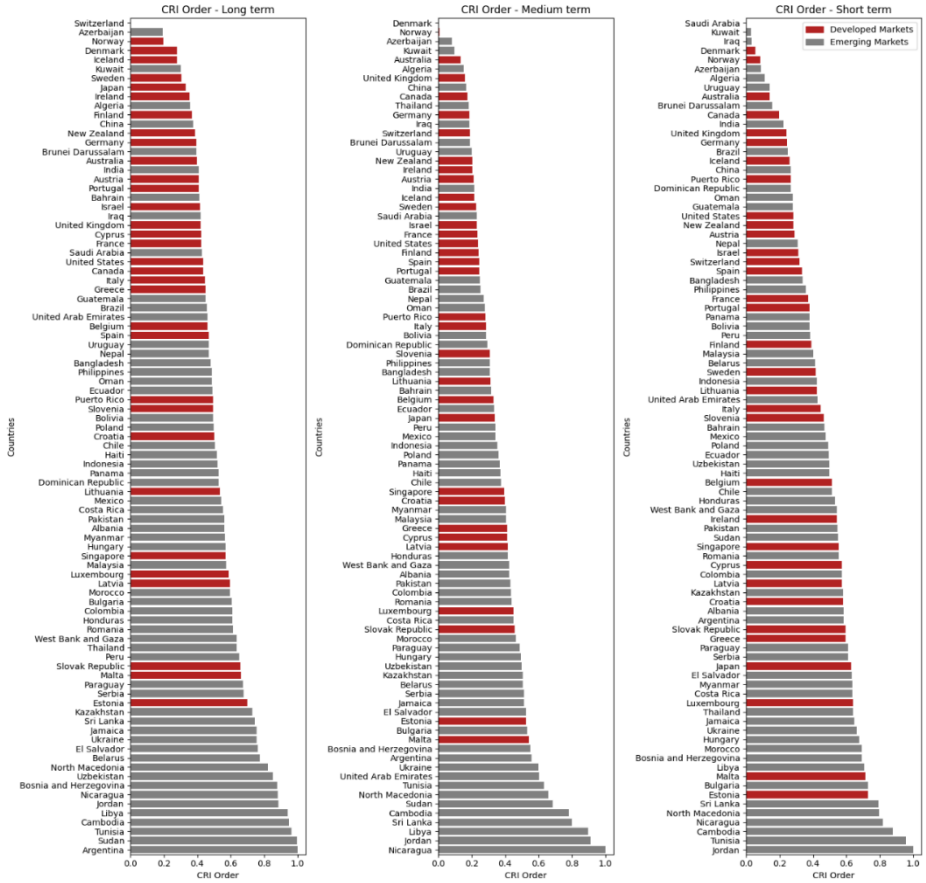


Fig. 12: Short-, Medium- and Long-Term Country Risk Index for all the analyzed countries (ranked by CRI).

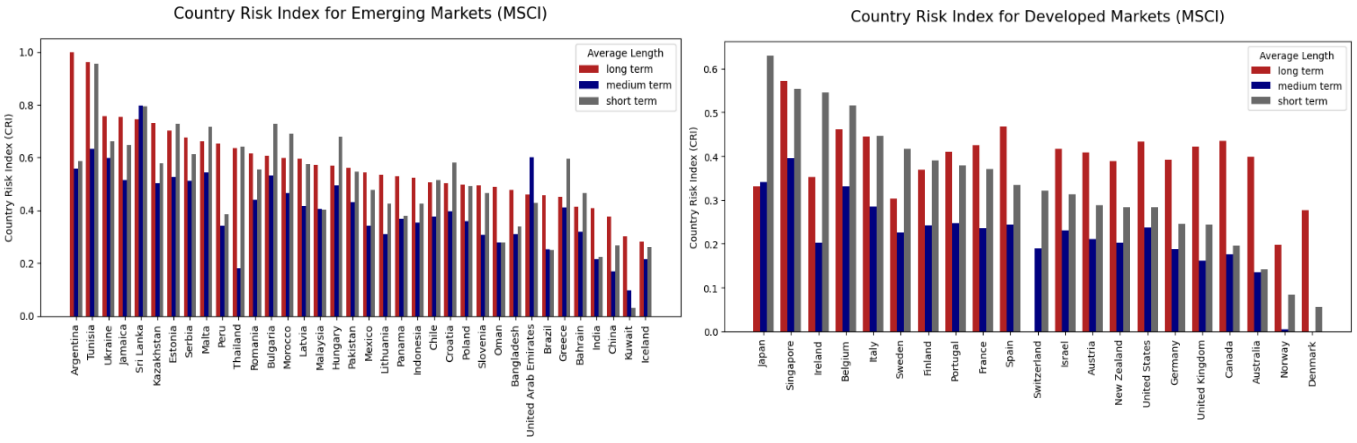


Fig. 13: Short-, Medium- and Long-Term Country Risk Index for Emerging (left chart) and Developed (right chart) Countries (MSCI Classification).

5.2. Aggregated CRIs

For a deeper understanding of the different EMs, this category has been further narrowed (following the IMF classification) into: European Emerging Markets (EME), Asian Emerging Markets (EMA), Latin America and Caribbean Markets (LATAM), and Middle East and Central Africa (MECA).

Figure 14 shows radar plots of the CRI for each category, divided by country and by time frame. The radar chart for developed economies shows relatively low CRI values across all terms (long, medium, and short), indicating low risk and stability in these countries.

Developed markets, such as the U.S., Canada, Germany, and Switzerland, generally offer a stable investment climate characterised by consistent economic policies, robust legal systems, and stable political environments. Even on shorter-term metrics, these markets maintain relatively low CRI scores, reflecting their resilience against both economic downturns and political volatility.

In the European emerging markets (e.g., Poland, Romania, and Belarus), CRI values are moderately higher than those of developed markets, with the short-term score often showing a slight dip. These markets benefit from EU-related stability but face challenges such as political shifts and vulnerability to economic shocks, particularly in the context of regional instability and fluctuating capital inflows. These factors contribute to slightly lower CRI values in medium-term evaluations [15].

Asian Emerging Markets, including China, India, and the Philippines, exhibit relatively lower CRI scores, particularly in the long and short term. This can be attributed to a strong reliance on exports, regulatory challenges, and geopolitical tensions. Volatility in these economies affects investor confidence, especially in the shorter term.

Latin American Markets show moderate CRI values with noticeable declines in the short term, reflecting higher risks. Issues like political instability, hyperinflation, and economic dependence on commodities such as oil, gas, metals, corn, and soybeans [16] affect risk ratings. Countries like Argentina and Colombia are particularly susceptible to economic and currency crises, impacting the overall CRI and making them more vulnerable and not appetible for capital inflows.

Middle East and African (MECA) Markets display the lowest CRI values, with significant short-term volatility. Countries in this region face high political and economic risks, largely due to oil dependency and geopolitical conflicts [17]. The short-term CRI scores are particularly low, emphasizing vulnerability to oil price fluctuations and regional instability. For instance, Gulf Cooperation Council (GCC) countries, while wealthier, are still heavily influenced by global oil markets, while non-GCC nations face added challenges due to less diversified economies and political tensions [18].

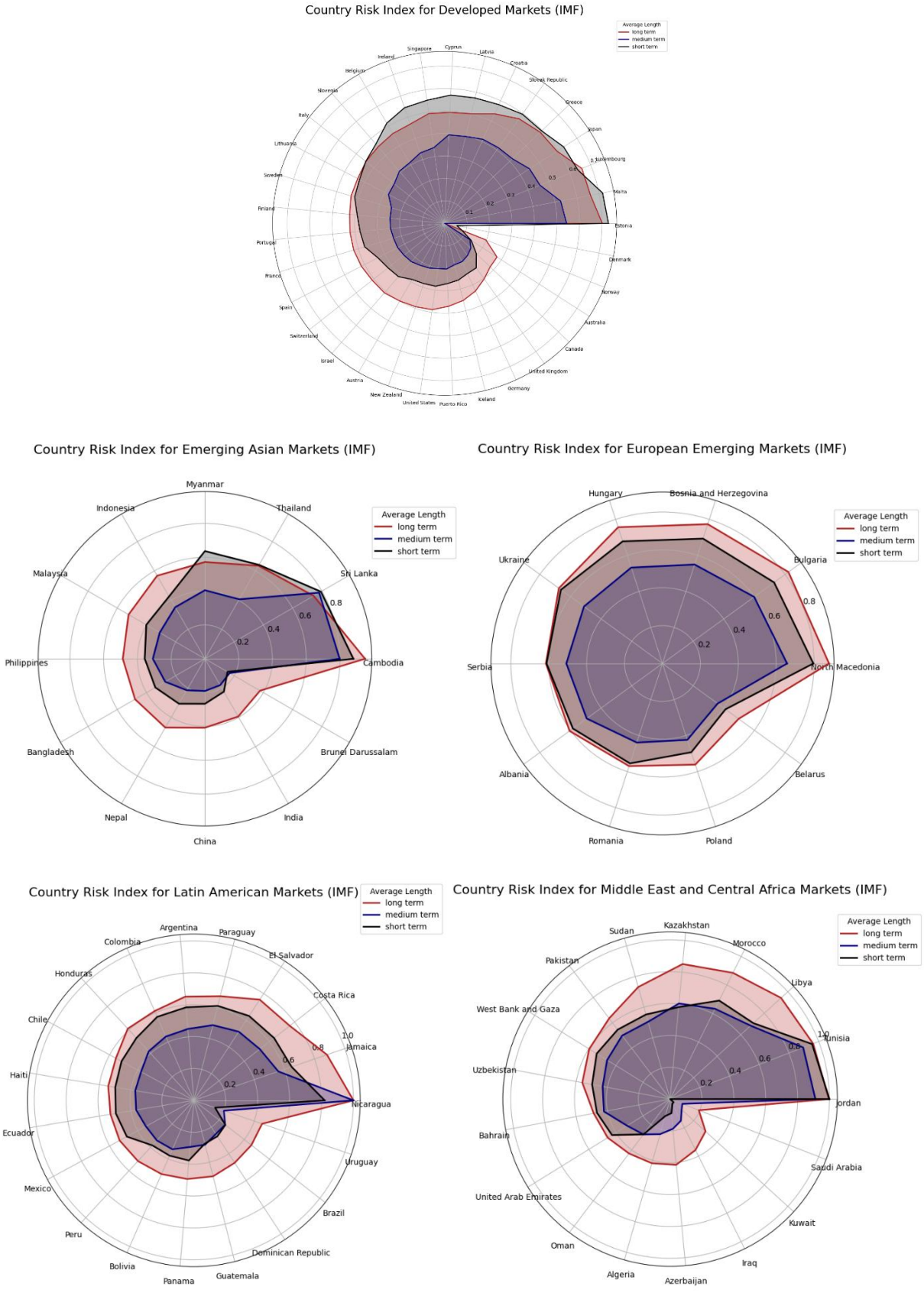


Fig. 14: Short-, Medium- and Long-Term Country Risk Index for Developed Markets (top-center), Emerging Asian Markets (center-left), Emerging European Markets (center-right), Latin America and Caribbean Markets (bottom-left), and Middle East and Central Africa Markets (bottom-right).

5.3. 10 Years Maturity Bond Yields Regressions

The CRI index importance has been used to compare different countries in terms of investment risk. An investor, who is willing to expose his portfolio to a wider risk, expects a greater return, hence, it is expected that the higher the

CRI of a country, the higher the yield generated by investing in it. Figure 15 shows a scatter plot where 10 year-maturity government bonds yield (expressed as yearly % return) are positively correlated with the aggregated index. As a fact the higher the CRI the higher the premium paid out by the debt issuers.

A univariate OLS regression has been also performed yielding the following results:

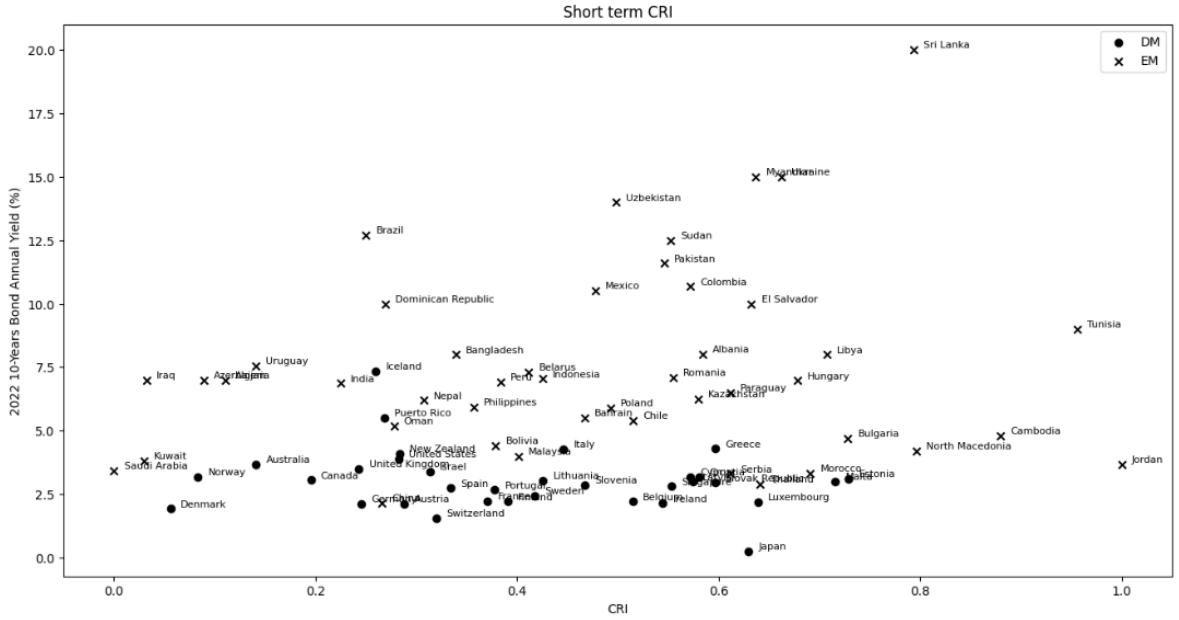
Timeframe	R-squared	t-test
Short Term	0.032	1.592
Medium Term	0.153	3.703
Long Term	0.186	4.166

Tab. 1: R-squared and t-test results of OLS univariate regression of 10 Years Maturity Bond Yields on CRI.

Even if a positive correlation holds, the short-term CRI presents a low R-squared value and statistical non significance (t-test<1.97), which highlights how in the short term the CRI can't explain the difference in bond yields. At least, when the regression is performed on the aggregated CRI (univariate linear regression). Differently, performing a multidimensional linear regression on the single indicators constituting the CRI, yields much better results. These final results show how the indicators that have been picked to build the CRI are consistent with explaining the differences in investment returns on fixed-income products. For further information visit Appendix II.

Timeframe	R-squared
Short Term	0.823
Medium Term	0.837
Long Term	0.874

Tab. 2: R-squared and F-Statistic result of OLS Regression of 10 Years Maturity Bond Yields on CRI constituents.



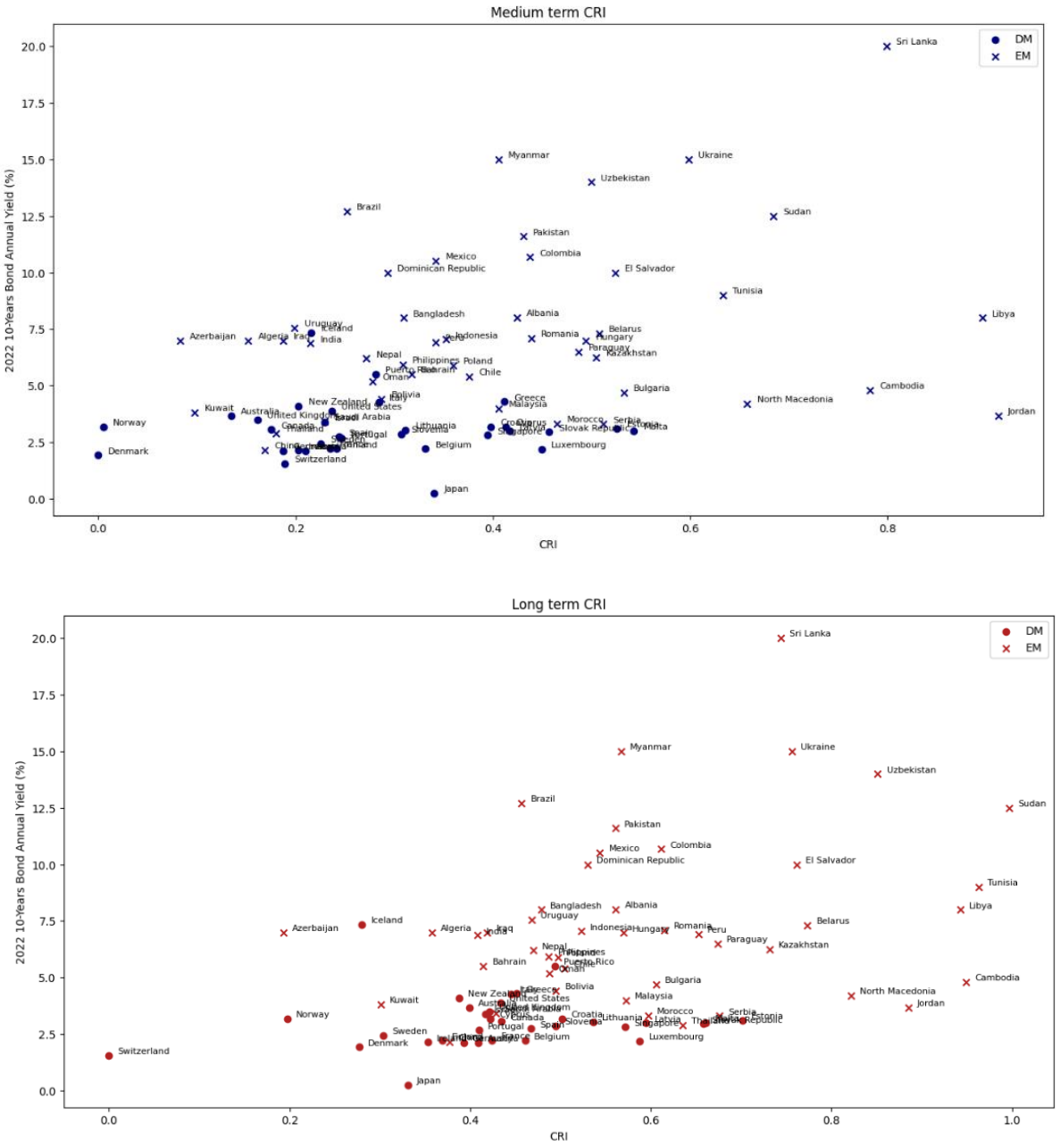


Fig. 15: Short-, Medium- and Long-Term correlation between 10 years bond yield vs CRI score for >90 EMs and DMs.

6. Conclusion

The study highlights the critical **trade-off** between **stability and growth** potential when comparing developed and emerging markets for investment purposes. Developed markets offer steady returns at lower risk, supported by their strong governance frameworks, well-established legal systems, and stable economic structures. These traits make developed markets particularly attractive for risk-averse investors seeking consistent performance over the long term. Conversely, emerging markets, while inherently riskier due to their susceptibility to external shocks, economic volatility, and political instability, offer considerable growth potential. For investors willing to assume higher levels of risk, these markets present opportunities for enhanced returns, especially in rapidly expanding economies or sectors.

To improve the attractiveness of emerging markets, the study emphasizes the role of policymakers in these regions. It recommends **prioritizing** economic **diversification** to reduce reliance on commodities or specific industries and addressing political instability, which often deters foreign investment. By fostering a stabler investment environment, emerging markets can better compete with developed nations in **attracting capital flows**. For investors, **leveraging analytical** tools like the Country Risk Index (CRI) in combination with broader macroeconomic **indicators** is essential to craft balanced and **diversified portfolios**. This approach helps mitigate risks while capitalizing on growth opportunities, ensuring a more comprehensive strategy for global investment.

As a fact, the **Country Risk Index (CRI)** proves to be a valuable tool for assessing and forecasting risk levels between different countries, especially in distinguishing between short-, medium-, and long-term investment profiles. For example, the study found that the CRI demonstrates strong predictive capabilities, particularly in the long-term context. An **Ordinary Least Squares (OLS) regression** analysis revealed that almost 20% of the variations in 10-year fixed income yield differences across countries can be explained by the CRI.

A deeper analysis using a **multidimensional linear regression** model further underscores the CRI's utility. It was observed that the individual metrics comprising the CRI exhibit strong correlations with bond yields, with **R-squared values between 80% and 90%** across all the studied time frames (short, medium, and long term). This suggests that the selected indicators effectively capture the underlying risk factors influencing market performance. To enhance the CRI's usefulness, the study proposes refining its methodology. One suggested improvement is developing a new model that incorporates the coefficients derived from multidimensional OLS regressions as weights in the CRI's aggregation process. Alternatively, **non-linear relationships** between indicators could be explored through **feature engineering**, which might better account for the complexities of global markets. These enhancements could make the CRI even more effective in guiding both policymakers and investors in assessing risk and making informed decisions in rapidly evolving global markets.

7. Appendix I: Building the CRI

As stated before, data have been retrieved from the International Monetary Fund (IMF) Databank (International Monetary Fund Website). Unfortunately, due to the lower density of data of the latest years, 2022 has been taken as a reference for the analysis.

Before proceeding with the construction of the CRI, data has been cleaned and a data reduction process has been performed. Specifically, 64 countries have been eliminated by considering low-influence countries, the ones having a GDP < 0.01 % of the World's Total GDP (calculated as a sum of the GDP of all 155 countries). The error committed neglecting 64 countries is 0.48%, that is, we are eliminating from the analysis a set of countries whose GDP sums to 0.48% of the total one.

The used data frames are shown in the following table.

Python Dataframe	Description	Unit of Measurement	Macro Category	Value of Interest
gs_df	Aggregated of six Gov. Indexes by WB	Absolute Values	Governance	Last Value (-)*
op_df	Openness	Trade as % of GDP	External Strength	Last Value (+)**
er_df	Exchange Rates	Local Currency Unit normalized by USD	Macroeconomic	Last Value - Average of j preceding periods (+)
gr_df	GDP Growth	Annual % Growth	Macroeconomic	Last Value - Average of j preceding periods (-)
inf_df	Inflation Rates	Annual % Change	Macroeconomic	Last Value - Average of j preceding periods (+)
ob_df	Overall Balance	Lending/Borrowing as % of GDP	Public Finance	Last Value - Average of j preceding periods (-)
gd_df	Public Gross Debt	Debt as % of GDP	Public Finance	Last Value - Average of j preceding periods (+)
std_df	Short Term Debt	STD as % of GDP	External Financing	Last Value (+)
ltd_df	Long Term Debt	LTD as % of GDP	External Financing	Last Value (+)
ca_df	Current Account	Balance as % of GDP	External Financing	Last Value (-)

Tab. 3: Key indicators with their respective Units of Measurements (UOMs), dataframe names, category of belonging and calculation methods. Note that: ** (-) indicates that the indicator has a negative impact on the CRI (lowers risk). ** (+) indicates that the indicator has a positive impact on the CRI (increases risk).*

Since different indicators present different units of measurement, all the datasets have been standardized by using a min-max normalization. Then the following formula has been used to calculate the CRI:

$$CRI^X = \frac{1}{N}\sum_{i=1}^{N} Value\ of\ Interest_i$$

Where N is the number of indicators used. It must be noted that the value of interest can assume negative values (e.g. a high Overall Balance Account in the aggregator as it indicates a strength).

It must be specified that the apex X indicates the chosen time frame (X = long, medium, and short-term). As a fact, the indexes belonging to the Macroeconomic and Public Finance categories have been calculated as follows:

$$Value\ of\ Interest_i\ (Public\ Finance, Macroeconomic) = Last\ Value\ (2022) - \frac{1}{J}\sum_{j=1}^{J} Value_j$$

Where, J = 10, 5, and 3 respectively for the long, medium, and short time frames.

Finally, the obtained CRIs have been standardized between 0 (lowest risk) and 1 (highest risk) to visualize the results better.

8. Appendix II: OLS Linear Regressions

The OLS multidimensional regression is helpful for understanding how various factors influence bond yields across different time horizons.

The strong points are:

- **High R-squared values**: All models have strong explanatory power (R^2>0.8 on all timeframes), indicating that the predictors collectively explain most of the variation in bond yields.
- **Robust overall significance**: The F-statistic p-values are far below 0.05, hence the regression is statistically significant.

Unfortunately, some predictors are **not statistically significant** (e.g., inflation rates, openness, short-term debt in certain models), which could make the analysis less reliable if these indicators are misleading or unnecessary. Moreover, non-significant indicators (reg. predictors) can introduce noise into the model, reducing its reliability. By examining each time frame, we can highlight:

Long-Term Model:

- **Inflation rates** and **Openness**: Marginally non-significant.
- **Gross debt**: Extremely non-significant, indicating no apparent relationship with long-term bond yields.

Medium-Term Model:

- **Inflation rates**, **GDP growth rates**, **Gross debt**, **Current account**, **Short-term debt**: Non-significant.

Short-Term Model:

- **Inflation rates**: Marginally non-significant.
- **Openness** and **Short-term debt**: Non-significant.

For more precise information you can relate to the following tables:

OLS Regression Results

Dep. Variable:	2022 Yield (%)	R-squared:	0.186
Model:	OLS	Adj. R-squared:	0.175
Method:	Least Squares	F-statistic:	17.35
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	8.12e-05
Time:	09:28:18	Log-Likelihood:	-203.87
No. Observations:	78	AIC:	411.7
Df Residuals:	76	BIC:	416.5
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.0574	1.156	0.915	0.363	-1.244	3.359
CRI	8.6096	2.067	4.166	0.000	4.493	12.726

OLS Regression Results

Dep. Variable:	2022 Yield (%)	R-squared:	0.153
Model:	OLS	Adj. R-squared:	0.142
Method:	Least Squares	F-statistic:	13.71
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	0.000402
Time:	09:28:18	Log-Likelihood:	-205.42
No. Observations:	78	AIC:	414.8
Df Residuals:	76	BIC:	419.6
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	2.8294	0.844	3.354	0.001	1.149	4.509
CRI	7.7778	2.101	3.703	0.000	3.594	11.961

OLS Regression Results

Dep. Variable:	2022 Yield (%)	R-squared:	0.032
Model:	OLS	Adj. R-squared:	0.020
Method:	Least Squares	F-statistic:	2.534
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	0.116
Time:	09:28:18	Log-Likelihood:	-210.61
No. Observations:	78	AIC:	425.2
Df Residuals:	76	BIC:	429.9
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	4.2586	0.942	4.523	0.000	2.383	6.134
CRI	3.0002	1.885	1.592	0.116	-0.754	6.754

Tabs. 4 to 6: Univariate Linear Regression for the 10 years bond yields as a function of the CRI (+ a constant term), and relative coefficients, t-test values and more. Long, Medium and Short term (Tab. 4, 5 and 6).

OLS Regression Results

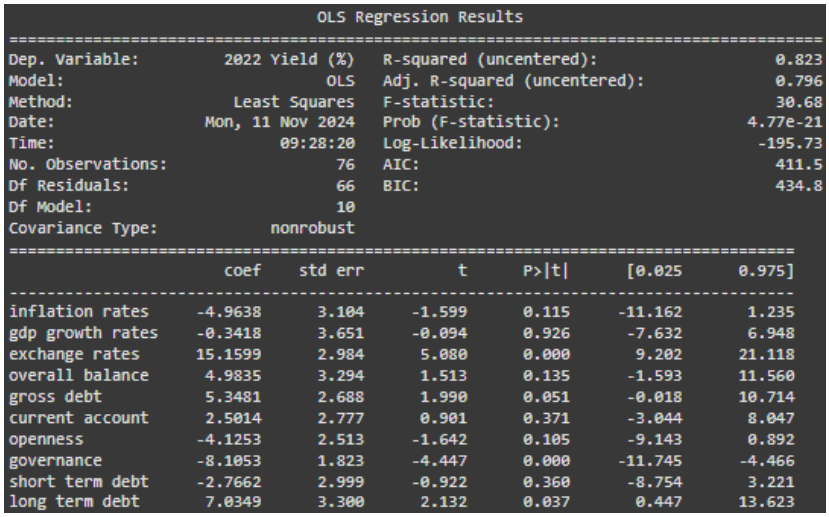
Dep. Variable:	2022 Yield (%)	R-squared (uncentered):	0.874
Model:	OLS	Adj. R-squared (uncentered):	0.855
Method:	Least Squares	F-statistic:	45.91
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	7.41e-26
Time:	09:28:20	Log-Likelihood:	-182.71
No. Observations:	76	AIC:	385.4
Df Residuals:	66	BIC:	408.7
Df Model:	10		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
inflation rates	4.5272	2.691	1.683	0.097	-0.845	9.899
gdp growth rates	-16.9688	3.708	-4.576	0.000	-24.372	-9.565
exchange rates	8.4498	2.353	3.591	0.001	3.751	13.148
overall balance	21.3296	4.946	4.313	0.000	11.455	31.205
gross debt	0.0897	2.482	0.036	0.971	-4.867	5.046
current account	0.9525	2.224	0.428	0.670	-3.488	5.393
openness	-3.0743	2.076	-1.481	0.143	-7.219	1.070
governance	-7.4802	1.621	-4.616	0.000	-10.716	-4.244
short term debt	-3.8475	2.474	-1.555	0.125	-8.787	1.092
long term debt	10.3731	2.751	3.771	0.000	4.880	15.866

OLS Regression Results

Dep. Variable:	2022 Yield (%)	R-squared (uncentered):	0.837
Model:	OLS	Adj. R-squared (uncentered):	0.812
Method:	Least Squares	F-statistic:	33.80
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	3.59e-22
Time:	09:28:20	Log-Likelihood:	-192.68
No. Observations:	76	AIC:	405.4
Df Residuals:	66	BIC:	428.7
Df Model:	10		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
inflation rates	-11.8847	9.547	-1.245	0.218	-30.945	7.176
gdp growth rates	1.2694	3.734	0.340	0.735	-6.187	8.726
exchange rates	11.6345	2.295	5.069	0.000	7.052	16.217
overall balance	8.4092	3.029	2.776	0.007	2.361	14.457
gross debt	1.5193	2.879	0.528	0.599	-4.228	7.267
current account	0.0138	2.638	0.005	0.996	-5.253	5.280
openness	-4.8049	2.375	-2.023	0.047	-9.547	-0.063
governance	-5.8745	1.754	-3.349	0.001	-9.376	-2.372
short term debt	-3.4149	3.434	-0.995	0.324	-10.270	3.440
long term debt	5.7428	3.329	1.725	0.089	-0.905	12.390



OLS Regression Results

Dep. Variable:	2022 Yield (%)	R-squared (uncentered):	0.823
Model:	OLS	Adj. R-squared (uncentered):	0.796
Method:	Least Squares	F-statistic:	30.68
Date:	Mon, 11 Nov 2024	Prob (F-statistic):	4.77e-21
Time:	09:28:20	Log-Likelihood:	-195.73
No. Observations:	76	AIC:	411.5
Df Residuals:	66	BIC:	434.8
Df Model:	10		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
inflation rates	-4.9638	3.104	-1.599	0.115	-11.162	1.235
gdp growth rates	-0.3418	3.651	-0.094	0.926	-7.632	6.948
exchange rates	15.1599	2.984	5.080	0.000	9.202	21.118
overall balance	4.9835	3.294	1.513	0.135	-1.593	11.560
gross debt	5.3481	2.688	1.990	0.051	-0.018	10.714
current account	2.5014	2.777	0.901	0.371	-3.044	8.047
openness	-4.1253	2.513	-1.642	0.105	-9.143	0.892
governance	-8.1053	1.823	-4.447	0.000	-11.745	-4.466
short term debt	-2.7662	2.999	-0.922	0.360	-8.754	3.221
long term debt	7.0349	3.300	2.132	0.037	0.447	13.623

Tabs. 7 to 9: Multidimensional Linear Regression for the 10 years bond yields as a function of the CRI constituents (+ a constant term), and relative coefficients, t-test values and more. Long, Medium and Short term (Tab. 7, 8 and 9).

We can highlight that the most misleading indicator is Gross Debt as it shows non-significancy in all models, yet it could create the illusion of importance in the analysis. This may share information with other variables (like long-term debt or overall balance), leading to redundancy (multicollinearity). Also, Inflation Rates is marginally non-significant in the long- and short-term models, while completely non-significant in the medium term. Thirdly, Openness and Short-Term Debt are non-significant across all models, suggesting it does not meaningfully explain bond yields in this dataset.

These predictors could be removed, and another regression should be run. Because of space constraints we did not proceed with this feature engineering step. Concluding, the analysis looks robust but could be improved by refining the predictor space or correlation analysis.

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