## Index Insights

Education – Global Equities

# Appraising home bias exposure

## Brazil

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## Introduction

Despite the increased integration of the world's economies and financial markets, studies show that pension funds worldwide continue to skew their portfolios to domestic securities. This paper examines the investment effects of home bias in the equity allocations of the Brazilian pension fund market:

- Brazilian pension funds have had a particularly large home bias in their equity allocations compared to developed markets.
- An examination of the characteristics, performance and return-to-risk profiles of the equity market in Brazil from 2008 through March 2021 shows that maintaining a home bias has been costly for Brazilian-based investors.
- The analysis also highlights the effects the depreciating Brazilian real had on returns.

# Contents

# Executive summary

Despite the increased integration of the world's economies and financial markets, studies show that pension funds worldwide continue to skew their portfolios to domestic securities. There are several explanations for this persistent investor preference, including the desire to avoid exposure to exchange rate or political risk, the extra costs of hedging against these risks, regulation[1], brand-names familiarity and asset-liability matching needs[2].

In this paper, we examine the investment effects of home bias in the equity allocations of Brazilian pension funds[3] from 2008 through March 2021. We measure the extent of home bias and analyze the market characteristics and performance relative to the global equity index, in both local and Brazilian real terms. The conclusions show that the aggregate risk-adjusted performance for Brazil was not always negative—this can be seen in Chart 14. In fact, Brazilian equities delivered better risk-adjusted returns vs the global equity index in local currency terms in almost 60% since 2008. The point at which the relative performance began to diverge significantly coincided with the sharp depreciation of the real, which severely depressed Brazilian equity returns relative to the global index. Consequently, this meant that Brazilian equities only delivered better risk-adjusted returns in only four years (or 29%) vs the global equity index, in Brazilian real terms. As a result, home bias was an opportunity cost for Brazilian-based investors during the period examined in this study.

It is important to assess these results within the context of the recessionary environment and the extraordinary central-bank measures that were undertaken in response to the global financial crisis and the COVID-19 pandemic. We make the following observations:

- **End of the commodity "supercycle" 2011**: As a large commodity exporter (especially in iron ore and oil), Brazil's market performance has been closely aligned to the commodity cycle. The end of the commodity boom in 2011 brought misery to the Brazilian economy, with GDP growth falling (or staying weak), between 2011-2017.
- **Oil price collapse.** The collapse in global oil prices from mid-2014 also severely affected Brazil; it led to the sharp and rapid depreciation of the real, exacerbating the decline of Brazilian equities. By 2015-2016, the Brazilian economy was officially in recession.
- **US dominance**. The period reviewed was difficult for the relative returns of most equity markets due to the overwhelming outperformance of US equities, which make up 57%* of the FTSE All-World Index. Our 2019 research[4] found that the FTSE USA has produced higher risk-adjusted returns than the FTSE All-World ex US in more than 80% between 2008-2019. US equities benefited from the extraordinary monetary measures undertaken in the aftermath of the global financial crisis, which underpinned the surge in US equities at the expense of overseas equity markets—especially the outperformance of US technology stocks (i.e., FAANGs) and the rotation away from value from 2015—and the resulting appreciation of the US dollar. *as of Mar 31, 2021.

For the purpose of this analysis, we use the FTSE All-World Index—a sub-index of the FTSE Global Equity Index Series (FTSE GEIS) that includes large and mid-cap developed and emerging companies—for its representation of the global universe of listed companies. An overview of the index is in the Appendix.

[1] Pension Markets in Focus 2017, OECD.

[2] Liberalising Foreign Investments by Pensions Funds: Positive and Normative Aspects, OECD Working Paper 5.3.

[3] Abrapp:https://www.abrapp.org.br/consolidado-estatistico/.

[4] Appraising home bias, FTSE Russell. 2019. https://www.ftserussell.com/research/appraising-home-bias-exposure-using-ftse-global-equity-index-series.

For a more comprehensive perspective of how home bias affects performance, it helps to understand the fundamental characteristics of the Brazilian equity market. The next section provides more details of those findings.

# Country analysis – Brazil

## Domestic equity exposure

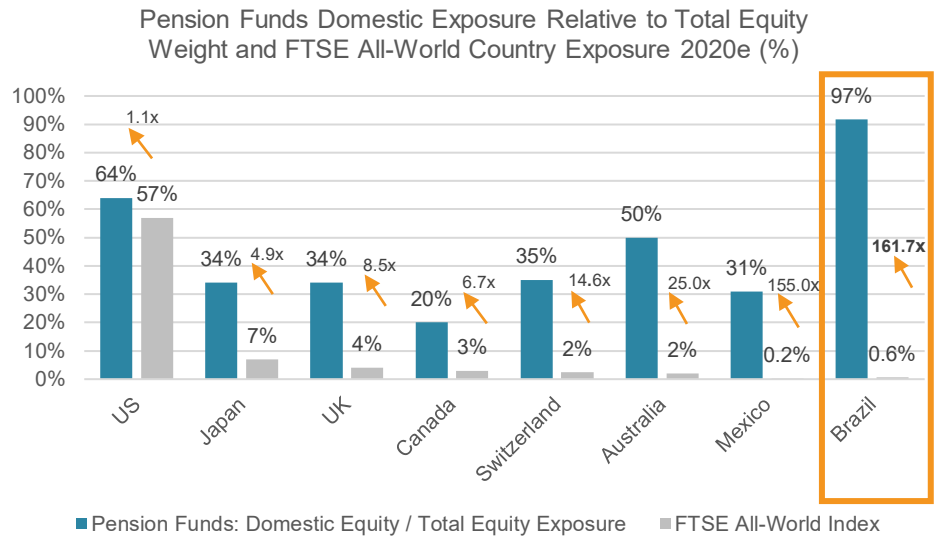
In Chart 1, we seek to measure the size of home bias in each country. We do this by estimating the percentage of total equities allocated to domestic equities in 2020 (blue bar) and compare it with the weight of the regional index in the FTSE All-World Index (grey bar). The difference in weight is converted into a ratio.

As this analysis reveals, home bias is pervasive across global pension schemes. Brazil and Mexico stand out for having the largest disparity between their allocation to domestic equities (97% and 31% respectively) and their weight in the FTSE All-World Index (0.6% and 0.2%), which translates into a home-bias ratio of over 150 times. This ratio is smallest for the US (although it mostly reflects the 57% US weight in the global index).

Brazil and Mexico stand out for having a high home-bias ratio.

**Chart 1: Pension funds estimated allocation to domestic equities relative to total equity exposure[3] and country weight in the FTSE All-World Index**

Source: FTSE Russell as of December 31, 2020, *Source: Thinking Ahead Institute research, Willis




Towers Watson "Global Pension Assets Study 2021", 2020e, CONSAR as of Dec 2019, FTSE Russell & ABRAPP as of Dec 2020.

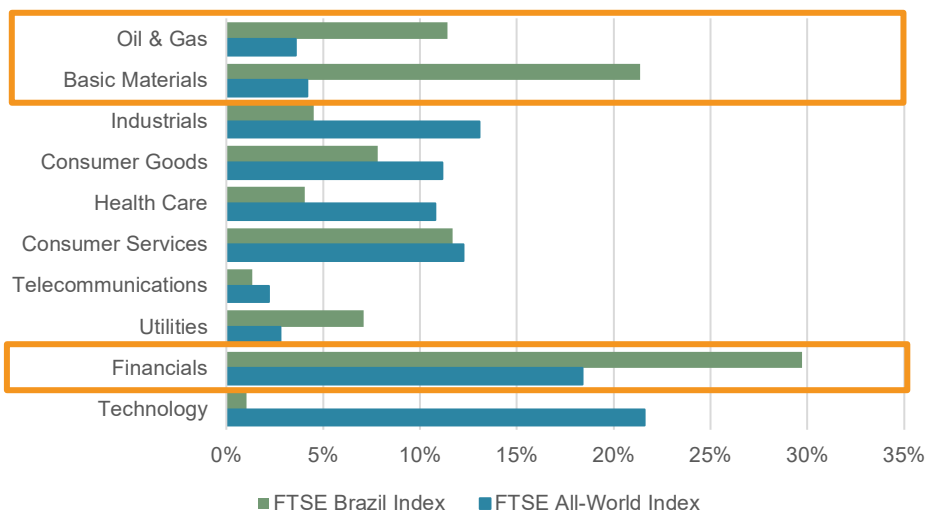
# Understanding the Brazilian equity market

Home bias carries inherent exposures. To better understand how it affects performance, it is important to examine both the industry group (ICB) exposures and the composition of corporate revenue sources.

We compare the Brazilian equity market (represented by the FTSE Brazil Index) with the global index (FTSE All-World Index). As Chart 2 shows, the oil & gas, basic materials and financials industries rank as the largest overweights relative

to the global index, accounting for over 60% of the total market capitalization of the Brazilian market. Technology is the most underweighted industry.

**Chart 2: Brazil and overseas industry exposure (%)**

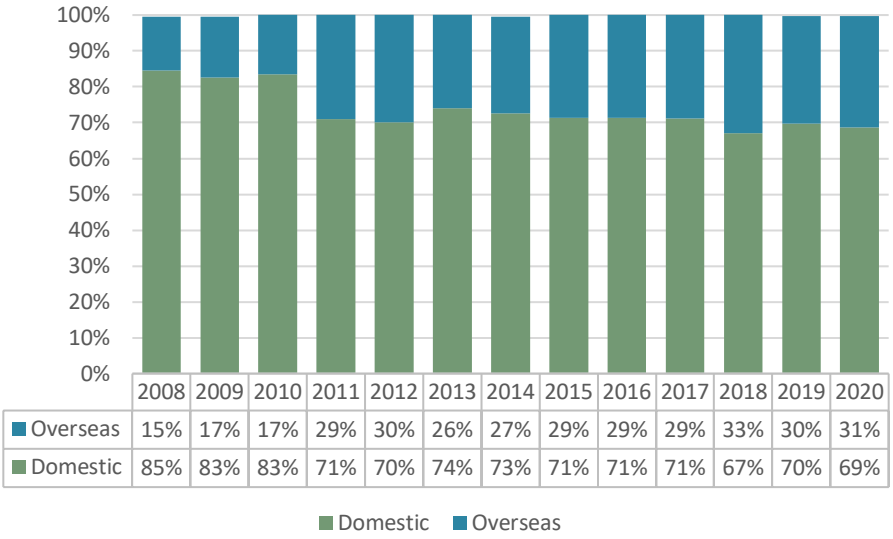



Relative to the global equity index, the FTSE Brazilian Index has a higher exposure to basic materials and financials.

Source: FTSE Russell; Industry Classification Benchmark data using FTSE Brazil Index and FTSE All-World Index as of March 31, 2021.

Segmenting Brazilian companies by domestic and overseas revenues sources in Chart 3 reveals that FTSE Brazil's listed companies have generated 69% of their revenues domestically. However, this current domestic slant represents a significant drop from the 85% seen in 2008.

**Chart 3: Breakdown of the FTSE Brazil Index by domestic and overseas revenues (%)**



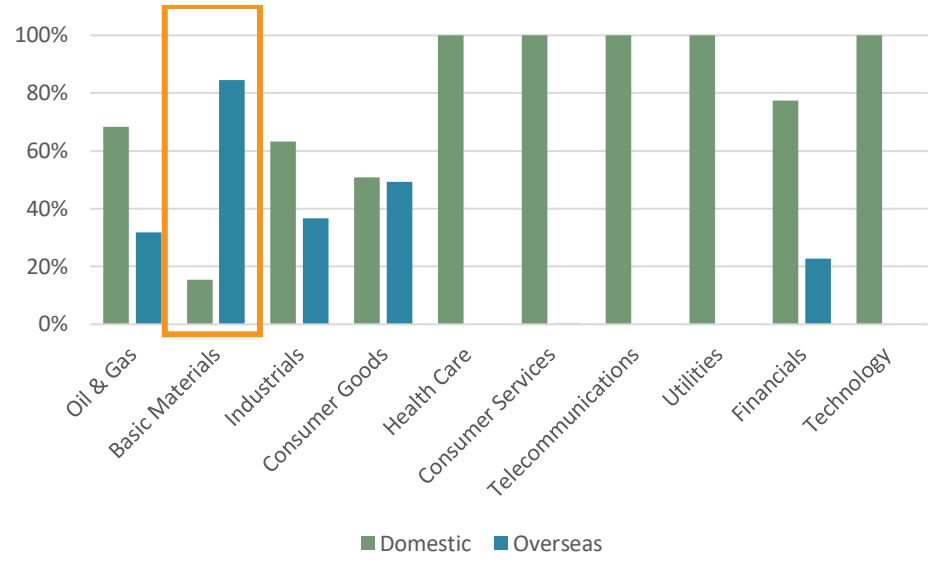

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overseas | 15% | 17% | 17% | 29% | 30% | 26% | 27% | 29% | 29% | 29% | 33% | 30% | 31% |
| Domestic | 85% | 83% | 83% | 71% | 70% | 74% | 73% | 71% | 71% | 71% | 67% | 70% | 69% |

FTSE Brazil derives 69% of its revenues domestically.

Source: FTSE Russell as of December 31, 2020.

Examining the revenue breakdown by industry shows that basic materials companies are the most dependent on overseas business (Chart 4). Consumer goods companies are nearly evenly split, while in other industries, revenues are sourced entirely from the domestic market.

**Chart 4: FTSE Brazil Index domestic and overseas revenue breakdown by industry**




Brazilian basic materials is the most dependent industry on overseas business.

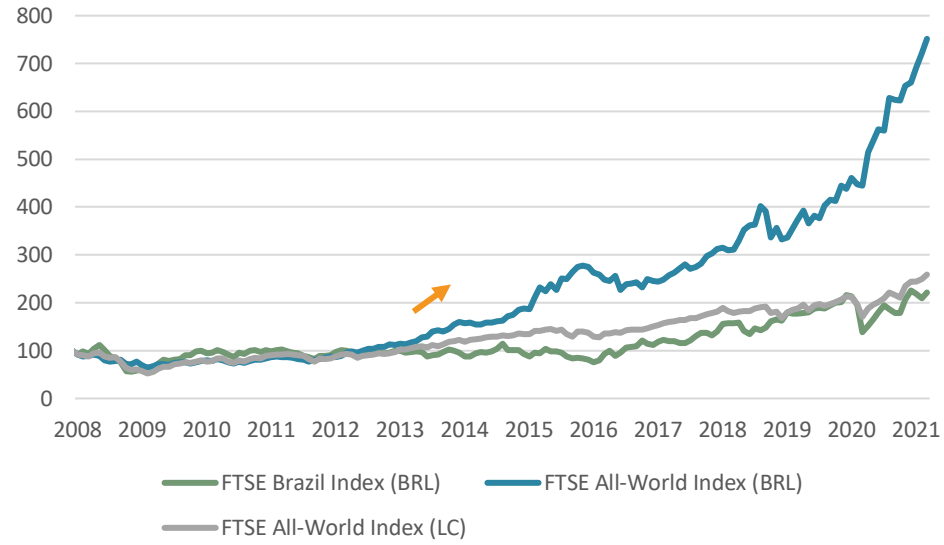
Source: FTSE Russell as of December 31, 2020 using Industry Classification Benchmark.

## Assessing the effect of Brazil home bias: performance

Charts 5 and 6 compare the performance of Brazilian equities with that of overseas equities in Brazilian real and in local-currency terms (to remove the currency effect). A depreciating currency improves the overseas returns in real of a Brazilian-based investor (and vice versa).

On a cumulative basis, Brazilian equities broadly tracked the global equity index performance (in local currency terms), for much of the period under review. The divergence in market performance seen during 2014-2016 (green versus grey lines) highlights the weak economic growth and recession Brazil experienced in 2015, after struggling to recover from the end of the commodity boom, which peaked in 2011. The collapse in the oil price in 2014-2015 (see also Chart 8) also had a profound impact on the Brazilian real (Chart 7), which saw one of the sharpest depreciations among emerging market currencies. The currency weakness created a huge disparity between the Brazilian market's relative performance versus the global equity index in Brazilian real terms, shown by the diverging blue line in Chart 5.

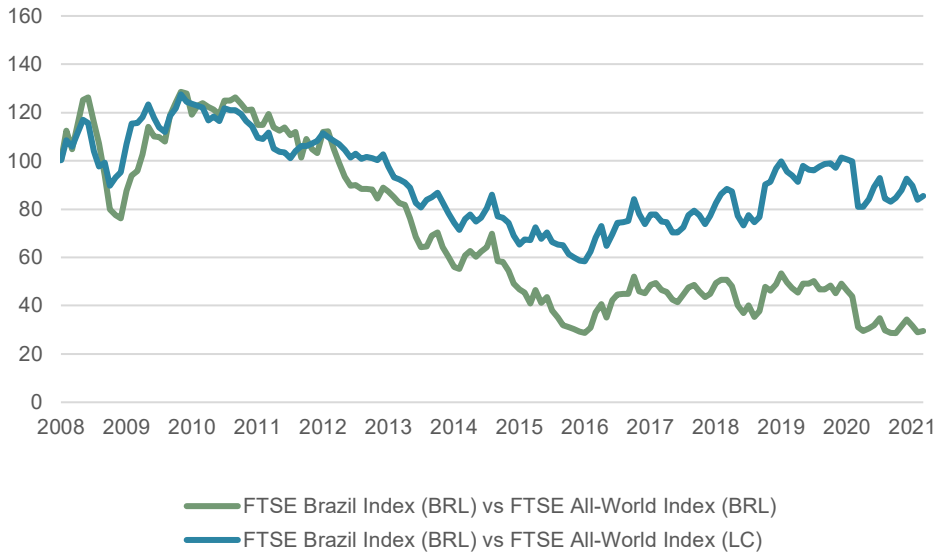
**Chart 5: Cumulative total returns of the FTSE Brazil Index and the FTSE All-World Index (BRL & local currency), rebased − Absolute**




Source: FTSE Russell from December 31, 2007 to March 31, 2021 (Q1 2021). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The relative performance in Chart 6 shows more clearly the outperformance of the FTSE Brazil Index against the global index (in Brazilian real) between 2008-2009, and again in 2016-2019, as the economy improved respectively from post GFC and the 2015 recession. Then from 2016, Brazil's recovery lag from the COVID-19 shock vs other economies, renewed weakness in the oil price, and currency effects further widened the performance gap between the relative returns in local currency and Brazilian real terms.

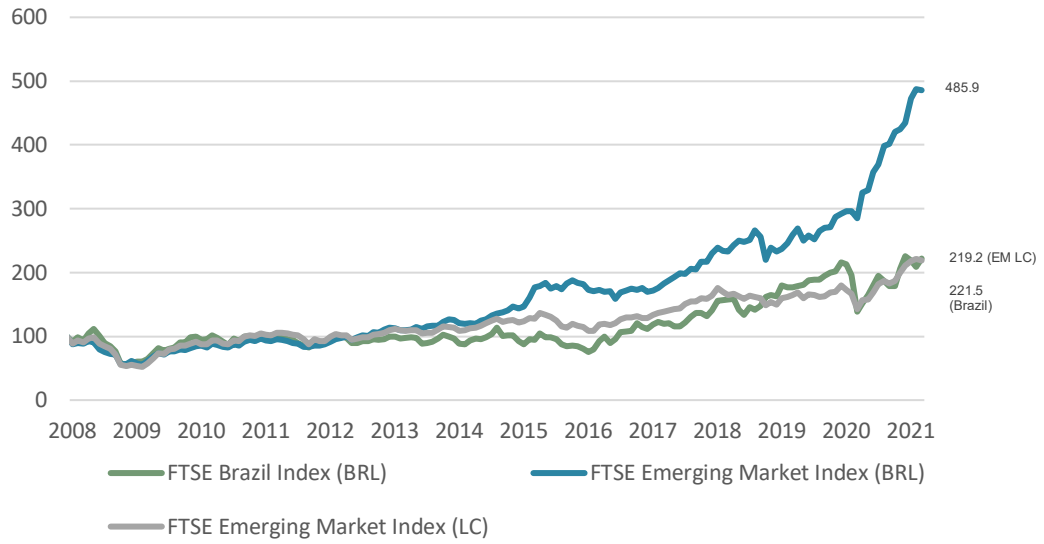
**Chart 6: Relative total returns of the FTSE Brazil Index relative to the FTSE All-World Index (BRL & local currency), rebased**




Source: FTSE Russell from December 31, 2007 to March 31, 2021 (Q1 2021). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Brazil's performance results against emerging market equities share a similar trajectory with its performance against the global index (see Chart 5). As can be seen in Chart 7, the Brazilian equity market tracked the performance of the emerging market index in local currency since 2008, but significantly underperformed against the emerging market in real terms.

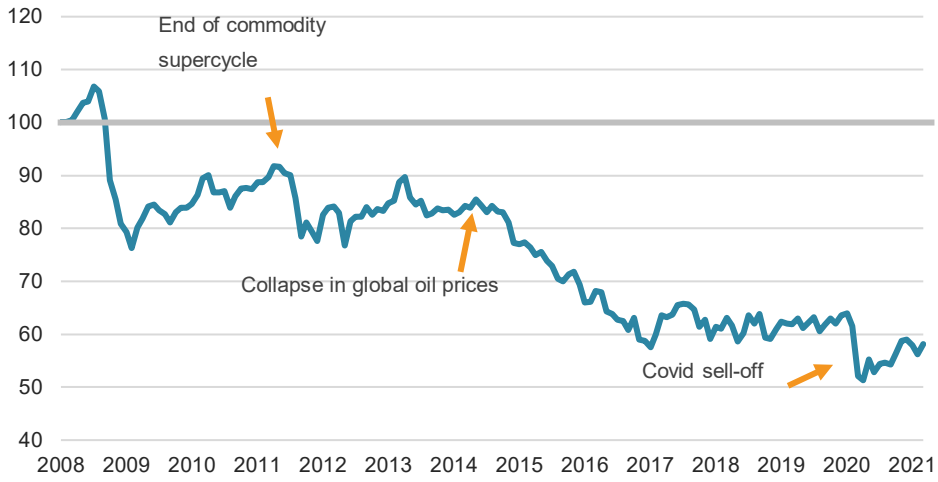
**Chart 7: Cumulative total returns of the FTSE Brazil Index and FTSE Emerging Index (BRL & local currency), rebased − Absolute**




Source: FTSE Russell from December 31, 2007 to March 31, 2021 (Q1 2021). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

We can examine the shifts in the Brazilian real since 2008 in Chart 8. Post the global financial crisis, the real initially recovered against a basket of foreign currencies. However, rising US interest rates, the end of the commodity boom, followed by the collapse in global oil prices, political uncertainty and the COVID-19 pandemic had a devastating effect on the currency, leading to its multi-year depreciation.

**Chart 8: Trade-weighted BRL Index, rebased**

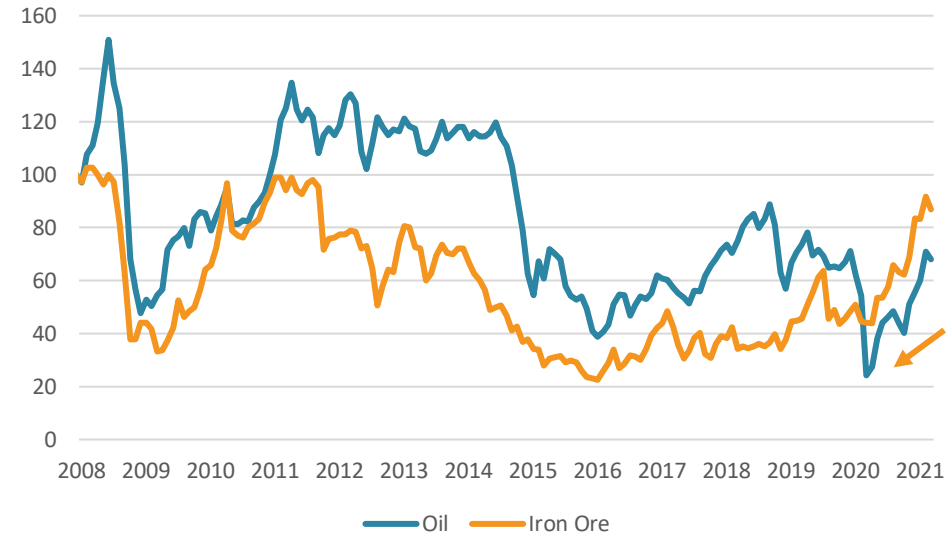



The end of the commodity boom and fall in the oil price had a profound effect on the Brazilian real, which led to its multi-year depreciation.

Source: Refinitiv from December 31, 2007 to March 31, 2021; the trade-weighted BRL Index is a measure of the value of the Brazilian real relative to a basket of foreign currencies.

The weakness in the Brazilian real mirrors the shifts in commodity prices as Chart 9 shows, including the 2020-2021 rise in iron ore and oil prices.

**Chart 9: Crude Oil and iron Ore cumulative returns (USD), rebased**




Covid-19 sell-off

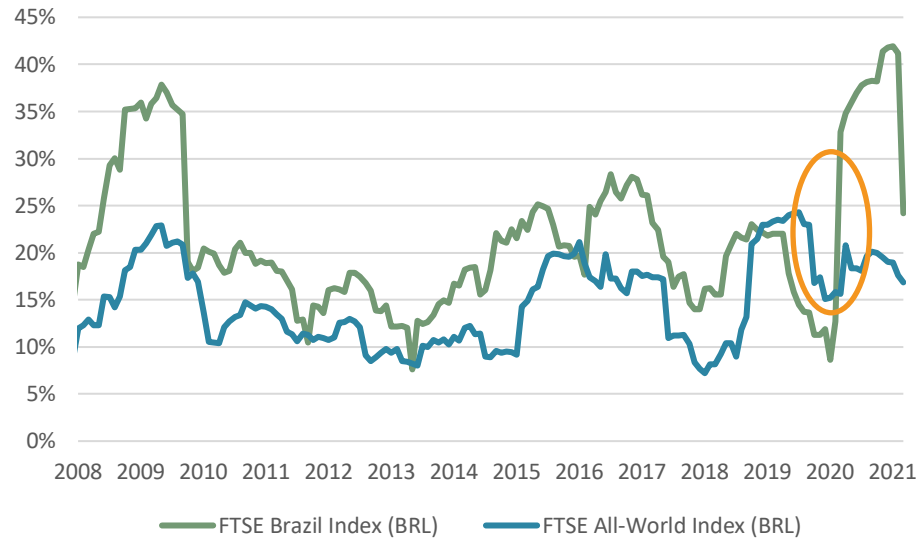
Source: Refinitiv from December 31, 2007 to March 31, 2021.

# Assessing the effect of Brazilian home bias: risk and return

Chart 10 highlights that, except for a brief period in 2019-2020, Brazilian equities have exhibited higher levels of volatility than overseas equities in the last 14 years. The highest spikes (green line), in 2008 and 2020, denote the GFC and COVID-19 uncertainty.

**Chart 10: 1Y rolling annualized volatility of the FTSE Brazil Index and the FTSE All-World Index (BRL) − Absolute**

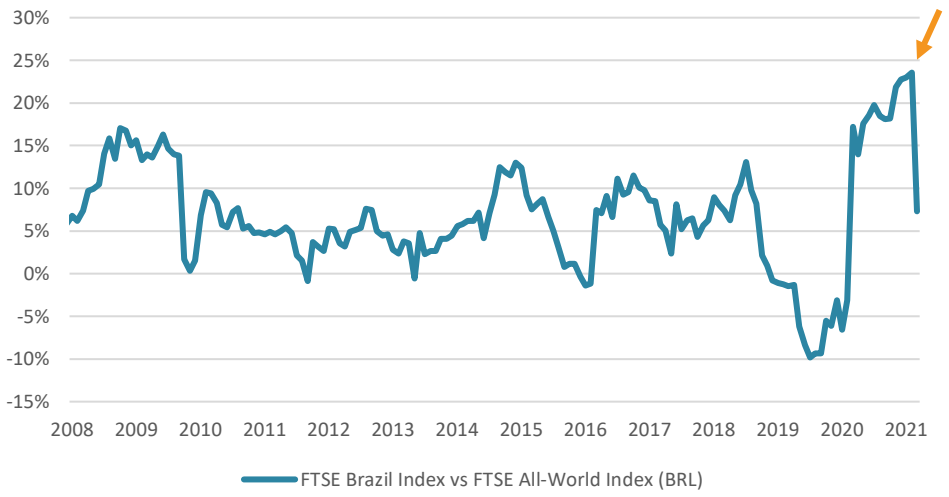
The Brazilian equity market has been more volatile than the global equity market since 2008.




Source: FTSE Russell from December 31, 2007 to March 31, 2021 (Q1 2021).

Chart 11 details the magnitude of the difference in volatility between Brazilian and global equities. Post GFC, Brazilian equity volatility stabilized within a relative volatility level of about +10% with international equities and remained broadly within this range until 2019. COVID-19 fears pushed the absolute volatility above 40% (see Chart 10) for Brazilian equities, and therefore increased this disparity with global peers to almost 25%.

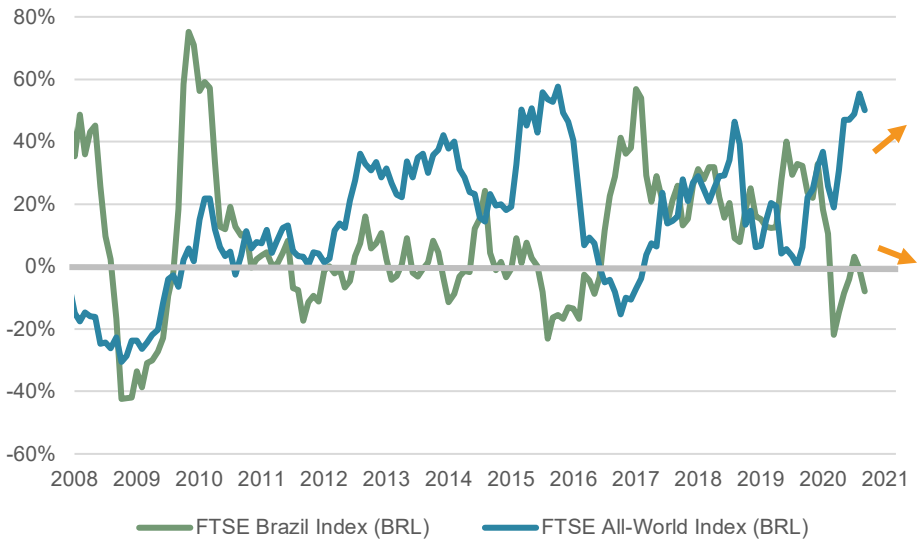
**Chart 11: 1Y rolling annualized volatility difference of the FTSE Brazil Index and the FTSE All-World Index (BRL) − Relative**




Source: FTSE Russell from December 31, 2007 to March 31, 2021.

In the next Chart, the rolling returns highlight the periods of Brazilian equity outperformance in 2008-2009, 2016-2017 and 2019 (Chart 12). The COVID-19 sell-off in 2020 widens sharply the difference in performance between Brazilian equity and global equity returns (not dissimilar to the period in 2014).

**Chart 12: 1Y rolling returns of the FTSE Brazil Index and the FTSE All-World Index (BRL) − Absolute**

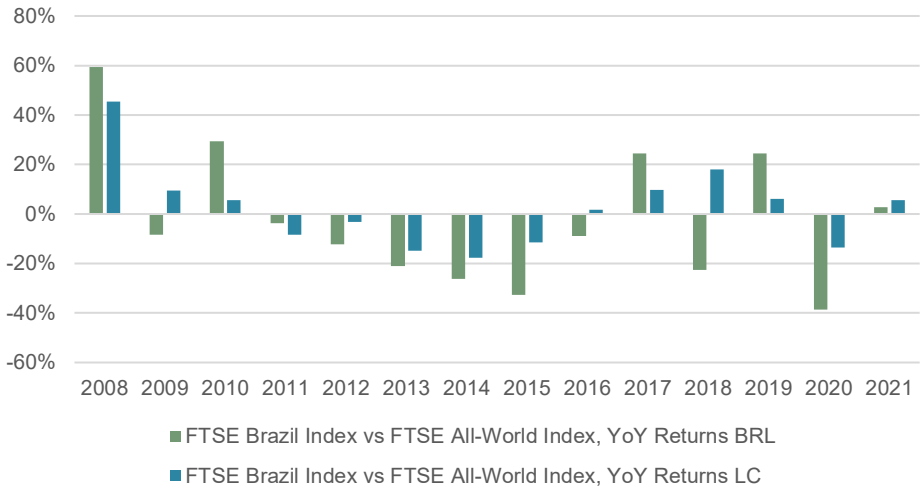



Source: FTSE Russell from December 31, 2007 to March 31, 2021. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 13 illustrates this difference in performance in more details. Brazilian equities outperformed global equities, in only five of the periods

examined in Brazilian real terms (green bar), while the figure rises to eight in local currency (blue bars), highlighting the impact of the weak real. This means that in 36% of the period, Brazilian investors would have been better off for having a bias to domestic equities, compared to 57% (without the currency impact as depicted by the blue bar).

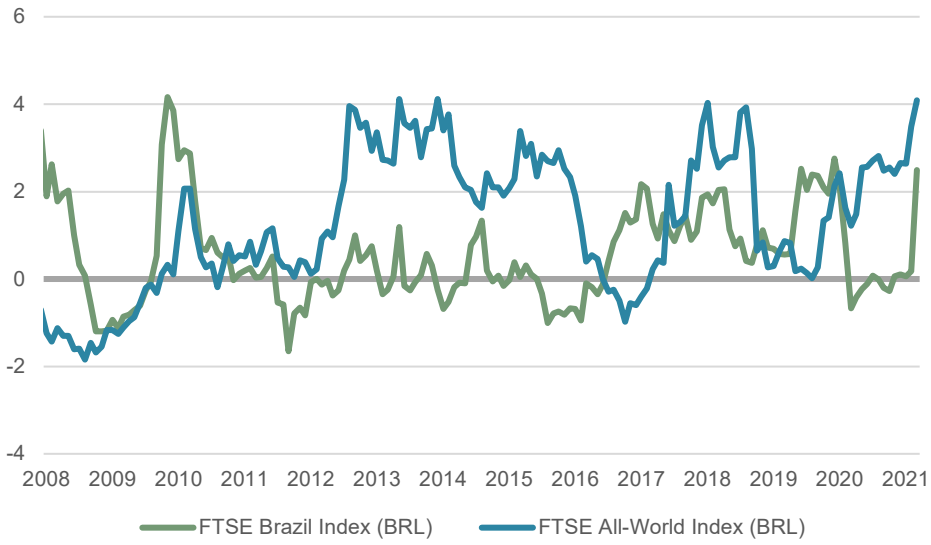
**Chart 13: Year-on-year returns of the FTSE Brazil Index and the FTSE All-World Index in BRL and LC – Relative**




Source: FTSE Russell to March 31, 2021. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Combining volatility and returns in Chart 14 shows international equities have generally delivered higher return/risk ratios than Brazilian equities since 2009.

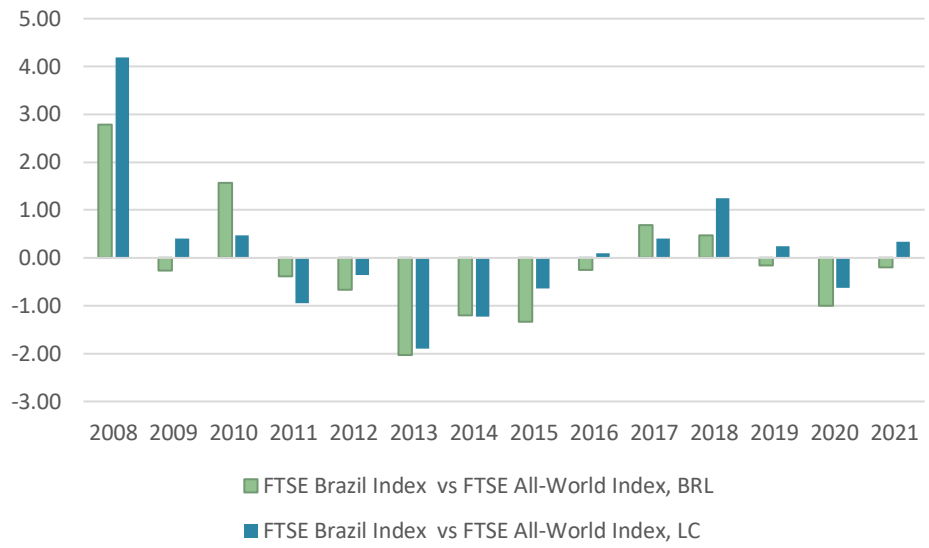
**Chart 14: 1Y rolling return/risk ratio of the FTSE Brazil Index and the FTSE All-World Index − Absolute**




Source: FTSE Russell from December 31, 2007 to March 31, 2021. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 15 underscores these finding in more detail, with the discreet periods highlighting that Brazilian equities have delivered better risk-adjusted returns in four of the periods examined for a Brazilian-based investor (green bar). However, comparing the Brazilian results against a global equity index (without the currency effect) shows that Brazilian equities delivered better risk-adjusted returns in almost 60% of the period (blue bar).

**Chart 15: Year-on-year return/risk ratios of the FTSE Brazil Index and the FTSE All-World Index, in BRL and Local Currency − Relative**




Source: FTSE Russell to March 31, 2021. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

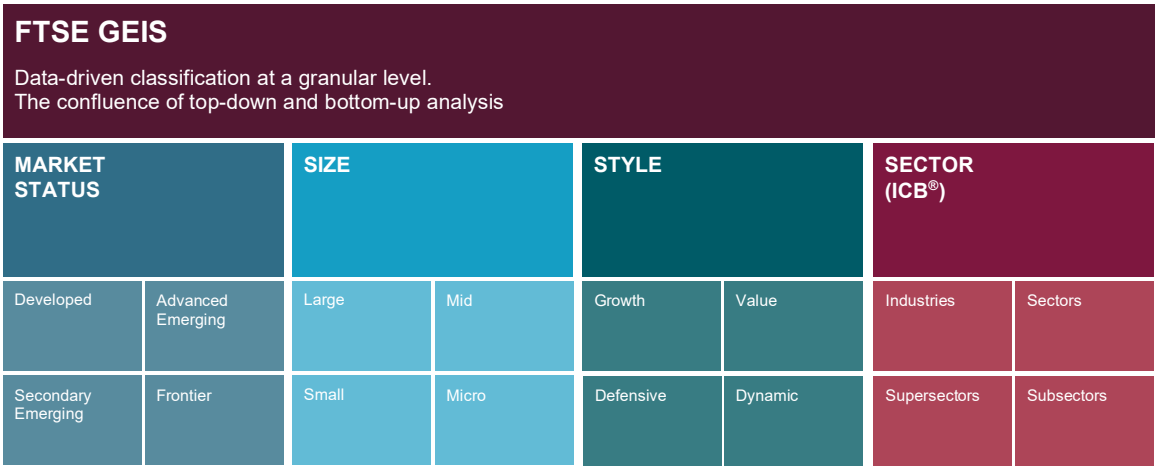
The risk-adjusted performance shows Brazilian investors being worse off for having a bias to Brazilian equities in Brazilian real than in local currency.

# Conclusion

The analysis shows that the severe depreciation of the real had a devastating effect on risk-adjusted returns for Brazilian-based investors and that a 161.7-times home bias has represented an opportunity cost for them in most of the period since 2008.

# Appendix

The FTSE Global Equity Index Series (GEIS) covers about 99% of the global equity market. The Series provides a flexible, building-block approach to meet the needs of market participants.




FTSE GEIS is divisible into modular sub-components, such as the large and mid-cap FTSE All-World Index and the FTSE Global Small Cap Index, which combine into a large, mid and small-capitalisation index, the FTSE Global All Cap Index.

A wide range of other sub-indexes that further segments the market by size (including micro-cap), sectors, regions, and individual countries are also available, a sample of which is listed below:

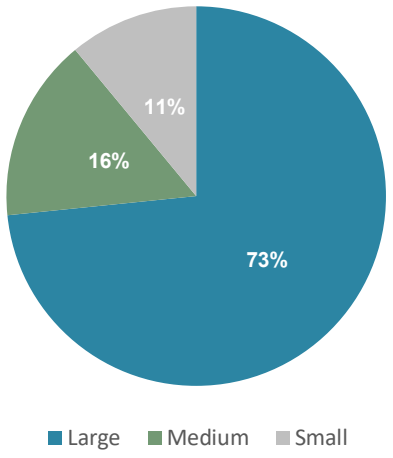
| FTSE Index | Global Total Cap | Global All Cap | All-World | Global Small Cap | Global Micro Cap |
|---|---|---|---|---|---|
| Include cap segments | Large, Mid, Small, Micro | Large, Mid, Small | Large, Mid | Small | Micro |
| % of FTSE Global Total Cap Index | 100% | 98% | 87% | 11% | 2% |
| Net Mcap (USDt) | 71.5 | 69.8 | 62.3 | 7.6 | 1.7 |
| Number of constituents | 18,007 | 9,231 | 4,040 | 5,191 | 8,776 |

Source: FTSE Russell, data as of March 31, 2021.

## Summary of the FTSE Global All Cap Index features

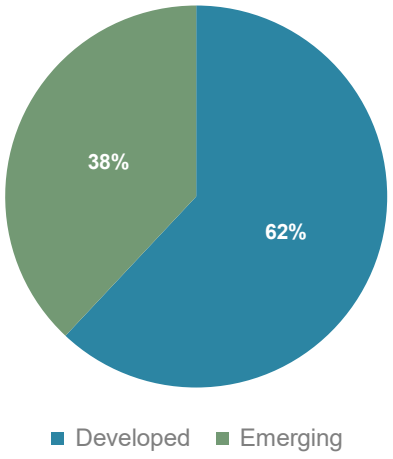
Charts 16 and 17 show the size and regional breakdown of the FTSE Global All Cap Index and Table 2 provides more granular segmentation, including the number of constituents. For the FTSE Global All Cap Index, 73% of the index is made up of large companies and 62% is classified as developed.

**Chart 16: FTSE Global All Cap Index − percentage of total market cap, segmented by size**




Source: FTSE Russell as of March 31, 2021.

**Chart 17: FTSE Global All Cap Index − percentage of total market cap, segmented by developed and emerging companies**




Source: FTSE Russell as of March 31, 2021.

**Further size and constituent numbers breakdown by Developed and Emerging**

| FTSE Global All Cap Index Composition Breakdown | | |
|---|---|---|
| **Index** | **%** | **Constituent numbers** |
| Developed (of which) | **62** | 5,717 |
| Large | 72 | 861 |
| Medium | 17 | 1,314 |
| Small | 11 | 3,542 |
| Emerging (of which) | **38** | 3,514 |
| Large | 80 | 870 |
| Medium | 11 | 995 |
| Small | 9 | 1,649 |
| **Total** | **100%** | **9,225** |

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