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## Effects of currency and international diversification on the risk and return of Brazilian portfolios: an empirical analysis.

*Effects of Currency and International Diversification on the Risk and Return of Brazilian Investment Portfolios: An Empirical Analysis*

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### Summary

The integration of financial markets and exchange rate volatility in the Brazilian economy highlight the need for efficient international investment allocation. This study analyzes the effects of currency and international diversification on the risk and return of Brazilian portfolios, evaluating the impact of this strategy on portfolio efficiency. Markowitz's (1952) mean-variance model was applied to data from 2015 to 2024, considering different levels of exposure to foreign assets with and without currency hedging. The results show that allocations between 15% and 30% in international assets increase risk-adjusted return and reduce volatility in reais.

It was also observed that partial currency exposure acts as asset protection during periods of devaluation of the real, without compromising long-term profitability. It is concluded that international diversification is an essential element of portfolio management in Brazil, promoting stability and preserving purchasing power in the face of macroeconomic instability.

**Keywords:** International Diversification. Exchange Rates. Risk and Return. Investment Portfolios. Portfolio Efficiency.

### Abstract

The integration of financial markets and the exchange rate volatility in the Brazilian economy highlights the need for efficient international asset allocation. This study analyzes the effects of currency and international diversification on the risk and return of Brazilian portfolios, assessing its impact on portfolio efficiency. The mean-variance model by Markowitz (1952) was applied to data from 2015 to 2024, considering different exposure levels to foreign assets with and without hedging.

The results show that allocating between 15% and 30% to international assets increases risk-adjusted returns and reduces volatility in local currency. Partial currency exposure also acts as protection against real depreciation without harming long-term performance. It is concluded that international diversification is essential for portfolio management in Brazil, promoting stability and preserving purchasing power amid domestic macroeconomic instability.

**Keywords:** International Diversification. Exchange Rate. Risk and Return. Investment Portfolios. Portfolio Efficiency.

## 1. Introduction

The expansion of the Brazilian financial market in recent decades has transformed significantly changes the profile of the national investor. The advancement of digitalization and the emergence of Investment platforms have contributed to broadening access and increasing sophistication of the strategies adopted by individuals. Even so, a strong concentration of [the following] is observed. Investments in domestic assets, reflecting a local bias that limits diversification potential and portfolio returns. According to data from the Getulio Vargas Foundation (FGV), only about 1.1% of Resources allocated to funds in the country have international exposure, while the markets Developed countries account for approximately 97% of the global market value.



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This geographic concentration of investments implies significant risks, especially in Economies marked by exchange rate instability and recurring inflation. Recent study by FGV. It was identified that, between 2006 and 2024, the devaluation of the real against the dollar increased costs by up to 15% of the lives of Brazilian families, regardless of income bracket, demonstrating the The vulnerability of domestic purchasing power in the face of currency fluctuations. The research indicates that Allocating at least 16% of the portfolio to dollar-linked assets could offset some of the risk. of this impact, functioning as a mechanism for exchange rate protection and asset preservation. real over time.

In addition to its defense role, international investment offers access to opportunities for structural growth and technological innovation that are not reflected in the economy. Brazilian. As evidenced by JP Morgan Asset Management, companies like Apple, Microsoft, NVIDIA, and Amazon, listed in developed markets, have market capitalizations. individual companies outperform the combined total of the leading companies listed on the Brazilian stock exchange, reinforcing the The importance of a global allocation.

Additionally, international diversification contributes to balancing the risk-risk ratio. Portfolio returns. The historically low correlation between the performance of the real and the markets. Global returns reduce volatility and improve the consistency of returns over the long term. Evidence Empirical data indicates that a portfolio composed of 50% stocks and 50% US bonds It delivered an annualized return of 7.2% with currency hedging, compared to 6.5% without hedging, in addition to a Volatility is approximately 60% lower. These results corroborate the efficiency of... Geographic and monetary diversification as a tool to smooth out fluctuations and leverage risk-adjusted earnings

Thus, the internationalization of investments is configured as a component. essential to modern and efficient asset management. More than a tactical alternative, it is... of a long-term structural strategy aimed at protecting purchasing power and expanding sources of return and the insertion of the Brazilian investor into a truly financial context global.

## 2. Theoretical Framework / Results

Contemporary financial literature recognizes that international diversification constitutes one of the central pillars of modern portfolio theory. Since Markowitz (1952), it has been demonstrated that Combining assets with imperfect correlations reduces the overall portfolio risk without compromising... necessarily, the expected return. In the Brazilian context, this premise gains additional relevance. due to exchange rate volatility, macroeconomic fluctuations, and sectoral concentration of



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Domestic market. The structural limitation of the universe of local assets (less than 1% of the capitalization). (global) means that the efficiency of portfolios depends on the incorporation of foreign assets capable to capture distinct economic cycles, sectors, and currencies.

Currency diversification, in particular, plays a key role in mitigating risk. systemic and in preserving the investor's purchasing power. According to FGV (2024), the The accumulated devaluation of the real between 2006 and 2024 generated an average increase of 13 to 15% in the cost of The lives of Brazilian families, an effect that is independent of income bracket. FGV itself recommends that, To offset some of this impact, the minimum allocation to international assets should be between 16% and 18% of the total portfolio.

From a portfolio theory perspective, currency exposure introduces an additional source of return, which reflects the interest rate differential and the expectation of appreciation or depreciation. relative to currencies. In emerging economies, such as Brazil, characterized by greater uncertainty. Regarding political and fiscal considerations, including dollar-denominated assets tends to reduce the portfolio's real volatility when... measured in terms of purchasing power. JP Morgan Asset Management (2024) shows that a The balanced global portfolio (50% equities and 50% US fixed income securities) presented annualized return of 7.2% with currency hedging and 6.5% without hedging, while the volatility of The portfolio with protection was approximately 60% smaller.

The US dollar, in turn, remains the main reserve currency and global liquidity, concentrating around 60% of the international reserves of central banks and more 70% of foreign exchange and interest rate derivatives transactions. This hegemony reflects not only the depth of US financial markets, but also institutional and legal confidence. that underpins the international financial system. In this way, assets pegged to the dollar act as instruments for preserving value during periods of domestic instability, functioning as A natural *hedge* against exchange rate and inflationary shocks.

Beyond the monetary dimension, exposure to companies listed in developed economies It allows participation in highly productive and innovative sectors, whose long-term returns exceed... Largely those observed in emerging markets. Data compiled by JP Morgan. They demonstrate that, between 2015 and 2024, the North American technology sector showed a return. annualized growth exceeding 29%, while the Brazilian stock index registered around 5% in the same period. period. This disparity reinforces the argument that the internationalization of the portfolio is not limited It is not only for exchange rate protection, but it also constitutes a driver of structural growth.

From an empirical standpoint, international financial integration has been associated with reducing the volatility of returns and increasing the efficiency of investment frontiers. Classic studies, such as those by Solnik (1974) and Harvey (1995), demonstrate that the correlation between



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Markets tend to remain below 0.7 on average globally, allowing for significant gains.

diversification. The same behavior was observed in JP Morgan's 2024 report, in

that the correlation between Brazilian and US variable income remained close to 0.45,

indicating partial independence between economic cycles and confirming the potential for reduction of risk in global portfolios.

Thus, the theoretical and empirical basis converge on the idea that currency diversification and

International strategies are essential tools for building more resilient and efficient portfolios.

In highly volatile economies like Brazil, the inclusion of foreign assets serves a dual purpose.

role: defensive, by protecting assets against currency devaluations and domestic shocks, and

expansion, by allowing the capture of returns from more liquid, mature markets and

Innovators.

### **3. Materials and Methods**

The aim is to evaluate the main effects on the portfolios of Brazilian investors when allocating part of its assets are invested in international assets, as well as the impacts of this decision on returns.

adjusted to the risk of the portfolios. To this end, the methodology adopted is based on the application of models.

of mean-variance portfolio optimization, following the formulation proposed by Markowitz

(1952), complemented by empirical simulations that consider different asset compositions.

Locals and foreigners. The goal is to estimate the efficient boundary for different levels of exposure.

international, allowing the identification of the allocation ratio that maximizes the expected return for a certain level of risk.

The analysis considered a base portfolio composed of assets representative of the market.

Brazilian assets (Ibovespa stocks, government bonds indexed to the IPCA and CDI) and, in parallel, assets International currencies expressed in US dollars, including S&P 500 index stocks and bonds.

Bloomberg US Aggregate Bond Index. Historical returns were obtained in local currency and in

foreign currency, between 2015 and 2024, in order to reflect a period with wide exchange rate variation and

different monetary policy cycles. Based on data provided by JP Morgan Asset

Management observed that, during this period, the annualized return on Brazilian equities was...

of approximately 9.2%, while US variable income reached 13.1%, and income global variable, 10.1%.

To assess the influence of the exchange rate on the optimal composition, two scenarios were simulated.

Distinct scenarios: the first with total currency exposure (without hedging), and the second with protection.

full exchange rate (with hedge). The difference between the results of these two cases allows us to measure the

The effect of exchange rates on volatility and returns in reais. According to data from JP Morgan, the



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The global 50/50 portfolio (S&P 500 + Bloomberg US Aggregate) delivered an annualized return of 6.5%.

Without hedging, the rate was 7.2%, and with hedging, volatility fell from 19.6% to 8.8%. These results

They indicate that the use of currency hedging helps to smooth out portfolio fluctuations, although

Reduce some of the gains resulting from currency appreciation during periods of real depreciation.

The study also incorporated data from FGV (2024) relating to the impact of exchange rate fluctuations.

regarding the cost of living in Brazil. When these results were combined with portfolio simulations, it was observed...

which, to neutralize approximately 70% of the inflationary impact resulting from the devaluation

Given the Brazilian real, an average allocation of 16 to 18% in dollar-denominated assets would be necessary. This proportion was...

tested at the efficient frontier, demonstrating a significant improvement in the Sharpe ratio and a reduction in

Full volatility, without compromising the expected return.

The efficiency evaluation methodology was complemented by correlation analysis between

The returns on Brazilian and international assets. Based on historical data from JP Morgan, the

The correlation between the Ibovespa and the S&P 500 remained close to 0.45, indicating low dependence.

between the domestic and external economic cycles. This empirical evidence confirms that the inclusion of

Foreign assets reduce systemic risk concentration and expand diversification opportunities.

Effective. Additionally, the analysis of accumulated returns shows that the real has undergone depreciation.

a 61% increase relative to the dollar between 2015 and 2024, which reinforces the importance of currency hedging as

An instrument for preserving heritage during periods of fiscal and political deterioration.

In this way, the empirical analysis confirms the theoretical hypothesis that exposure to assets

international investments, when calibrated between 15% and 30% of the total portfolio, are capable of improving

substantially improve the efficiency of Brazilian portfolios. In addition to expanding the universe of opportunities,

Internationalization reduces volatility in reais and provides intertemporal stability.

establishing itself as an essential strategy for building wealth in economies subject to

Macroeconomic and exchange rate instability.

#### **4. Results and Discussion**

Initially, it is possible to observe, based on the data consolidated by JP Morgan Asset

Management and by the Getulio Vargas Foundation (FGV), which has seen a significant expansion in

Brazilian investors' interest in international assets has increased over the last decade.

The increased access to digital platforms has led to a greater demand for geographic and currency diversification. Still...

Thus, the proportion of resources effectively allocated outside the country remains low, representing

only about 1.1% of the total invested in fixed income and less than 3% in variable income, which

confirms the predominance of domestic bias and the structural dependence on conditions.

national macroeconomics.



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An analysis of the returns and volatility of the main Brazilian and foreign assets between The years 2015 and 2024 reveal significant differences in both magnitude and stability. While the The average annualized return of the Ibovespa was 9.2%, with volatility close to 22%, according to the S&P index. The 500 model showed an annualized return of 13.1% and volatility below 15%. The performance of the bonds... Public inflation indexed to the IPCA (Brazilian consumer price index) showed positive results, but were limited by the strong correlation with the trajectory. The country's fiscal situation and the risk of reinvestment during periods of high inflation. Conversely, the Bonds in the Bloomberg US Aggregate Bond Index maintained consistent real returns and correlation. negative with variable income, confirming the efficiency of the balance between stocks and bonds in international contexts.

Brazilian exchange rate behavior during the same period reinforces the relevance of this. diversification. The national currency has accumulated a depreciation of approximately 61% against the The US dollar, reflecting both internal shocks of a fiscal and political nature as well as factors... External factors, such as rising interest rates in the United States, contribute to this heightened volatility. This directly impacted household purchasing power, raising the cost of consumption for families by... 13 to 15%, FGV (2024), and also affecting the real profitability of portfolios concentrated in assets In this context, it was observed that the inclusion of dollar-denominated assets, even in small local areas, was a significant factor. In terms of proportion, it provided significant gains in asset resilience.

It was found that the 20% increase in international assets (distributed equally between (global stocks and bonds) increases the Sharpe ratio by 24% compared to the portfolio composed exclusively through domestic assets. Furthermore, volatility in reais decreased by 35% in... The scenario with currency hedging is 18%, and the scenario without hedging is 18%, which confirms the stabilizing effect of... monetary diversification. These results are consistent with Solnik's international findings. (1974) and Harvey (1995), which demonstrate efficiency gains obtained by incorporating assets. from different markets.

Sensitivity tests applied to historical series showed that, even with With increasing correlation between markets, international diversification maintains a marginal benefit. Positive regarding the overall portfolio risk. When the correlation between the Ibovespa and the S&P 500 was high. Artificially increased from 0.45 to 0.70, the efficient frontier shifted only 4 percentage points towards the... on the right, indicating that the gains from diversification persist even under scenarios of greater integration. financial. This result reinforces the empirical strength of the argument that global exposure is capable to reduce extreme losses and smooth the return trajectory of local currency portfolios.

Another relevant aspect concerns the choice between maintaining or not maintaining currency exposure. Analyses indicate that currency hedging substantially reduces the volatility of returns, but it can... Limiting gains during periods of real devaluation. Thus, for investors with a long-term horizon.



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Given the timeframe and moderate risk profile, partial exposure to foreign exchange (between 10% and 20% of the total portfolio) It proves to be the most efficient, balancing protection and potential for appreciation.

In summary, the results confirm the hypothesis that international diversification does not It not only improves the risk-adjusted performance of Brazilian portfolios, but also functions as... a mechanism to mitigate the effects of exchange rate volatility and domestic economic cycles. Strategic allocation between local and global assets, calibrated according to the investor's profile. It constitutes a fundamental tool for intertemporal stability and wealth creation. in emerging economies. Therefore, investing abroad ceases to be a merely strategic decision. opportunistic and becomes a structuring component of long-term asset management, capable of maximizing real returns, reducing risks, and ensuring greater balance in the face of the dynamics of global economy.

### **Final Considerations**

The results of this study highlight the relevance of international diversification as an indispensable element for building more efficient and resilient portfolios. It was found that The heavy concentration of Brazilian investments in domestic assets limits the potential for return. and exposes the investor to systemic risks specific to the national economy, such as high inflation, Exchange rate volatility and fiscal instability. Empirical analysis confirmed that the allocation of part of the Investing in international assets significantly improves the risk-return ratio of portfolios. and protects purchasing power during periods of devaluation of the real.

The results obtained through portfolio simulations demonstrated that the inclusion of Assets denominated in dollars (in proportions between 15% and 30%) provide significant gains of efficiency, reducing volatility and increasing risk-adjusted return. It was also observed that The use of currency hedging instruments can smooth out fluctuations without completely eliminating them. The benefit of monetary diversification, being particularly suitable for more... conservatives. These findings are consistent with the evidence presented by institutions. such as FGV, Itaú Private Bank and JP Morgan Asset Management, which indicate that the exposure International cooperation is crucial for mitigating local shocks and capturing growth opportunities. global.

Another important point is that foreign investment should not be interpreted solely as a defense strategy, but also as a vector for accessing economic sectors and High-growth companies, absent from the domestic market. The contemporary global scenario is dominated by companies that are intensive in technology, innovation, and sustainability, which makes



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The participation of Brazilian investors in these markets is essential to ensure competitiveness and increasing long-term returns.

In summary, it can be concluded that the internationalization of portfolios is not just a theoretical recommendation of modern portfolio theory, but a practical necessity in light of... Structural characteristics of the Brazilian economy. The maintenance of a strategic portion of assets. Global returns should be understood as an instrument for preserving value and increasing real returns. ensuring greater stability in the face of domestic volatility. In this way, promoting education Financial resources and access to international investment vehicles become essential for the investor. so that Brazilians can build a more solid, diversified portfolio aligned with the dynamics of global market.

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