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Introducing The MarketVector™ Brazil Economic Exposure Indexes

Providing Targeted Exposure to Domestically and Globally Oriented Brazilian Companies

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Introduction

MarketVector Indexes™ ("MarketVector") maintains indexes under the MarketVector™, MVIS® and BlueStar® names. MarketVector`s mission is to accelerate index innovation globally. In achieving that objective, we design index strategies that enable investors to execute on their investment outlooks with precision. Nowhere is this concept more important than in regional and single-country investing, which is why we are proud to introduce the **MarketVector™ Brazil Economic Exposure Indexes** (Brazil Economic Exposure Indexes), comprising the **MarketVector™ Brazil Domestic Exposure Index** and the **MarketVector™ Brazil Global Exposure Index**, the latest additions to our growing family of economic exposure indexes.

Traditionally, to capture country exposure, investors typically use a company's locale or primary listing venue as a proxy for its region or country. But in today's integrated global economy such factors often have little bearing on where a company generates its revenue or conducts its business. Country indexes built on standard "company to country" mapping is indeed an efficient way to capture the entirety of a country's equity market, but may be limiting investors from targeting their exposure to the reasons they are investing in that country in the first place. Thus, a more innovative approach in certain markets may prove useful. This is the case in Brazil (as we will outline in this paper) and the impetus for the Brazil Economic Exposure Indexes.

The Brazil Economic Exposure Indexes bifurcate the Brazilian equity market based on where and how companies derive a majority of their revenue. Used individually, or taken as a pair, these indexes can be an incredibly powerful tool for investors as economic trends invariably impact a country's local economy differently than its global exporters. Furthermore, broad country benchmarks, in most cases, are dominated by either domestically or globally oriented companies, crowding out the performance of the less represented segment. Leading Brazil equity benchmarks, as an example, have significantly higher representation of domestically oriented companies, presenting an opportunity to adopt an alternative approach.

In this analysis we introduce the Brazil Economic Exposure Indexes starting with an overview of the index construction process. We then provide an explanation for how and why economic trends drive divergent performance between the two indexes. Finally, we offer some insights into how investors might use the Brazil Economic Exposure Indexes to supplement or diversify their Brazil exposure, or take tactical investment actions to add alpha.

MarketVector™ Brazil Economic Exposure Index Architecture

Construction of the **Brazil Economic Exposure Indexes**, illustrated in **Exhibit 1**, starts with establishing a broad and complete investable universe of Brazilian companies. Following this step, MarketVector researches and verifies the percentage of revenue (or revenue-related assets if revenue data is ambiguous or unavailable) for each company included in the investable universe. Based on that information, companies are assigned to either the MarketVector™ Brazil Domestic Exposure Index ("Brazil Domestic Index")or MarketVector™ Brazil Global Exposure Index ("Brazil Global Index") and then weighted based on a strategy the considers both market cap and geographic revenue distribution.

Exhibit 1: Selecting Index Components*

Establish Universe of Brazilian Companies Listed in Brazil

- **~280 Eligible Brazilian companies listed on a Brazilian exchange,** where Brazilian companies are defined as:
  - Companies that are incorporated in Brazil, or
  - Companies that are not incorporated in Brazil but derive at least 50% (25% for current index components) of their revenue or revenue-related assets from Brazil

Apply Investability Screens

- **126 securities are included in the investable universe:**
  - Free float factor of at least 10 percent.
  - Full market capitalization of at least 150 million USD.
  - Three-month average-daily-value traded of at least 5 million USD.
  - At least 250,000 shares per month over the last six months.
  - Only one share line/class of each company is included

Assign Companies to Brazil Global or Domestic Index

- **22 securities are included in the Brazil Global Index and 104 securities are included in the Brazil Domestic Index:**
  - Upon initial entry into the investable universe, companies with at least 50% of revenue from outside/within Brazil are added to the Brazil Global/Domestic Index.
  - On an ongoing basis, companies will remain in the Global/Domestic Index until revenue from outside/within Brazil falls below 45%.
  - Companies are weighted based on free-float market cap, percentage of revenue from within/outside Brazil, and dollar value of revenue from within/outside Brazil with a maximum component weight of 8%.

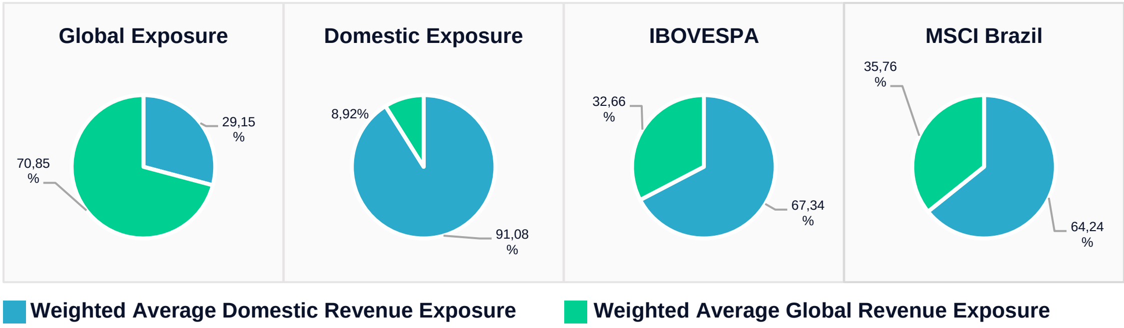
*These are simplified rules. Please refer to the index guide for a detailed explanation.

MarketVector™ Brazil Economic Exposure Index Composition

MarketVector's index construction process results in a pair of indexes that are at once related and distinct -- regarding underlying exposures and risk/return drivers -- not only from each other, but also from leading Brazilian equity benchmarks.

Exhibit 2 illustrates the geographic revenue exposures of the widely-followed Ibovespa and MSCI Brazil indexes, compared to that of the Brazil Economic Exposure Indexes, based on the index components and their respective weights in the index. It is notable that the Brazil Domestic Index provides purer exposure to the domestic economy than both the Ibovespa and MSCI Brazil indexes, while the Brazil Global Index provides unique and targeted exposure to Brazil's globally-oriented export-focused companies across a wide range of industries.

Exhibit 2: Geographic Revenue Exposures of the MarketVector™ Brazil Global Exposure Index and MarketVector™ Brazil Domestic Exposure Index against Broad Brazil Benchmarks



Source: MarketVector Indexes™, b3, FactSet; MSCI Brazil Index is represented by the iShares MSCI Brazil ETF; Revenue Exposure data calculated by MarketVector Indexes™. Data as of September 16, 2022.

Taking a look at the top-ten holdings in **Exhibit 3**, those who are familiar with the Brazilian market should quickly understand the difference between these indexes.

Exhibit 3: Top-10 Holdings of the IBOVESPA and MarketVector™ Brazil Economic Exposure Indexes

Name	MarketVector™ Brazil Domestic Exposure Index
PETROL BRASILEIROS PRF NPV	8.00%
MERCADOLIBRE INC	6.65%
ITAU UNIBANCO HOLD PRF NPV	5.56%
BCO BRADESCO SA PRF NPV	5.15%
BCO DO BRASIL SA COM NPV	3.60%
B3 SA COM NPV	2.96%
VIBRA ENERGIA S.A. COM NPV	2.44%
HAPVIDA PARTICIPAC COM NPV 144A/REG S	2.26%
ITAUSA S.A. PRF NPV	1.82%
ULTRAPAR PARTICIPA COM NPV	1.76%

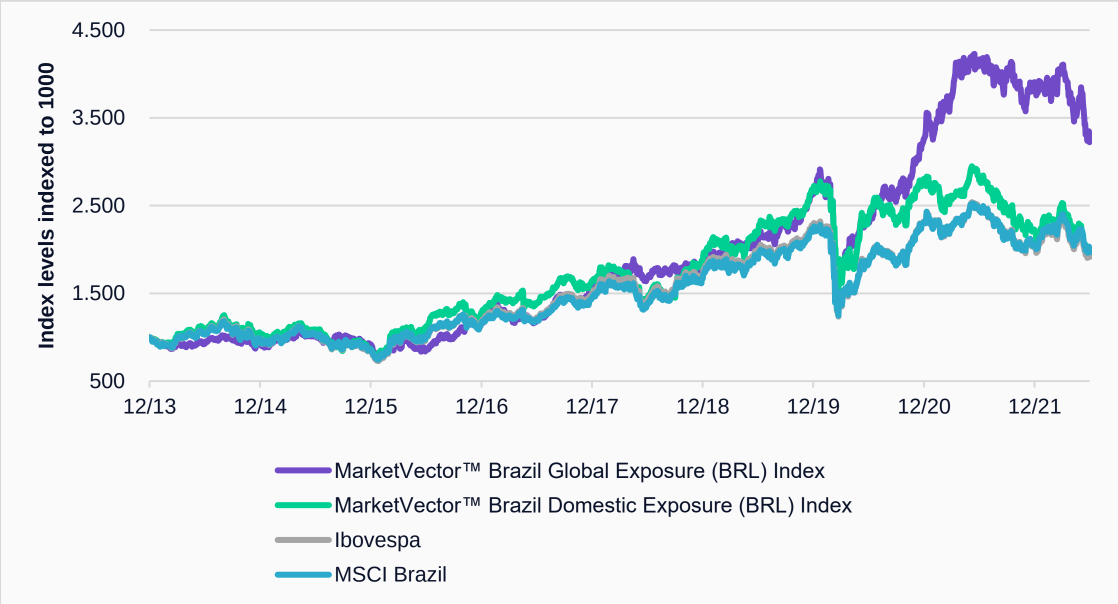
Name	MarketVector™ Brazil Global Exposure Index
AMBEV SA COM NPV	8.00%
WEG SA COM NPV	8.00%
SUZANO SA COM NPV	8.00%
JBS SA COM NPV	8.00%
VALE S.A. COM NPV	8.00%
GERDAU SA PRF NPV	6.30%
NATURA &CO HDLS SA COM NPV	6.01%
CIA SIDERURGICA NC COM NPV	4.73%
PETRO RIO SA COM NPV	4.63%
EMBRAER SA COM NPV	4.52%

Name	IBOVESPA	Global or Domestic
VALE SA	16.94%	Global
PETROBRAS - PETROLEO BRAS-PR	6.41%	Domestic
ITAU UNIBANCO HOLDING S-PREF	5.77%	Domestic
BANCO BRADESCO SA-PREF	4.55%	Domestic
PETROBRAS - PETROLEO BRAS	4.11%	Domestic
B3 SA-BRASIL BOLSA BALCAO	3.93%	Domestic
AMBEV SA	2.85%	Global
HAPVIDA PARTICIPACOES E INVE	2.41%	Domestic
WEG SA	2.27%	Global
ITAUSA SA	2.26%	Domestic

Source: MarketVector Indexes™, b3. Data as of September 16, 2022.

The Brazil Indexes also leads to dramatic performance differentials versus both the Ibovespa and MSCI Brazil indexes since 2013, as shows in **Exhibit 4**.

Exhibit 4: Total Returns of the MarketVector™ Brazil Economic Exposure Indexes vs Ibovespa and MSCI Brazil Since 2013



Source: MarketVector Indexes™, FactSet. Data as of June 30, 2022.

The most important manifestation of the Brazil Indexes' methodology, in terms of exposures, is not in individual companies, but in sectors, as shown in **Exhibit 5**. The results are somewhat intuitive; the Brazil Global Index is heavily weighted in materials and consumer staples while the Brazil Domestic Index is heavily weighted in financials, utilities, and consumer discretionary. Interestingly, in contrast to many perceptions of the Brazilian market, the energy sector primarily serves the domestic market.

Sector exposure differentials are most pronounced when comparing the Brazil Global and Domestic Indexes, but there are also noticeable differences when comparing to the Ibovespa index. For example, many investors look to the Brazilian market as a way to gain exposure to the materials sector, and indeed materials represents the Ibovespa index's second-largest sector. However, the Brazil Global Index has 17.5 percent higher weight in materials than the Ibovespa. In stark contrast, Ibovespa has a roughly 24 percent weighting in financials compared to just two percent in the Brazil Global Index. Finally, the Brazilian consumer sector, which is a primary driver of the local Brazilian economy (represented by the consumer discretionary sector), is just the seventh largest sector in the Ibovespa – with a weight of less than six percent compared to roughly 17 percent of the Brazil Domestic Index.

Exhibit 5: Relative Sector Exposures among MarketVector™ Brazil Economic Exposure Indexes and Broad Brazil Benchmarks

Sector	IBOVESPA	Domestic Exposure	Global Exposure	Domestic Relative to Ibovespa	Global Relative to Ibovespa	Global Relative to Domestic Exposure
Materials	24.59%	2.92%	39.90%	-21.66%	15.32%	37.49%
Financials	23.95%	26.21%	2.06%	2.26%	-21.89%	-20.51%
Energy	13.74%	13.21%	4.63%	-0.53%	-9.11%	-8.27%
Consumer Staples	9.52%	5.40%	36.10%	-4.13%	26.58%	23.33%
Utilities	7.04%	12.59%	0.00%	5.55%	-7.04%	-12.12%
Industrials	6.89%	7.58%	17.31%	0.69%	10.42%	10.55%
Consumer Discretionary	5.85%	19.46%	0.00%	13.61%	-5.85%	-18.43%
Health Care	4.83%	5.37%	0.00%	0.55%	-4.83%	-5.06%
Communication Services	1.61%	2.97%	0.00%	1.36%	-1.61%	-2.85%
Information Technology	1.16%	2.34%	0.00%	1.17%	-1.16%	-2.25%
Real Estate	0.83%	1.96%	0.00%	1.13%	-0.83%	-1.88%

Source: MarketVector Indexes™, b3. Data as of September 16, 2022.

Linking the MarketVector™ Brazil Economic Exposure Indexes' Performance to the Brazilian Economy

In theory the performance of country equity benchmarks should be tied to GDP growth but in practice there are many forces that work to loosen that connection. The three most important factors are:

1- Fluctuations in equity market price multiples.

2- Percentage of GDP attributable to privately versus publicly held companies.

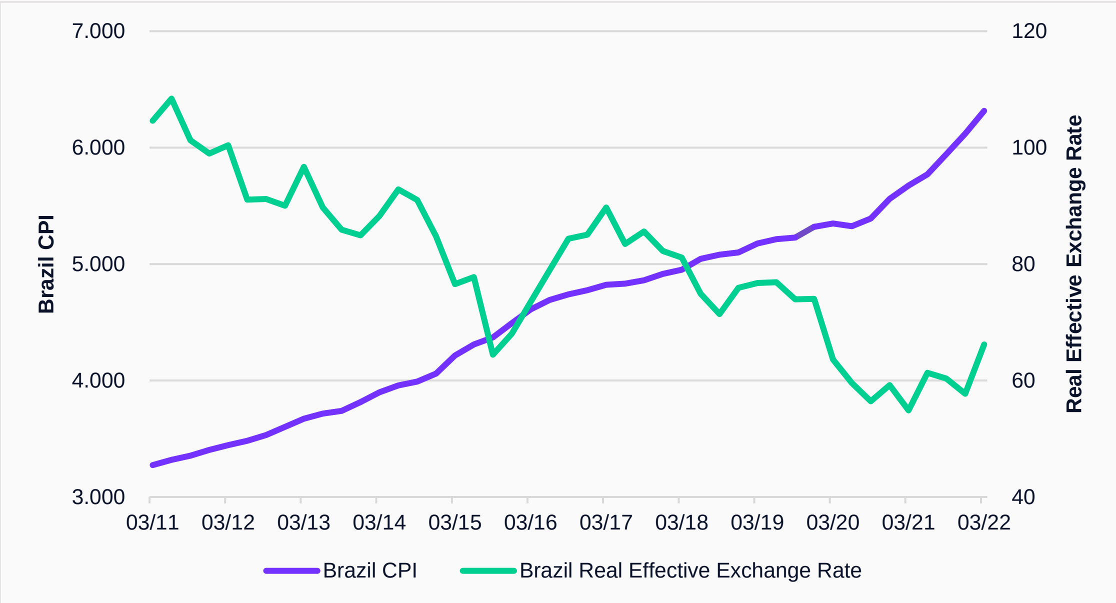
3- Mismatches between GDP components with equity benchmark exposures.

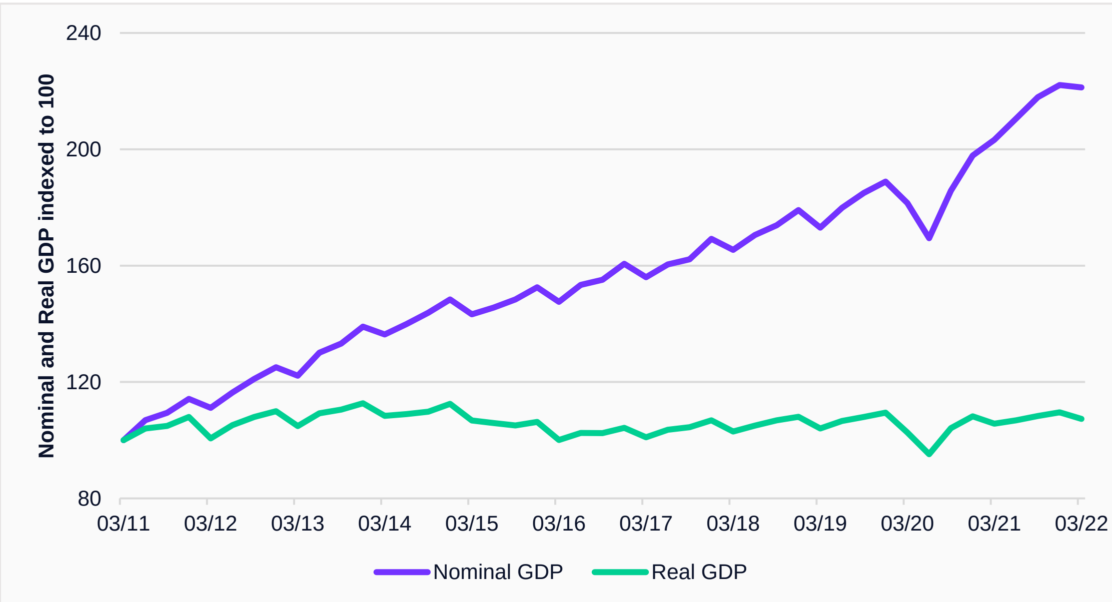
Economic exposure indexes aim to reconcile some of the difference between a country's GDP components and equity benchmarks exposures. This seemingly simple solution can profoundly improve the correlation between equities and macroeconomic factors that impact GDP. The impact is generally weaker when looking at larger, globally-integrated, and services-oriented countries. However, for many emerging markets and smaller developed markets, the connections are quite clear. Given the nature of Brazil's economy and equity markets the connections between the performance of the economy and the Brazil Economic Exposure Indexes seem to be relatively reliable, and therefore valuable. We can start by looking at some basic economic indicators then connect the dots to Brazil's equity market performance.

Over the course of the last decade Brazil has experienced relatively high inflation compared to Developed Markets and many other large Emerging Markets, as indicated by Brazil's consumer price index (CPI), which grew at a compound annual rate of roughly 6.8 percent. It should be noted that from a historical perspective, Brazilian inflation and interest rates are dramatically lower and more stable than they were during the country's hyperinflationary era during the 1980s.

Over the same period Brazil's real effective exchange rate (REER) has declined by roughly 22 percent. The REER measures the performance of a country's currency against a basket of currencies of its largest trading partners. The inverse relationship between Brazil's CPI and REER is illustrated in **Exhibit 6**. Regardless of whether inflation has been caused by or is the cause of a weak Real, the last ten years might be considered a lost decade for the Brazilian economy as real GDP (that is nominal GDP adjusted for inflation) was relatively flat even as nominal GDP grew at a compound annual rate of approximately eight percent, as demonstrated in **Exhibit 7**.

Exhibits 6 and 7: Brazil CPI vs REER and Nominal vs Real GDP

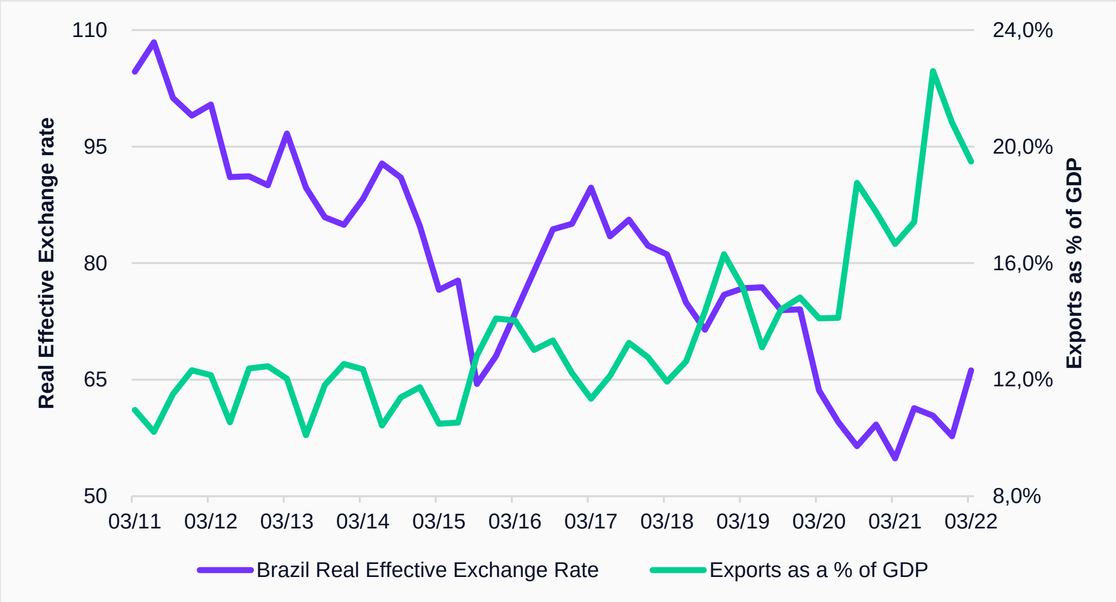




Source: Brazil Institute of Geography and Statistics, Bank for International Settlements, MarketVector Indexes™. Data as of March 31, 2022.

Economic theory suggests a weaker currency should boost exports (typically with some lag, known as the J-curve) and hold back domestic GDP by tightening discretionary budgets. This connection -- between a country's currency and exports -- is stronger when the country exports mostly goods rather than services but more specifically items that are globally commoditized. Brazil's largest exports are agricultural products, iron ore, crude petroleum, and frozen meat products. As expected exports as a percentage of Brazil's GDP has climbed significantly, nearly doubling, since early 2015. It should be noted that acceleration in export's share of GDP really started around mid-2018. The inverse relationship between Brazil's REER and exports as a percentage of GDP is shown in **Exhibit 8**.

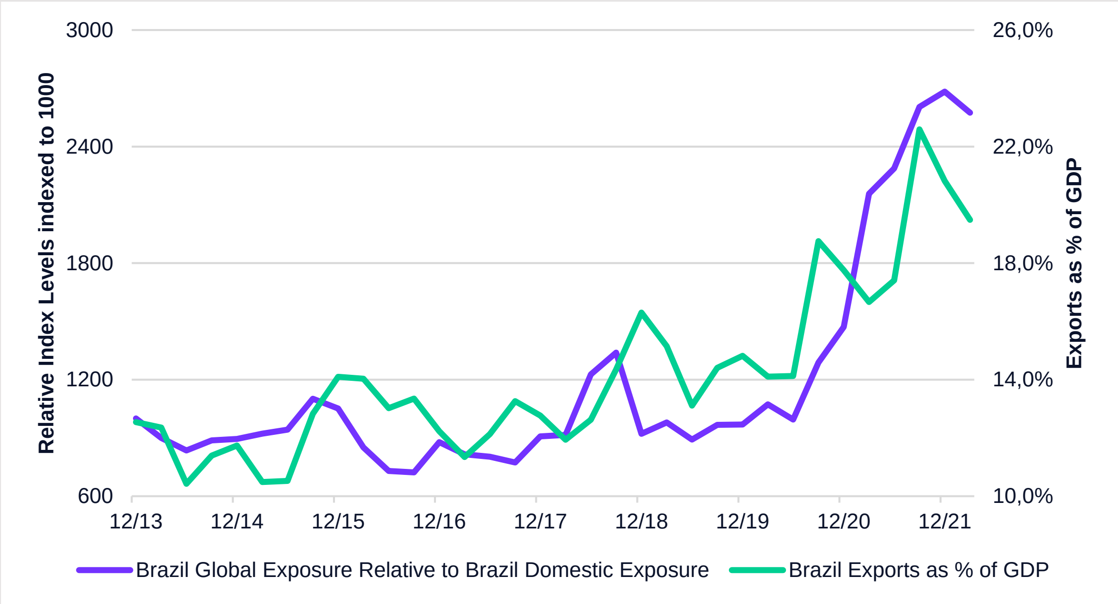
Exhibit 8: Brazil's REER and Exports as Percentage of GDP



Source: Brazil Institute of Geography and Statistics, Bank for International Settlements, MarketVector Indexes™. Data as of March 31, 2022.

The composition of Brazil's exports closely corresponds to the exposures found in the Brazil Global Index. Approximately 90 percent of the Brazil Global Index is comprised of companies that manufacture or produce goods or commodity-linked products, with metal and mineral miners making up more than 25 percent of the index. Because of this notable alignment the growth in Brazil's exports as a percentage of GDP has manifested in the relative performance of the Brazil Global Index against the Brazil Domestic Index since 2013. **Exhibit 9** compares the ratio of Brazil's GDP when including and excluding exports with the relative performance of the Brazil Global Index over the Brazil Domestic Index.

Exhibit 9: MarketVector™ Brazil Global Exposure Index Outperformance Coincides with Rise in Brazilian Exports as Percentage of GDP



Source: Brazil Institute of Geography and Statistics, MarketVector Indexes™. Data as of March 31, 2022.

Two Indexes, Many Powerful Solutions

Precise Exposures for Tactical Investments

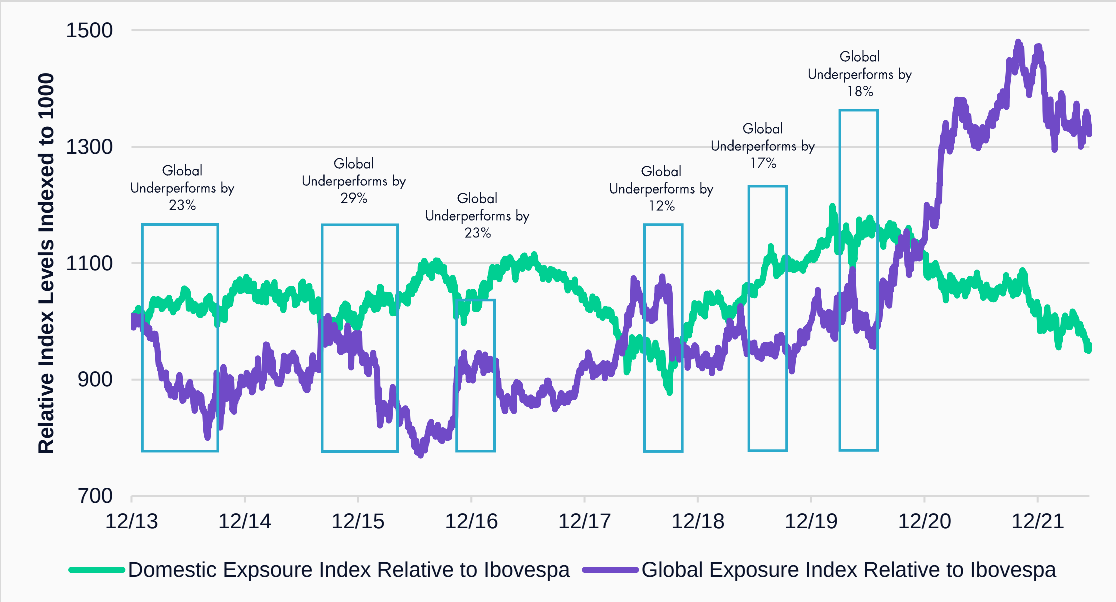
From 2019 through mid-June, 2022, Brazil's economic conditions have provided a tailwind for the Brazil Global Index relative to the Brazil Domestic Index. Unfortunately for most investors, the country's main local equity benchmark, and the widely-used MSCI Brazil index, are dominated by domestically-oriented companies: Even if an investor correctly drew the conclusion that Brazil's economy would benefit from its export sector they would not have found an investment vehicle that actually corresponded to that analysis.

In fact, from the end of 2019 through June 15, 2022, the Ibovespa and MSCI Brazil indexes were down roughly 14 and 10 percent, respectively while the Brazil Global Index gained approximately 24 percent. This represents a staggering outperformance by the Brazil Global Index of 38 percent against the Ibovespa and 34 percent against MSCI Brazil.

The utility of the Brazil Economic Exposure Indexes works in the opposite direction as well. Investors who understood that high inflation and a weakening currency would hurt domestically-oriented companies could have entered into a short position on the Ibovespa or MSCI Brazil index. But that investment action would have left money on the table as the Brazil Domestic Index underperformed the Ibovespa and MCSI Brazil indexes by 10.5 and 14.5 percent, respectively from the end of 2019 through June 15, 2022; shorting the Brazil Domestic Index would have been a more profitable position. This underperformance is, in part, due to the fact that the Brazil Domestic Index has a 91 percent exposure to domestic sources of revenue compared to the Ibovespa and MSCI Brazil indexes which have only 67 and 64 percent exposure to domestic sources of revenue, respectively.

Exhibit 10 charts the relative performance of the Brazil Economic Exposure Indexes against the Ibovespa since 2013. The chart demonstrates that the relative performance of these indexes is highly cyclical and frequently inverse. Just because the Brazil Global Index has outperformed significantly since mid-2020, it is unlikely to continue to outperform indefinitely. In fact, since 2013 there have been several major drawdowns in the Brazil Global Index compared to the Ibovespa, also demonstrated in **Exhibit 10.** As expected, the Brazil Domestic Index also outperformed the Ibovespa in those periods, and underperformed the Ibovespa in periods when the Brazil Global Index outperformed.

Exhibit 10: Relative Performance of the MarketVector™ Brazil Economic Exposure Indexes and Ibovespa



Source: MarketVector Indexes™, Factset. Data as of June 17, 2022.

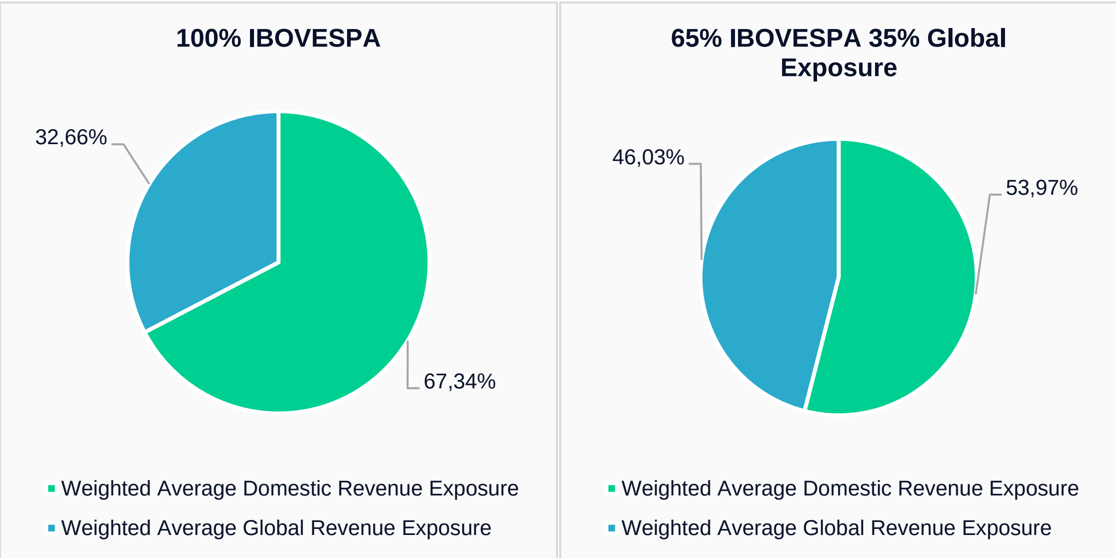
Completing and Diversifying Broad Brazil Equity Exposure

We have seen that the Ibovespa benchmark is lacking, to some degree, in exposure to Brazil's globally-oriented companies, despite that fact that its largest holding is in Vale at a nearly 17 percent weight. Incorporating the Brazil Global Index alongside the Ibovespa as a core component of a Brazilian equity portfolio benchmark can achieve a more balanced exposure among Brazil's globally and domestically-oriented companies, which can potentially help absorb some of the impact of economic shocks on the Brazilian equity market.

It is ultimately a strategic asset allocation decision for each investor or institution regarding the appropriate percentage allocation to the Brazil Global Index as a complement to IBOVESPA. However, our research has demonstrated the potential diversification benefits of such an allocation.

As an example, **Exhibit 11** demonstrates the change in exposure to global or domestic sources of revenue that results from an allocation of 35 percent to the Brazil Global Index and 65 percent to the Ibovespa Index.

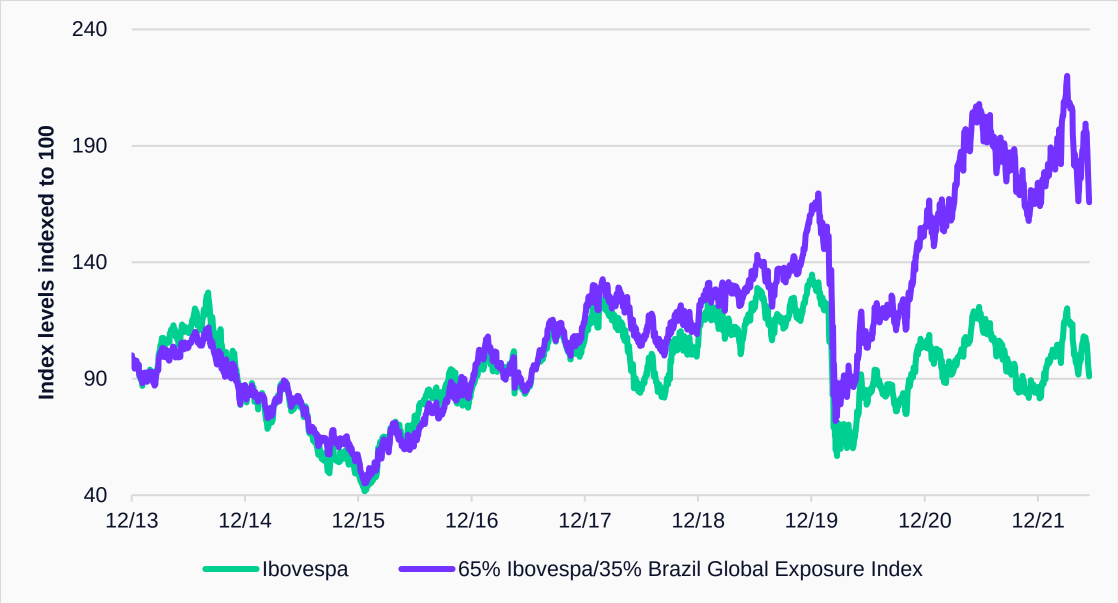
Exhibit 11: Economic Revenue Exposures with and without adding MarketVector™ Brazil Global Exposure Index to Broad Brazil Benchmark



Source: MarketVector Indexes™, b3, FactSet; Revenue Exposure data calculated by, MarketVector Indexes™. Data as September 16, 2022.

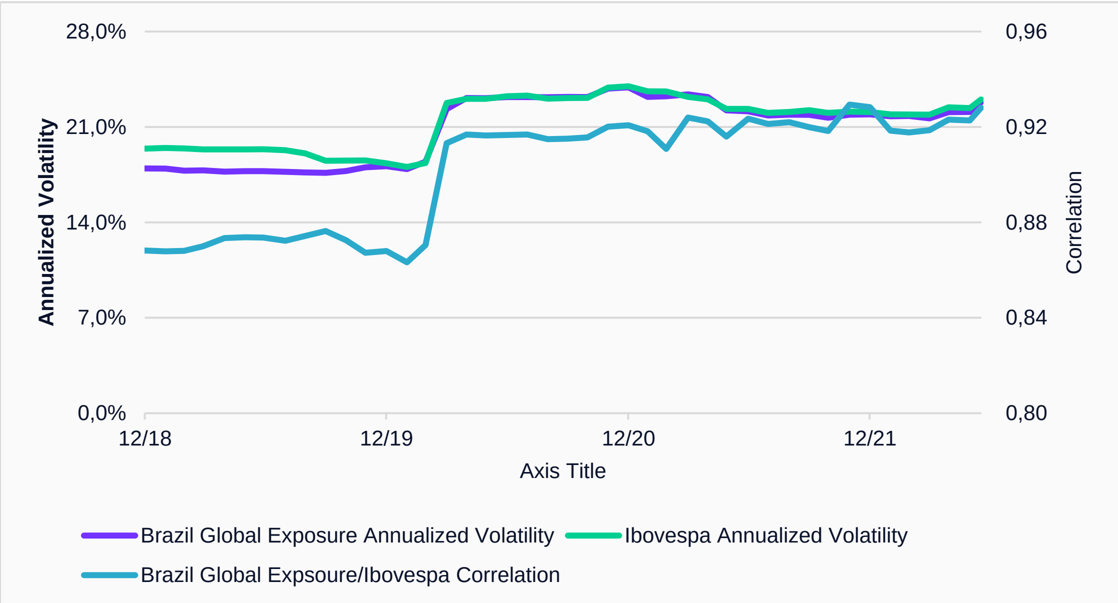
Such an allocation would have yielded an annualized outperformance of roughly 2.7 percent while reducing annualized volatility by roughly 2.9 percent. Furthermore, **Exhibit 12** shows a total return comparison while **Exhibit 13** illustrates rolling five-year monthly volatilities and correlations of the Ibovespa against the Brazil Global Index.

Exhibit 12: Returns of the Ibovespa Index vs an Allocation of 65% to Ibovespa and 35% to MarketVector™ Brazil Global Exposure Index (in USD) Rebalanced Semi-Annually



Source: MarketVector Indexes™. Data as June 17, 2022.

Exhibit 13: 5-Year Rolling Correlations and Volatility of the Ibovespa and MarketVector™ Brazil Global Exposure Index



Source: MarketVector Indexes™. Data as June 17, 2022.

Conclusion

Brazil is one of the world's most dynamic and important countries from an economic and capital markets perspective. It's sheer size -- seventh in population and 11th in global GDP -- places it fifth within the Emerging Market equity universe, with a weight of more than 5.5 percent in the MSCI Emerging Market Index and approximately 6 percent in the FTSE Emerging Markets All Cap Index. Brazil is also the world's largest exporter of soybeans, beef, coffee and frozen chicken, and the world's second largest exporter of iron ore and sugar. With such a dynamic and important economy, Brazil is too big to ignore for global investors and ripe for innovation.

By bifurcating the Brazilian equity market by companies' percentage of revenue from within and outside Brazil, the **MarketVector™ Brazil Economic Exposure Indexes** provide, for the first time, a way for investors to gain more precise exposure to the economic and industry trends driving the Brazilian economy or to diversify their pre-existing Brazil equity exposures.

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Joshua Kaplan is the Global Head of Research and Investment Strategy at MarketVector Indexes™. Joshua is involved in MarketVector™'s' index design, maintenance and commercialization activities. He is also responsible for producing research and analysis on MarketVector™'s indexes and investment trends. Josh joined MarketVector Indexes™ following the acquisition of BlueStar Indexes in August 2020 where he served as BlueStar's Director of Research and Finance. Prior to joining BlueStar Indexes in late 2011, Joshua specialized in fundamental equity analysis for a small-cap tech-focused hedge fund affiliated with a leading Israeli private equity firm. Joshua is a CFA Charterholder and graduated from Syracuse University with degrees in Finance, Entrepreneurship, and Economics.

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