SPECTRA INVESTMENTS

Insper HUB DE INOVAÇÃO E EMPREENDEDORISMO PAULO CUNHA

IMPACT OF EXCHANGE RATE ON RETURNS IN PRIVATE EQUITY AND VENTURE CAPITAL

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HIGHLIGHTS

Brazil's currency volatility is a well-known challenge, particularly in the Private Equity and Venture Capital sectors. Hedging against these fluctuations often proves to be expensive, primarily due to the disparity in interest rates and the extended duration involved in such investments. Nevertheless, fund managers have tools to mitigate at least a portion of the risk associated with Brazilian currency devaluation, as for instance spreading acquisitions throughout the investment period and strategically timing exits to coincide with periods of appreciation in the Brazilian Real. In this study, we explore the impact of Brazil's volatile foreign exchange rates over the past three decades on the private equity and venture capital markets. Our analysis covers both the outcomes of individual divestments and the broader impact on PE and VC funds. It's crucial to recognize that these analyses utilize distinct datasets: the deal analysis focuses exclusively on investments that have been liquidated, while the fund analysis looks at funds considering contributions from limited partners, distributions to them, and the market-value pricing of portfolio companies. Despite these differing perspectives, our research provides valuable insights into the capability of funds to manage the challenges posed by currency-related risks.
This study was conducted through a collaboration between Insper and Spectra. Our primary findings include:

- Since 1994, the Brazilian Real has experienced significant depreciation. Until 1998, the exchange rate from the Brazilian Real (BRL) to the U.S. Dollar (USD) was 1:1, while in 2022, it varied between 5.0 and 6.0.
- A remarkable 78% of transactions registered a lower Gross Internal Rate of Return in USD compared to BRL. On average, the IRR in BRL was 7.5% higher than the IRR in USD.
- An investor who consistently invests the same amount in Brazil every year would have achieved an IRR that is 1.9% higher in BRL than in USD. This result indicates that a perennial investor would experience an exchange rate impact much lower than previously suggested.
- The depreciation was not linear. There were significant shifts in the Brazilian currency relative to the US Dollar. The timing of investments and divestments relative to the local currency's valuation significantly affects USD performance. Investments made between 1994 to 2000, when the Real was overvalued, predominantly led to BRL depreciation, adversely impacting the USD IRR. Conversely, investments from 2002 to 2006, during the Real's undervaluation, generally saw an appreciation, thereby enhancing their USD performance.
- Most transactions invested and divested since 2010 faced Brazilian Real depreciation, accounting for almost 60% of the sample. This affected the fund's returns, with the BRL/USD exchange rate showing more than a 3x depreciation over this period.
- Fund managers were able to mitigate a significant portion of the negative impacts of currency devaluation. Although 80% of the funds performed worse in USD than in BRL, the negative impact was lower. On average, BRL IRR was 5.8% higher than in USD.
- Although the currency risk offset part of the return achieved by Brazilian fund managers, the industry also performed well in USD.
- On average, the exchange rate fluctuated by 45% between the initial investment in a company and the exit date (7.5% a year during the average holding period). However, the difference of inflation between Brazil and the US during the same period was 27% (4.9% a year during the average holding period). This indicates that inflation accounts for 66% of the fluctuations in the exchange rate.

The Dynamics of the Brazilian Real Exchange Rate

Over the last thirty years, the Brazilian foreign exchange market has experienced substantial fluctuations, mirroring the nation's economic and political transformations. In 1994, following the implementation of the Real Plan, the exchange rate between the Brazilian Real and the U.S. Dollar was established at 1:1. Throughout the favorable economic cycle of Fernando Henrique Cardoso's first administration, this rate was maintained until 1998.

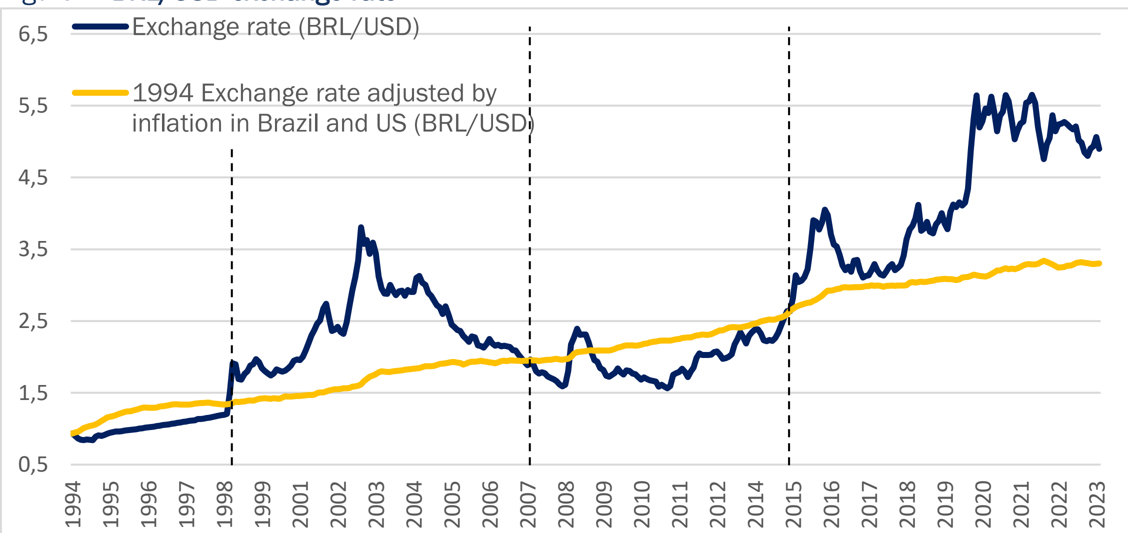
The Brazilian economy encountered challenges in 1998 due to the contagion effects of the 1997 Asian financial crisis and the subsequent Russian crisis in 1998. This period of economic instability extended into the second term of President Fernando Henrique Cardoso's administration, and the exchange rate BRL to USD was close to 4:1 in December 2002.

In January 2003, the left-wing president Luiz Inácio Lula da Silva took office and maintained the previous economic policy, stabilizing the market. The favorable global economic climate, combined with a commodities boom, bolstered the Brazilian economy. This period of growth and stability drew substantial foreign investment, resulting in an appreciation of the Brazilian Real against the U.S. Dollar. Post-2006, the foreign exchange rate fell below 2 BRL/USD, and aside from some turbulence in 2008, due to global economic crises, it remained below 2 until 2012.

However, post-2012, Brazil was beset by a series of political and economic upheavals. In 2014, Operation Car Wash (Operação Lava Jato), the nation's most extensive anti-corruption campaign, commenced, culminating in the arrest of numerous business figures and political leaders, including former President Luiz Inácio Lula da Silva in 2018. President Dilma Rousseff faced impeachment in 2016. The 2018 election saw the ascent of right-wing candidate Jair Bolsonaro to the presidency. Additionally, the world grappled with the outbreak of the COVID-19 pandemic in 2020. In a significant political turnaround at the end of 2022, Luiz Inácio Lula da Silva was re-elected as president. These developments led to a pronounced devaluation of the Brazilian Real, exacerbating exchange rate volatility and posing considerable challenges for both investors and the broader economy.

Figure 1 depicts the fluctuation in the exchange rate between the Brazilian Real and the U.S. Dollar over time. The inflation-adjusted exchange rate since 1994 is represented by the yellow line, while the blue line shows the actual observed rate. Assuming the inflation-adjusted is the fair exchange rate, this graph reveals that the Real was undervalued from 1998 to 2006, entered a phase of appreciation between 2006 and 2015, and in 2018, started to depreciate once more.

Figure 1. **BRL/USD exchange rate**

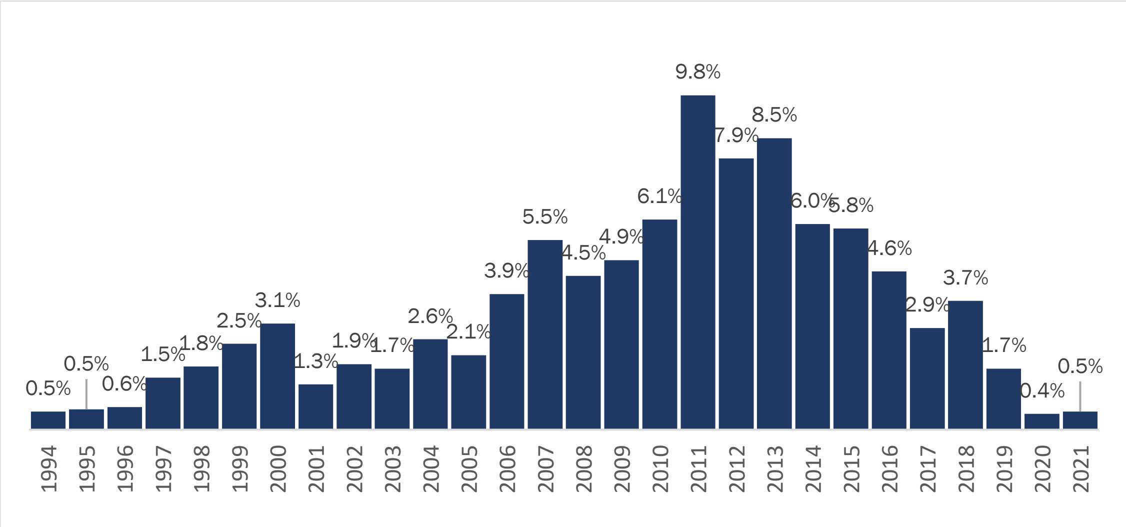


Sample of Deals

Our dataset encompasses 1,184 Private Equity (PE) and Venture Capital (VC) investments in Brazil, initiated between 1994 and 2021 and liquidated between 1994 and 2023. This information is derived from proprietary data provided by Spectra Investments. Consequently, our analysis is based on gross performance metrics as reported by the fund managers. For instances where data was available exclusively in either Brazilian Reais or U.S. Dollars, conversions were conducted using the exchange rates prevailing on the dates of investment and divestment.

Close to 60% of the investments analyzed were both invested and divested starting from 2010 (Figure 2), a period mostly dominated by BRL depreciation: the BRL/USD exchange rate started the year 2010 close to 1.70 and ended 2022 near 5.50, that is, a depreciation of more than 3 times.

Figure 2. **Distribution of the deal in the sample according to the investment year**



Exchange Rate Impact on Deal Performance

Figure 3 presents a histogram showing the difference between a deal's IRR in BRL and its IRR in USD. The data indicates that 78% of the deals were negatively impacted by currency risk (i.e., the difference was greater than 0%). Additionally, 15% of the deals had an IRR in BRL that was up to 5% higher than the IRR in USD. On average, the difference between the IRR in BRL and USD was 7.5%, with a median difference of 8.1%.

Figure 3. **Histogram of the difference between a deal's IRR in BRL and USD (BRL IRR minus USD IRR)**

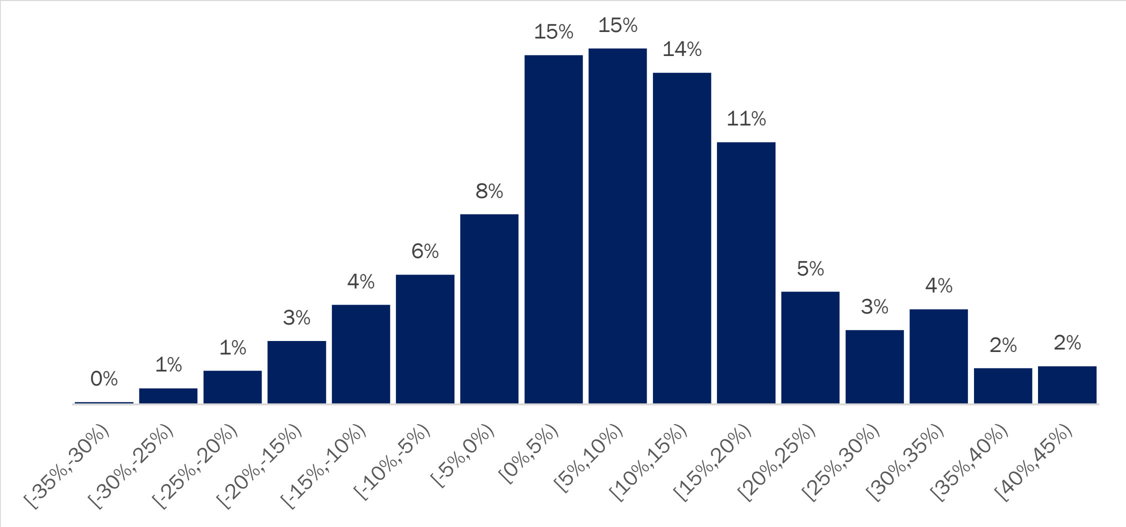


Figure 4 illustrates the impact of currency fluctuations on the Internal Rate of Return in U.S. Dollars, categorized by the year of investment entry, known as the vintage year. This analysis specifically focuses on how currency valuation at the time of investment influences returns in USD in Brazil.

When investing during a period where the Brazilian Real is overvalued, characterized by a low BRL to USD exchange rate, investors find themselves converting each USD to fewer BRLs. This was evident in 1994, when the exchange rate hovered around 1 BRL to 1 USD. Among the 8 deals from this vintage year, two experienced no BRL depreciation, meaning the IRR in USD was the same as the IRR in BRL (IRR in BRL – IRR in USD = 0). However, the other six deals witnessed BRL depreciation, with the maximum negative impact on the IRR in USD being 45%.[1]

Conversely, investing when the Brazilian Real is undervalued, as indicated by a high USD to BRL exchange rate, means acquiring more BRL for each USD. This situation often leads to BRL appreciation, which, in turn, increases the investment's Internal Rate of Return (IRR) in USD. For example, deals made between 2002 and 2006, a period during which the BRL/USD exchange rate ranged from 2.1 to 3.6, generally experienced yearly BRL appreciation. This trend significantly boosted the USD performance of these investments.

In summary, Figure 4 demonstrates how the timing of an investment relative to currency valuation can significantly influence the return on investment in Brazil when measured in a different currency. It highlights that, with few exceptions, deals from vintage years between 1994 and

[1] The vertical axis on the graph represents the BRL depreciation, estimated using the formula $\left(\frac{1+IRR_{BRL}}{1+IRR_{USD}}\right) - 1$. Each point on the graph corresponds to an individual deal. Consequently, a point positioned above the zero line on the vertical axis signifies that the deal achieved a higher IRR in BRL compared to USD. Conversely, a point below the zero line indicates that the deal had a lower IRR in BRL than in USD.

2000, as well as from 2012 onward (except for 2016), predominantly experienced BRL depreciation regardless of the holding period length, adversely affecting the IRR in USD. However, between 2007 and 2011, the impact of BRL movements on investments was more varied. Some deals benefited from BRL appreciation, while others suffered from BRL depreciation. This period allowed fund managers greater flexibility to mitigate currency risk, underscoring the importance of strategic currency management in foreign currency investments.

Figure 4. **BRL depreciation during deal's holding period categorized by year of investment**

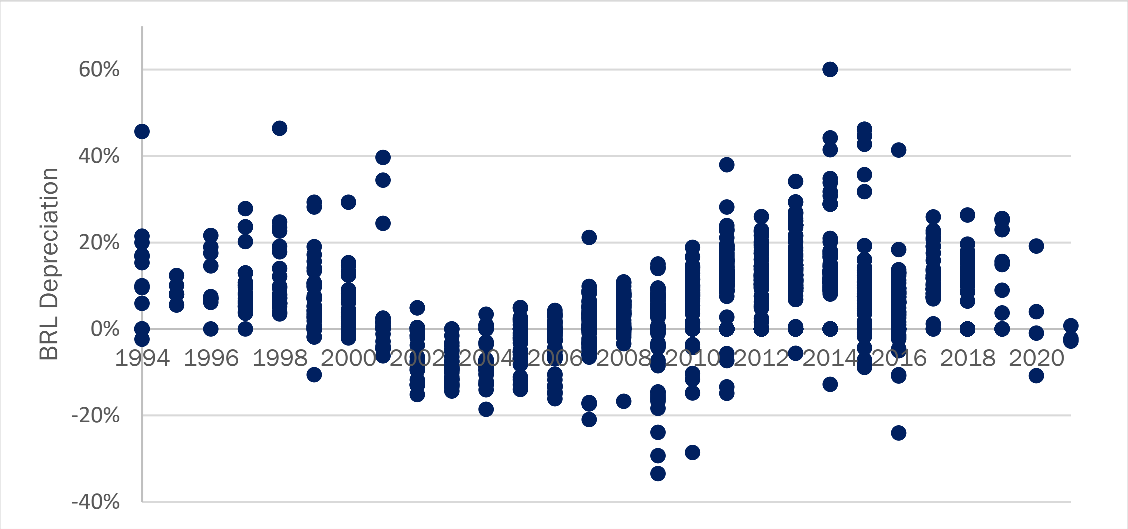
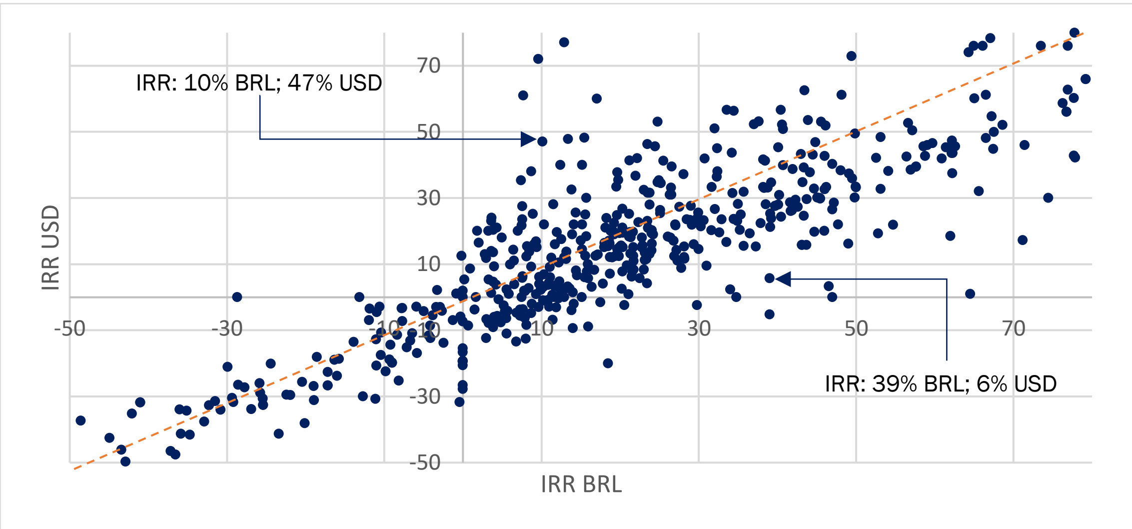


Figure 5 presents a comparison of the gross Internal Rate of Return (IRR) in Brazilian Real (BRL) on the horizontal axis, with the gross IRR in U.S. Dollars (USD) on the vertical axis. The points on the graph represent individual deals. It's important to note that the IRR in USD can be misleading when assessing fund managers' track records. Due to currency devaluation, what appears to be exceptional performance in BRL can translate into only average returns in USD. For example, a deal with an IRR of 39% in BRL may only yield an IRR of 6% in USD. Conversely, currency appreciation can elevate what would be considered median returns into exceptional ones. An instance of this is observed in a deal where the IRR is 10% in BRL but as high as 47% in USD.

Figure 5. **Comparison between USD IRR and BRL IRR**



One could argue that this outcome is unsurprising, given the divergent trajectories of inflation in Brazil and the US over the past three decades. When comparing the differences in inflation rates between the entry and exit dates (∆IPCA - ∆CPI), we observed a 27% variance (with a median of 21) –4.9% a year for the average holding period. Meanwhile, the exchange rate fluctuated by an average of 45% (with a median of 32%) between the entry and exit dates – 7.5% a year for the average holding period. This suggests that 66% of the exchange rate fluctuation can be attributed to the disparity in inflation.

An investor who consistently invests the same amount in Brazil every year would have achieved an IRR that is 1.9% higher in BRL than in USD. This result indicates that a perennial investor would experience an exchange rate impact much lower than previously suggested.

Alternatively, an investor might attempt to time the market, adjusting their exposure to Brazilian investments based on whether the Real is undervalued or overvalued. During periods when the Real was overvalued, such as 1994-1998 and 2008-2014, 80% and 76% of deals, respectively, had a higher IRR in BRL, averaging 3.3% and 8.9%. Conversely, during periods when the Real was undervalued, such as 1999-2007 and 2015-2023, 59% of deals in the first period had a higher IRR in USD, averaging 11.6%. In the second period, only 19% of deals had a higher IRR in USD. This strategy seems less effective in offsetting the exchange rate issue.

Exchange Rate Impact on PEVC Funds

General partners demonstrate skill in diversifying and partially mitigating currency risk. They strategically time the acquisition of companies throughout the investment period and execute partial or complete exits judiciously, particularly when the Brazilian Real (BRL) appreciates against the U.S. Dollar (USD), thus capitalizing on favorable currency valuations.

We selected all funds, known as Fundos de Investimento em Participações (FIPs), listed with the Comissão de Valores Mobiliários (CVM), the Brazilian Securities Exchange Commission. These funds are classified as either Private Equity (PE) or Venture Capital (VC) by the Brazilian Private Equity Association (ABVCAP). We augmented this dataset with additional funds from the Spectra Insper database, which includes funds either dedicated to Brazil or to Latin America with investments in Brazil. The added funds either were raised before 2003 or utilized non-CVM-regulated vehicles for investing in Brazil. Our dataset encompasses 387 funds raised between 1994 and 2022.

We estimated the cash flows arising from capital calls, capital distributions, and the current market value of the invested fund portfolios, based on their financial statements as of December 2022. Utilizing these estimated cash flows, we calculated the net Internal Rate of Return (IRR) in both Brazilian Real (BRL) and U.S. Dollars (USD). This analysis diverges from our deal-level approach as it encompasses not only deals that have exited but also those still within the portfolio, marked at their market value.

Figure 6 contains the distribution of funds according to vintage year, and we observe that 79.5% of the funds were raised in 2010 or after that.

Figure 6. **Distribution of funds according to vintage year**

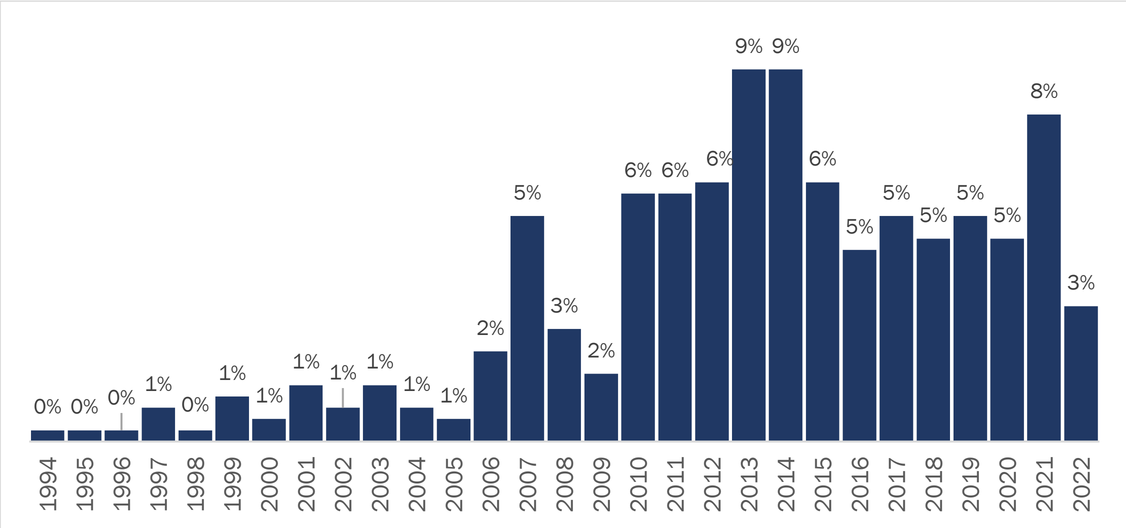


Figure 7 presents the histogram of the BRL depreciation during funds' life until December 2022. While 80% of the deals exhibited lower performance in USD compared to BRL, the mean and median difference between IRR in BRL and in USD are 5.8% and 6.2%, respectively. These figures are considerably lower than the mean yearly depreciation of 7.5% during individual deals' holding period.

Additionally, the distribution of the BRL depreciation during the life is much narrower for funds: 94% of the funds had a difference between the IRR in BRL and the IRR in USD ranging from -20% to 20%, with 52.9% of the funds showing a depreciation between 0% and 10%. As expected, although fund managers did not eliminate the negative impact of currency volatility on their portfolio, they were able at least to mitigate a big part of it.

Figure 7. **Histogram of the BRL depreciation of the PE and VC funds during their lives**

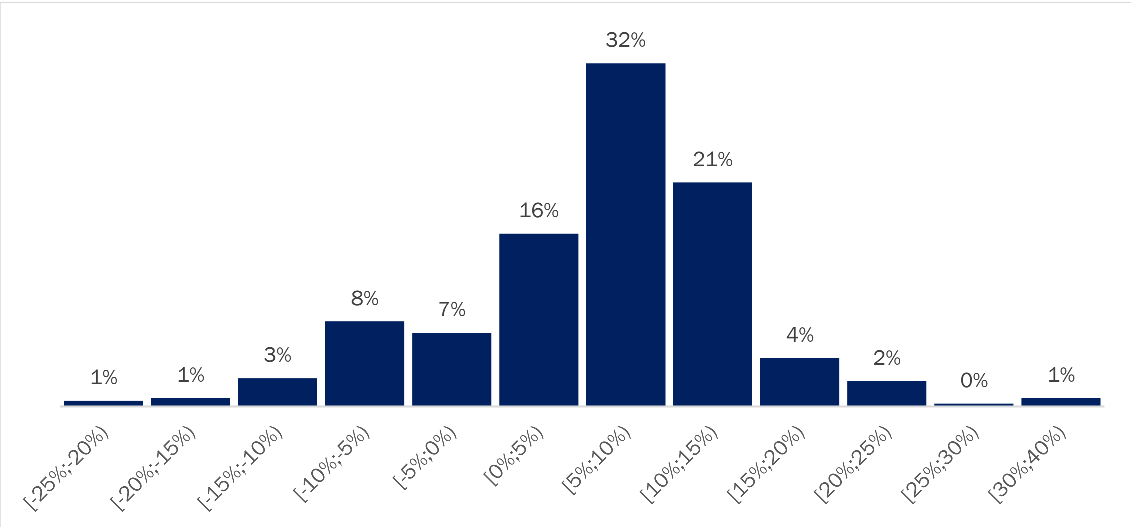


Figure 8 displays the BRL depreciation during funds' lives categorized by their vintages[2]. A value above the zero mark on the vertical axis signifies that the funds achieved a higher IRR in BRL compared to USD. From 2000 to 2005, the discrepancy in IRR was relatively modest, with most

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[2] Fund's vintage was the year of the first share integralization.

funds showing a variance between the BRL IRR and USD IRR within a -5% to +5% range. Funds vintage from 2006 to 2010 experienced their investment phase amidst average currency fluctuations. However, their divestment phase coincided with the beginning of the Real's depreciation cycle. Notably, funds with vintages starting from 2020 are characterized by more favorable returns in USD.

Figure 9 displays the dispersion between returns in BRL and USD. A net IRR of 42% in BRL can become 19% in USD. However, for 53% of the funds, the difference between the IRR in BRL and IRR in USD was up to 10%. In 25% of the cases, the impact was between 10% and 20% of IRR.

Figure 8. **BRL depreciation during funds' life categorized by vintage**

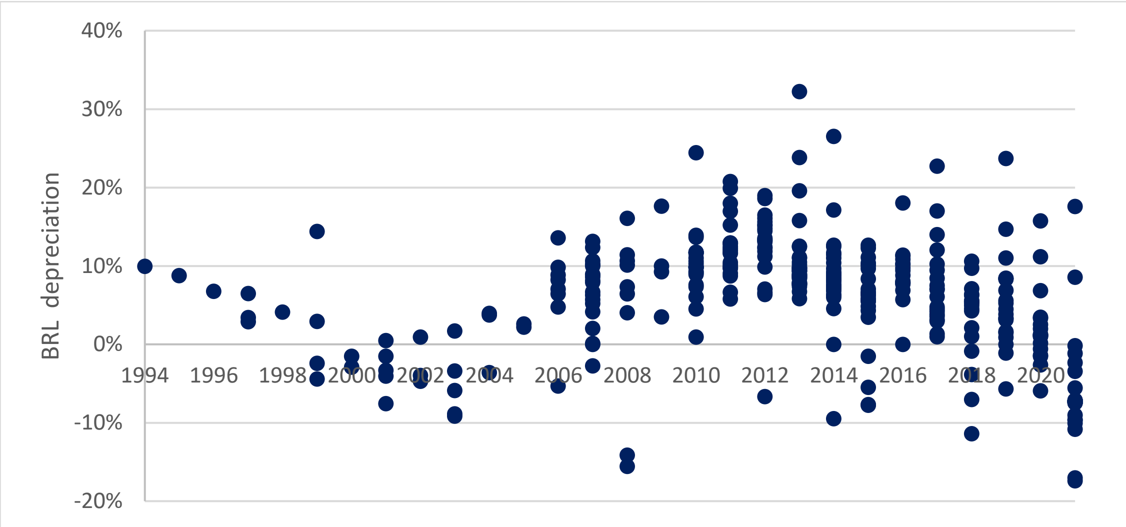
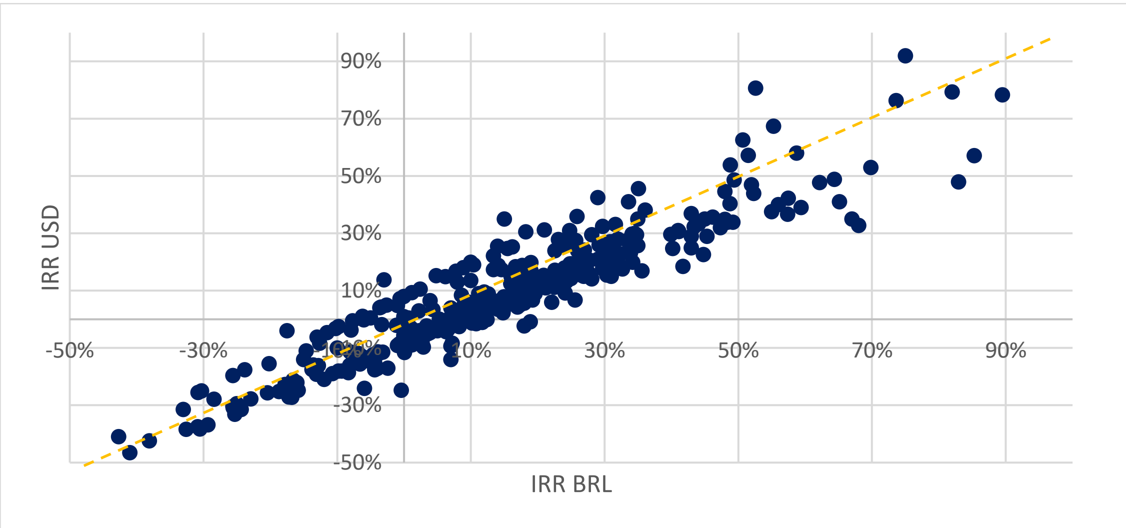


Figure 9. **Comparison between USD IRR and BRL IRR for funds**



CONCLUDING REMARKS

The examination of Brazil's foreign exchange rate over the past three decades reveals the profound impact of exchange rate fluctuations on the returns of Private Equity (PE) and Venture Capital (VC) investments.

Investments made during periods of the Brazilian Real's (BRL) depreciation typically resulted in diminished returns when converted to U.S. Dollars (USD). Conversely, investments during periods of the Real's appreciation often saw an increase in value in USD terms. This trend underscores the crucial role of timing and currency considerations in shaping international investment strategies.

Approximately sixty percent of the PE and VC investments analysed were initiated and exited during the post-2010 depreciation cycle of the Real. This timing inevitably influenced returns, with the Real depreciating more than threefold against the USD. The study found that 78% of deals yielded lower Internal Rates of Return (IRRs) in USD compared to BRL, illustrating the significant impact of exchange rate dynamics on investment outcomes.

However, Brazilian fund managers have been able to mitigate, at least partially, the impact of currency volatility. Although 80% of the funds performed better in BRL than in USD, the range of impact was much narrower than at the individual deal level: 52.9% of the funds experienced a depreciation of BRL in relation to USD in the range of 0% to 10%. The ability of PE funds to mitigate at least a portion of the currency impact amidst intense volatility is crucial. If PE funds demonstrate an effective management or cushioning of the effects of currency fluctuations, this would highlight their strategic adaptability and resilience. Such a capability is particularly relevant in today's market, where exchange rate volatility can significantly influence investment returns and decision-making processes.

In conclusion, the Brazilian PE and VC market has evolved amid challenging and fluctuating economic conditions. Investors in these markets have had to navigate a landscape marked by substantial exchange rate volatility, directly impacting investment returns. These findings underscore the importance of considering currency risk and timing in investment strategies, especially in markets with volatile exchange rates like Brazil. As the market continues to evolve, adapting strategies to mitigate these currency risks will be crucial for investors seeking to optimize returns in the Brazilian PE and VC sectors.

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