

Research

# Appraising home bias exposure

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Russell

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# Table of contents

<b>Executive summary</b>	<b>3</b>
<b>Overview</b>	<b>4</b>
<b>Regional analysis</b>	<b>7</b>
United States	7
United Kingdom	16
Japan	25
Canada	34
Australia	43

## Executive summary

This paper assesses both the extent and impact of home bias in the equity allocation of five large pension fund markets by examining the characteristics, performance and return/risk profiles of each market.

The findings reveal interesting variations in the impact of home bias exposure across the regions between 2008 and 2019. In most regions, except for the US, overseas equities outperformed domestic equities, with the movement in exchange rates having a large effect on risk-adjusted returns. Overall, home bias was highly positive in the US, but negative in the UK, Japan, Canada and Australia.

Studies have shown that pension funds have inherent home biases within their equity allocations. The OECD explains that pension providers have tended to invest less than they should in foreign securities compared to the proportion of foreign securities in global financial markets, contrary to Modern Portfolio Theory<sup>1</sup>, which encourages diversification of assets to lower investment risks. The OECD cites several explanations for this persistent investor preference, including the desire to avoid exposure to exchange rate or political risk, the extra costs to hedge against these risks, regulatory barriers<sup>2</sup> and asset-liability matching needs<sup>3</sup>. In another study, the Thinking Ahead Institute<sup>4</sup> research attempts to quantify the level of domestic biases in several markets and shows that they have been pervasive across regions.

In this paper, we seek to understand whether a home bias in the equity allocations of pension funds has benefited investors. We measure their extent and analyze their effects over a 12-year period. A summary of the findings is presented in the overview section and is followed by a detailed analysis of each region.

For the purpose of the 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.

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<sup>1</sup> Portfolio Selection, the Journal of Finance, Vol 7, No 1 (Mar. 1952) H. Markowitz

<sup>2</sup> Pension Markets in Focus 2017, OECD.

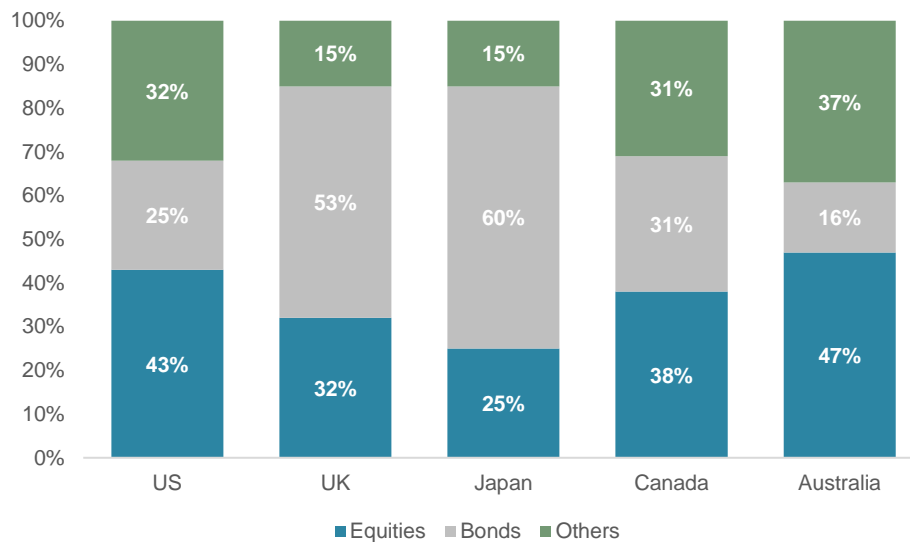
<sup>3</sup> Liberalising Foreign Investments by Pensions Funds: Positive and Normative Aspects, OECD Working Paper 5.3.

<sup>4</sup> Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019".

## Overview

A recent study<sup>4</sup> showed that pension fund providers in the US, UK, Japan, Canada and Australia allocated less than 50% of their overall assets to equities in 2018 (blue area in Chart 1). This represents a substantial downsizing of the equity allocation over the last 20 years. Note that in markets where equities used to be a dominant asset 10 years ago, some markets, like Japan, have allocated as little as 25% more recently.

**Chart 1: Pension funds estimated asset allocation in 2018**



We used the FTSE All-World Index to measure the degree of home biases within the equity allocation of pension funds.

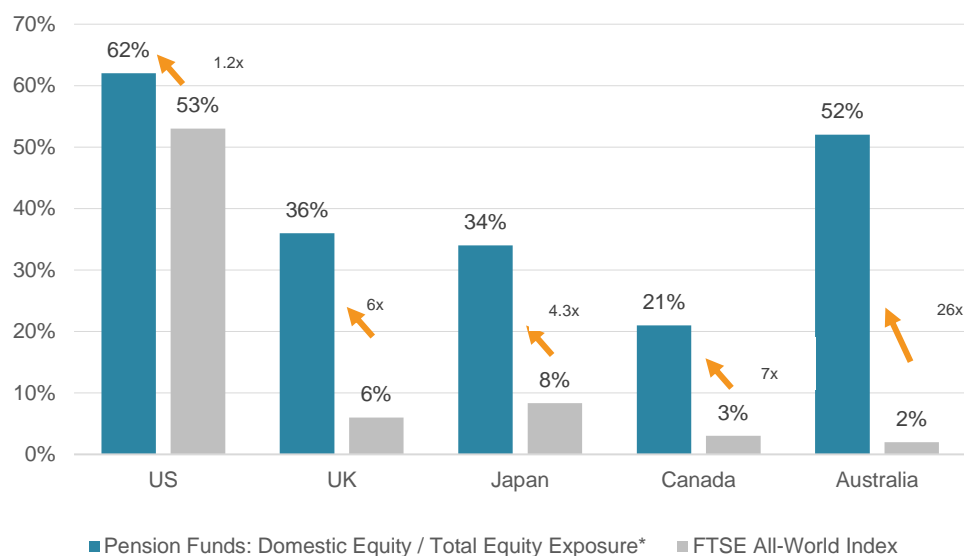
Source: Thinking Ahead Institute, Willis Towers Watson<sup>4</sup>.

The same study estimated the percentage of domestic allocation within each region's total equity allocation in 2018. Using this data and comparing it with the weight of the respective markets in the FTSE All-World Index, we can gauge the size of the home bias within an equity allocation. The results are shown in Chart 2. The blue bar represents the estimated percentage of total equities allocated to domestic equities in 2018 from the study, and the grey bar signifies the weight of the regional index in the FTSE All-World Index. The difference in weight is converted into a ratio.

Across the large pension fund markets, Australia stands out for having the largest disparity between its allocation to domestic equities (52%) and its weight in the FTSE All-World Index (2%), which translates into a ratio of 26 times. By contrast, the disparity is smallest for the US (although this largely reflects the US accounting for more than half the weight of the global index).

<sup>4</sup> Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019".

**Chart 2: Pension funds estimated allocation to domestic equities relative to total equity exposure<sup>4</sup> and country weight in the FTSE All-World Index**



Australia and the US stand out for having the largest and smallest disparities respectively, between their allocations to domestic equities and their weights in the global index.

Source: FTSE Russell as of December 31, 2018 and \*Thinking Ahead Institute, Willis Towers Watson.<sup>4</sup>

As this analysis reveals, home bias is pervasive across major markets. But, in considering the overall opportunity set, has it been good for investors?

- Our analysis finds that between 2008-2019, there have been pros and cons to holding domestic-equity biases in pension funds. However, most of the pension fund markets studied revealed that overseas equities have generally outperformed domestic equities over the period.
- Of the five markets examined, the US was the only region, in which a home bias would have strongly benefited investors. In fact, not having a US bias in portfolios would have been a significant opportunity cost for investors. US equities produced better risk-adjusted returns versus overseas equities for over 80% of the period examined.
- However, these results need to be assessed within the context of the recessionary environment and the extraordinary monetary measures undertaken in the aftermath of the global financial crisis. This unusual set of conditions underpinned the surge in US equities at the expense of overseas equity markets and resulted in the appreciation of the US dollar.
- In the UK, Japan, Canada and Australia, home bias was negative for investors, with domestic equities generating higher risk-adjusted returns than overseas equities for only 25% (and lower) of the period reviewed.

Table 1 summarizes the main findings for each region and evaluates the overall impact of a home bias from an investor's perspective.

**Table 1: Summary of home-bias impact on investor outcomes**

	US (USD)	UK (GBP)	Japan (JPY)	Canada (CAD)	Australia (AUD)
<b>Home-bias ratio</b> (based on Chart 4)	1.2x	6x	4.3x	7x	26x
<b>Domestic vs overseas revenue source</b>					
% of revenue generated by market constituents domestically*.	64%	23%	40%	51%	61%
<b>Relative outperformance in calendar years</b>					
Number of years domestic equities outperformed overseas equities, in base currency.	9 / 12yrs	3 / 12yrs	3 / 12yrs	3 / 12yrs	5 / 12yrs
<b>Currency impact in calendar years</b>					
Number of years base currency appreciation improved returns.	9 / 12yrs	3 / 12yrs	7 / 12yrs	5 / 12yrs	5 / 12yrs
<b>Return/risk ratio in calendar years</b>					
Number of years domestic equities delivered better risk-adjusted returns.	10 / 12yrs	2 / 12yrs	2 / 12yrs	3 / 12yrs	3 / 12yrs
<b>Conclusion</b>					
Was home bias positive or negative?	Positive	Negative	Negative	Negative	Negative

Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures. \*On December 31, 2017.

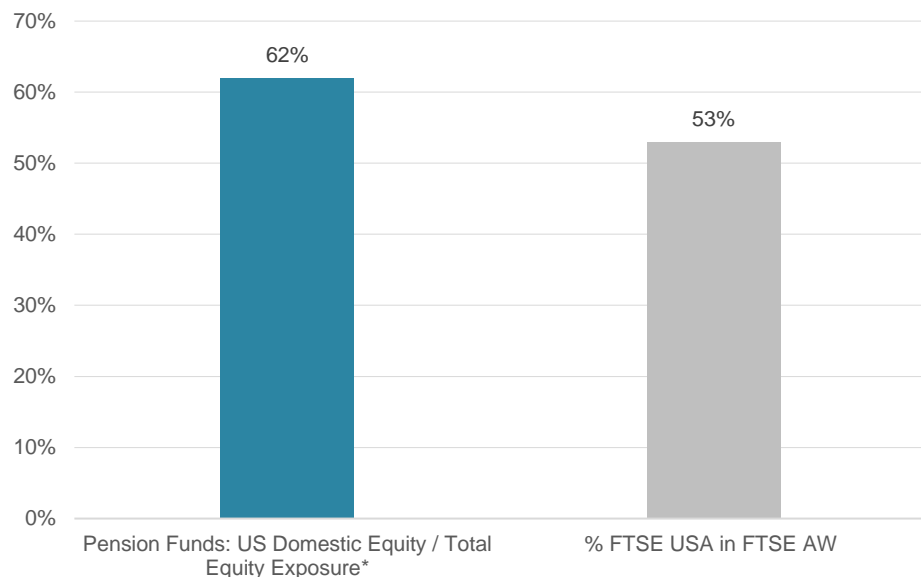
The next section provides a detailed analysis of the impact of home bias for each region.

## Regional analysis

### United States

In Chart 1, we saw that US pension funds had allocated 43% to equities in 2018, of which 62% was in US equities (Chart 3). When we divide the latter by the 53% weight of the FTSE USA in the FTSE All-World Index, we get a home-bias ratio of 1.2 times. The figure appears relatively small compared to those of the other four regions (Chart 2), in part an outgrowth of the US' dominant weight in the global index.

**Chart 3: US' Home-bias versus its weight in the FTSE All-World Index**



The home-bias ratio of the US is 1.2 times its weight in the global index, the smallest of the five regions.

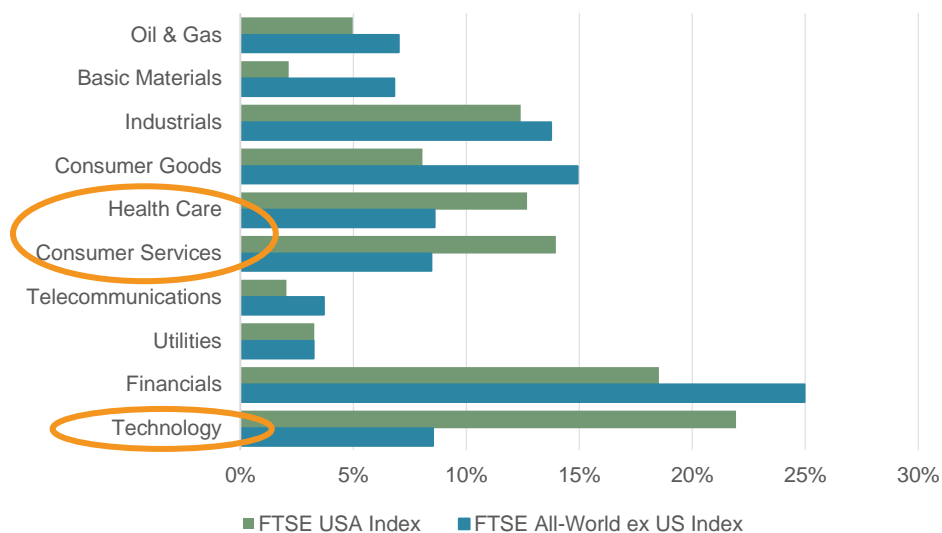
Source: \*Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019,"<sup>4</sup> FTSE USA Index and FTSE All-World Index as of December 31, 2018.

### Understanding the US 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.

As Chart 4 shows, allocating to the US equity market (represented by the FTSE USA) means being overweight US technology, health care and consumer services relative to the global index (represented by the FTSE All-World ex US). Together, these three industries make up nearly 50% of the total US market. The US home bias also means being underweight consumer goods and financials.

**Chart 4: US and overseas industry weights (%)**

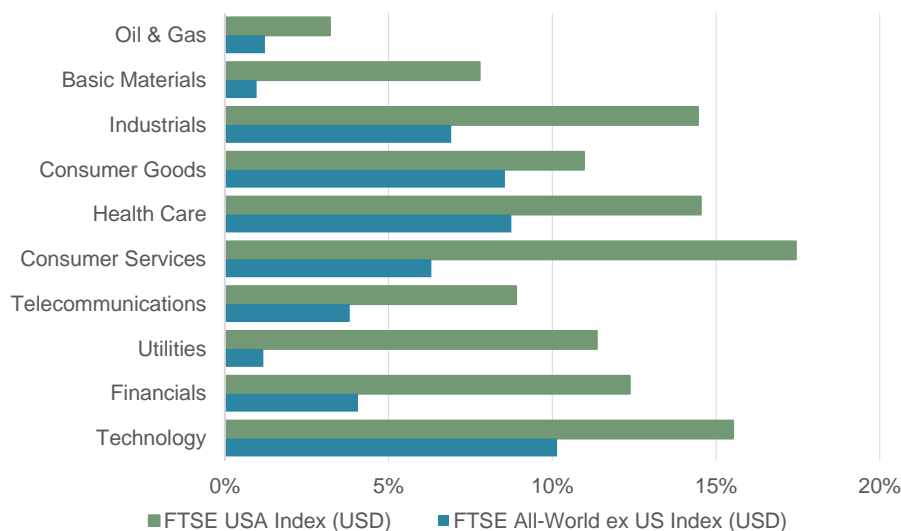


Technology, health care and consumer services make up nearly half of the US equity market.

Source: FTSE Russell; Industry Classification Benchmark data using FTSE USA Index and FTSE All-World ex US Index as of June 28, 2019.

Reviewing the industry performance over the past 12-years shows that US industries have outperformed all of their overseas counterparts, with health care, consumer services, industrials and technology registering strong gains.

**Chart 5: US and overseas average annualized industry returns % (2008-2019)**



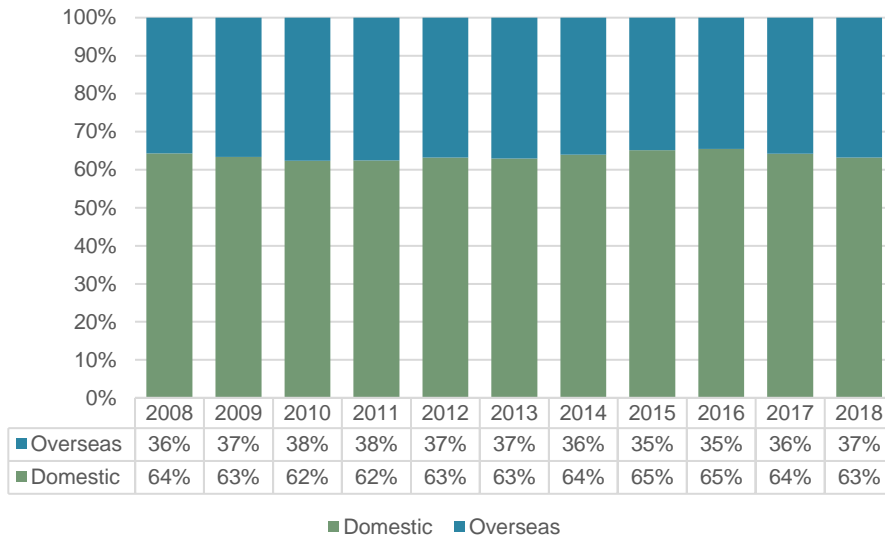
Source: FTSE Russell; Industry Classification Benchmark Industry data using FTSE USA Index and FTSE All-World ex US Index total returns in USD from between December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.



Segmenting the revenue sources of US companies by domestic and overseas exposure reveals that FTSE USA constituents have generated more than 60% of their revenues domestically. Moreover, this percentage has barely changed over the last 10 years (Chart 6).

FTSE USA constituents rely on the domestic market for most of their revenues.

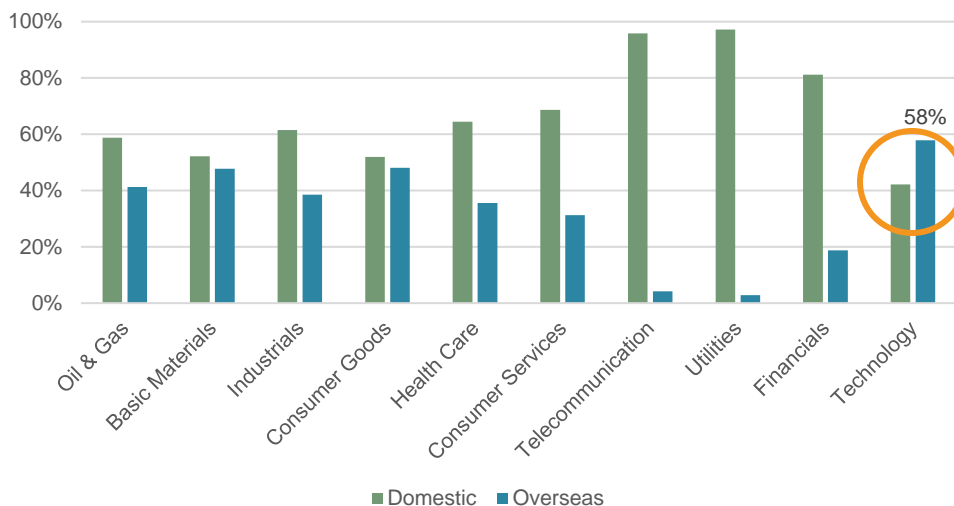
**Chart 6: Breakdown of the FTSE USA Index by domestic and overseas revenues (%)**



Source: FTSE Russell as of December 31, 2018.

Examining this revenue breakdown by industry, US technology (which constitutes over 20% of the total US equity market) is the only industry that generates most of its revenues from abroad (i.e., 58%) (Chart 7).

**Chart 7: The FTSE USA Index domestic and overseas revenue breakdown by industry (%)**



US technology is the only industry that generates the majority of its revenues from abroad.

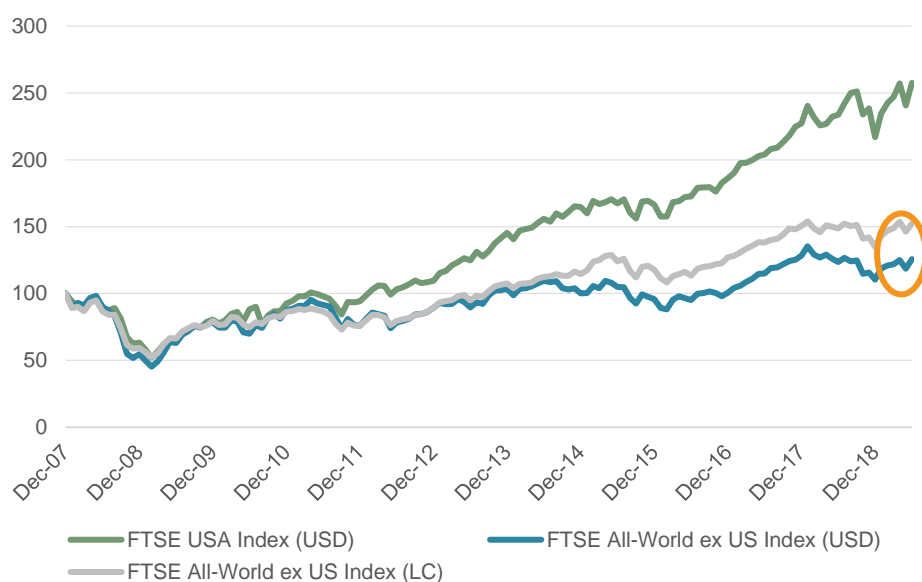
Source: FTSE Russell as of December 31, 2018 using data from the Industry Classification Benchmark.

## Assessing the effect of US home bias: performance

Charts 8 and 9 compare the performance history of US equities with that of overseas equities, in both US dollar and local currency terms, to show the impact of currency movements on overall returns. An appreciating currency diminishes the overseas returns in USD of a US-based investor (and vice versa).

Cumulative US equity returns have significantly outperformed those of overseas equities over the period (Chart 8, green line). This was true even after accounting for the currency impact (as shown by the outperformance of the FTSE All-World ex US Index in local currency versus in US dollars).

**Chart 8: Cumulative total returns of the FTSE USA Index and the FTSE All-World ex US Index (USD & local currency), rebased**

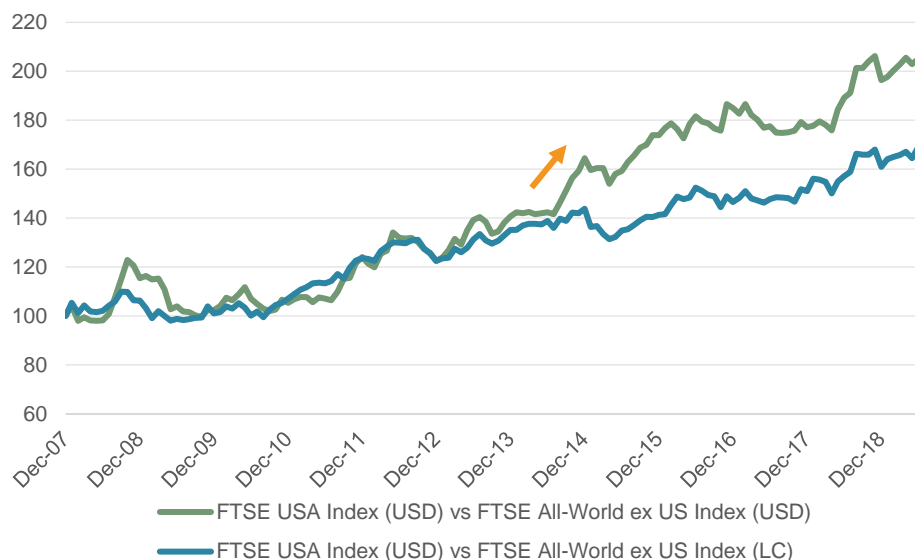


US equities have outperformed overseas equities over the period examined, making home bias highly positive for US-based investors.

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 9 examines the performance through the lens of relative data, in both US dollar and local currency terms. US and overseas equities started the period performing in line with each other, without much effect from the US dollar. However, there was a major inflection point in 2014, when the performance of US equities significantly diverged from that of overseas equities.

**Chart 9: Relative total returns of the FTSE USA Index versus the FTSE All-World ex US Index (USD & local currency), rebased**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 10 shows the sharp appreciation of the US dollar in 2014, which coincided with the outperformance of US equities relative to overseas equities.

**Chart 10: DXY Dollar Index, rebased**

US dollar strength against most other currencies has boosted US equity returns, especially in 2014.



Source: Refinitiv from December 31, 2007 to June 28, 2019; the US Dollar Index (DXY) is a measure of the value of the US dollar relative to a basket of foreign currencies. The Index increases when the US dollar appreciates against other currencies.

The rally in the dollar in 2014 was driven by divergence in monetary-policy expectations among the major central banks, with the Federal Reserve ending its quantitative easing (QE) program and the ECB maintaining QE to confront mounting deflationary risks in the Eurozone.

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

As Chart 11 shows, overseas equities have been persistently more volatile than US equities over the 2008-2017 period. However, since 2017, this disparity has narrowed, culminating in US equity volatility overtaking that of overseas equities at the end of the second quarter of 2019.

**Chart 11: 1Y rolling annualized volatility of the FTSE USA Index and the FTSE All-World ex US Index (USD) – Absolute**

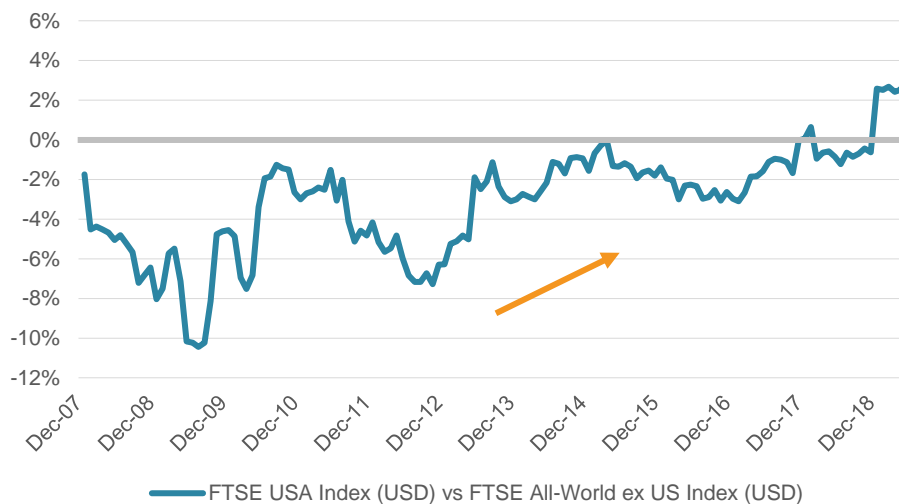


US equities have been less volatile than their global peers until recently.

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 12 focuses on the relative volatility between US and overseas equities. Although the gap has widened recently, US equities have been far less volatile than global equities for most of the period examined.

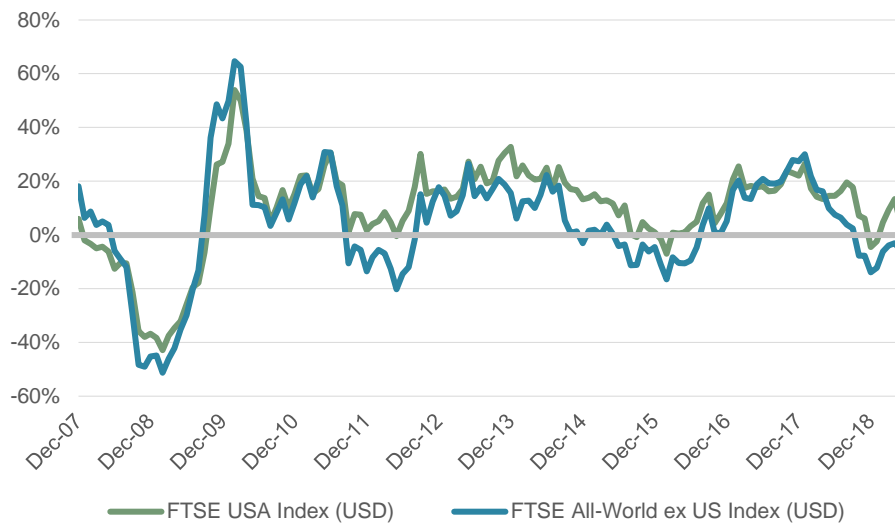
**Chart 12: 1Y rolling annualized volatility difference of the FTSE USA Index and the FTSE All-World ex US Index (USD)– Relative**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The rolling returns in Chart 13 confirm previous observations that US equities have outperformed overseas equities for the majority of the period examined.

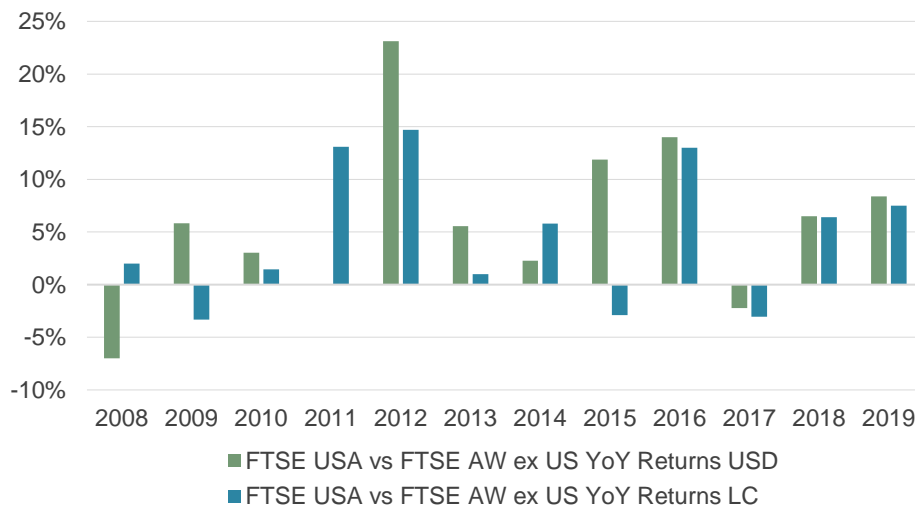
**Chart 13: 1Y rolling returns of the FTSE USA Index and the FTSE All-World ex US Index (USD) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 14 depicts the yearly returns of the FTSE USA relative to the FTSE All-World ex US, in both US dollars (green bars) and local currency terms (blue bars). Of note, US equities have outperformed overseas equities in USD in nine out of the 12 years, except in 2008 and 2017. US equity outperformance was most pronounced in 2012 (ahead by 23% in USD), although it was strong in 2015 and 2016. Notably, US relative returns were higher in USD than in local currency in most years, underscoring the impact of the strong US dollar.

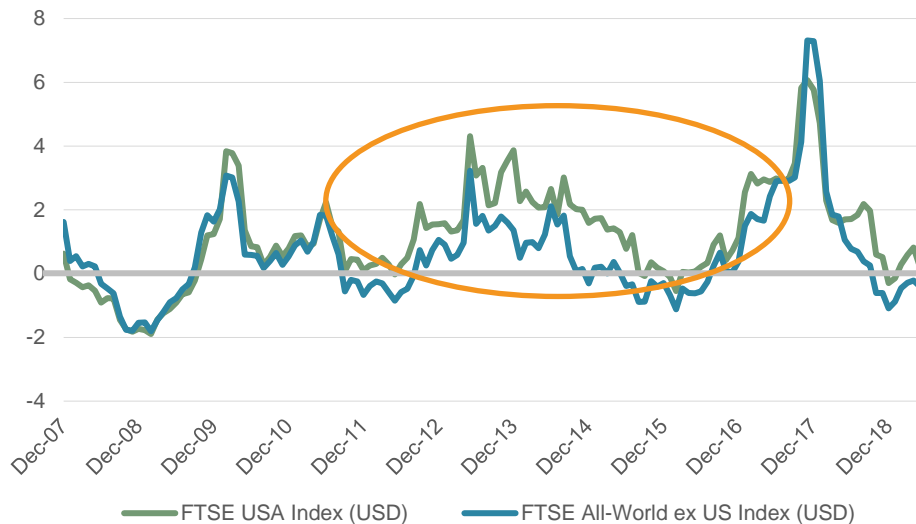
**Chart 14: Year-on-year returns of the FTSE USA Index versus the FTSE All-World ex US Index (USD & local currency) – Relative**



Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 15 combines the one-year rolling return and risk data for the US and compares the ratio against overseas equities. It shows that US equities have delivered higher risk-adjusted returns than overseas equities, especially between 2011 and 2017.

**Chart 15: 1Y rolling return/risk ratios of the FTSE USA Index and the FTSE All-World ex US Index – Absolute**



US equities have generated higher risk-adjusted returns than the global index.

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The discreet year-on-year return/risk ratios since 2008 shows that US equities have generated better risk-adjusted returns than overseas equities in 10 of the past 12 years analyzed (Chart 16).

**Chart 16: Year-on-year return/risk ratios of the FTSE USA Index and the FTSE All-World ex US Index – Absolute**



A home bias to US equities would have paid off for US investors. US equities overwhelmingly outperformed overseas equities, generating better risk-adjusted returns in ten of the past 12 years analyzed.

Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

## Conclusion

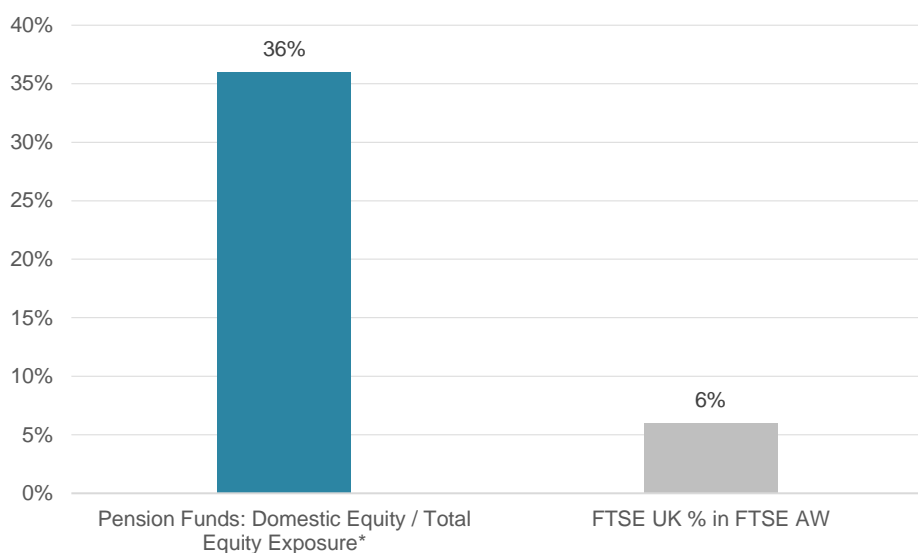
With US equities outperforming their overseas peers on a risk-adjusted basis in 10 of the past 12 years since the global financial crisis, our analysis suggests that a home bias to US equities over that period would have paid off significantly for US investors.

## Regional analysis

### United Kingdom

In Chart 1, we saw that pension funds in the UK had allocated about 32% of their total assets to equities in 2018, of which 36% was invested in the UK. Dividing this number (36%) by the weight of the UK in the FTSE All-World Index (6%) gives a home-bias ratio of six times (Chart 17).

**Chart 17: UK's home-bias versus its weight in the FTSE All-World Index**



The home-bias ratio of the UK is six times its weight in the FTSE All-World Index.

Source: \*Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019,"<sup>4</sup> FTSE UK Index and FTSE All-World Index as of December 31, 2018.

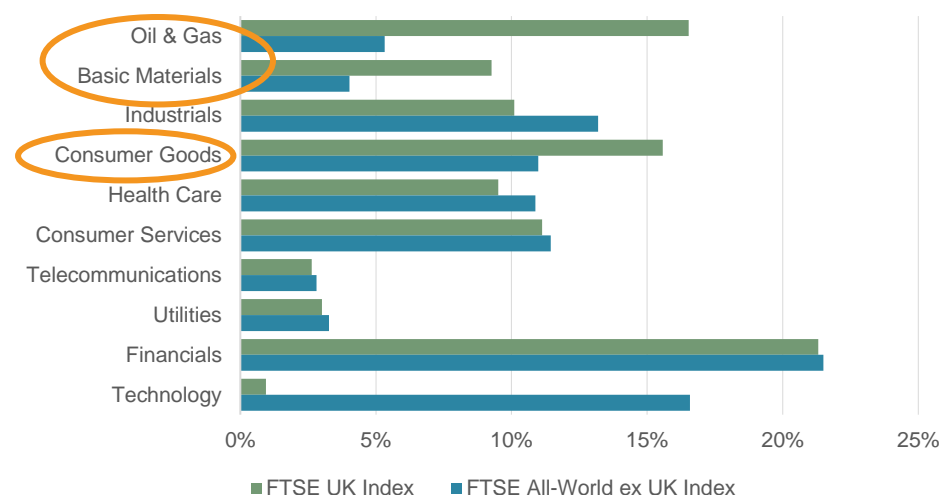
### Understanding the UK equity market

Home biases carry inherent exposures. In this section, we consider whether a home bias benefited UK investors. 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 UK equity market (represented by the FTSE UK) with that of the global index (FTSE All-World ex UK). As Chart 18 demonstrates, UK oil & gas, basic materials and consumer goods constitute overweight exposures relative to the global index. UK financials is the largest industry, accounting for more than 20% of the UK market (although its weight is almost identical to that of its overseas peers). By contrast, the UK has a very small weight to technology, which also represents a significant underweight relative to the global index.



**Chart 18: UK and overseas industry weights (%)**

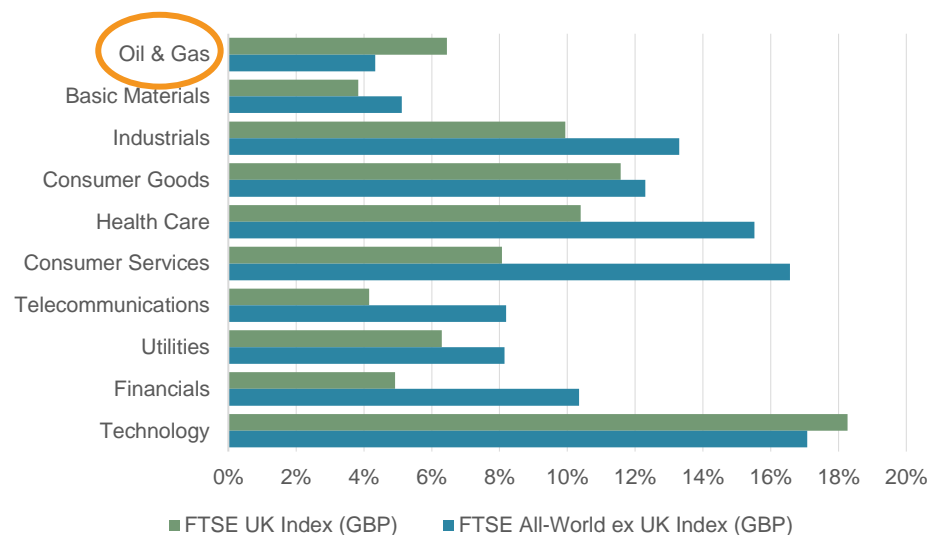


UK oil & gas and basic materials are large overweights, and technology, a large underweight, compared to the global index.

Source: FTSE Russell; Industry Classification Benchmark data using FTSE UK Index and FTSE All-World ex UK Index as of June 28, 2019.

Comparing performance, Chart 19 shows that of the largest industries highlighted in the previous chart, only UK oil & gas has outperformed its overseas counterpart during the period. (Technology also outperformed, but its weight is negligible in the overall UK index.)

**Chart 19: UK and overseas equities average annualized industry returns % (2008-2019)**

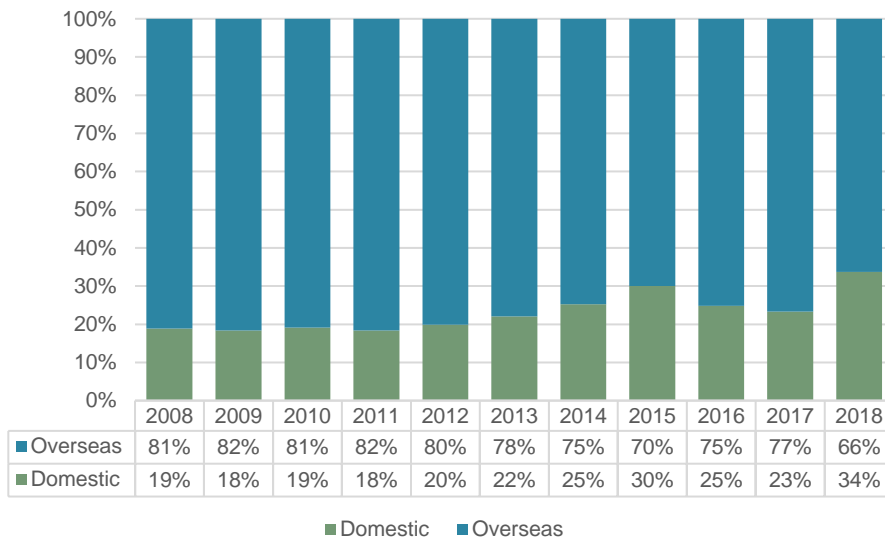


Source: FTSE Russell; Industry Classification Benchmark data using FTSE UK Index and FTSE All-World ex UK Index total returns in GBP between December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

FTSE UK's listed companies are highly dependent on overseas business, with nearly 70% of their revenues coming from abroad. Of note, is that percentage has been gradually decreasing over the period. Even so, a home bias to UK equities still results in a heavy exposure to overseas businesses and macroeconomic trends.

**Chart 20: Breakdown of the FTSE UK Index by domestic and overseas revenues (%)**

Nearly 70% of FTSE UK revenues are sourced from abroad.

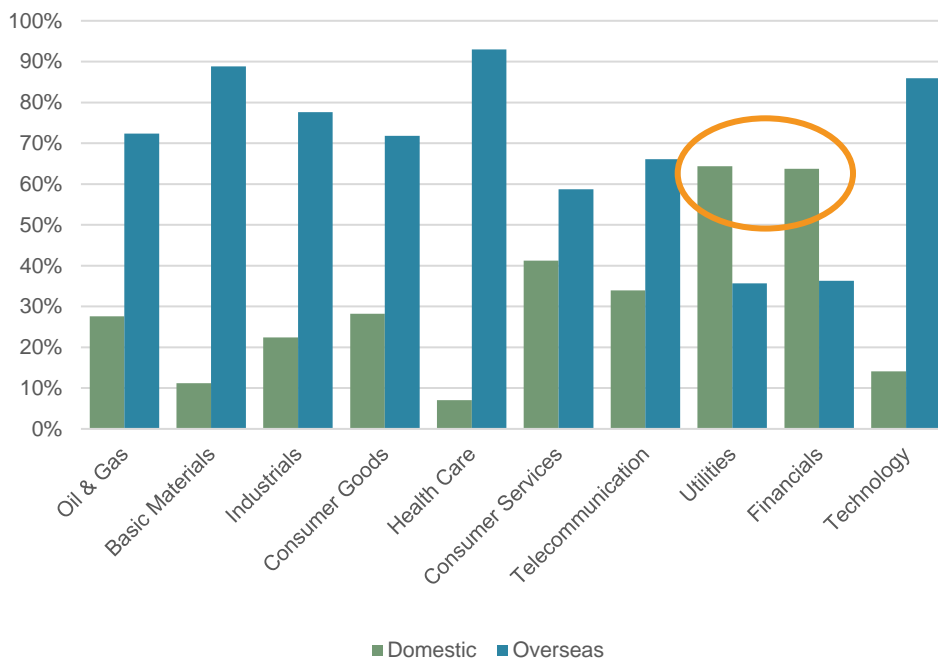


Source: FTSE Russell as of December 31, 2018.

Examining the revenue breakdown by industry shows that utilities and financials are the only industries, which source most of their revenues in the UK (Chart 21).

**Chart 21: FTSE UK Index domestic and overseas revenue breakdown by industry**

Only UK utilities and financials source most of their revenues domestically.



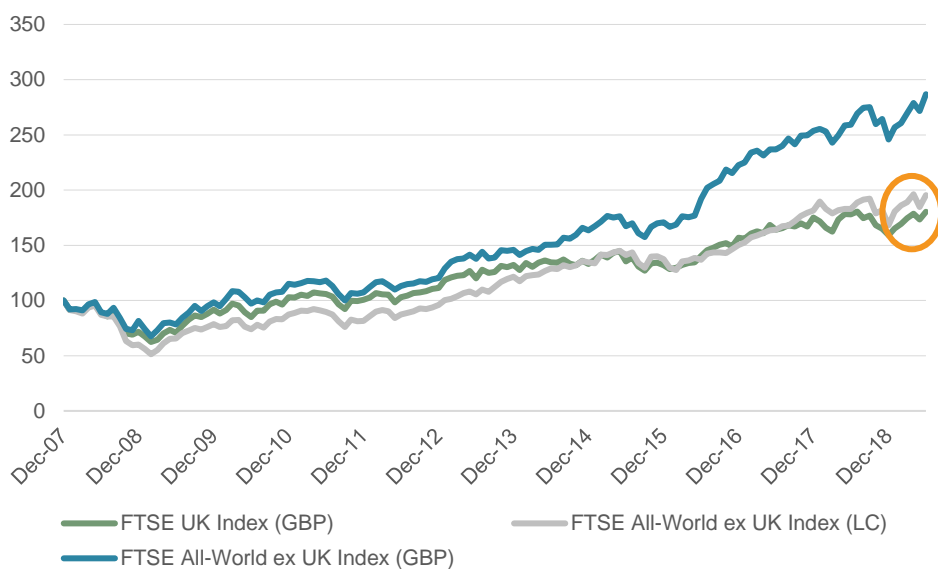
Source: FTSE Russell as of December 31, 2018 using Industry Classification Benchmark.

## Assessing the effect of UK home bias: performance

In Charts 22 and 23, we compare the performance of UK equities (FTSE UK) with that of overseas equities (FTSE All-World ex UK) in sterling, and in local-currency terms (to remove the currency effect). A depreciating currency improves the overseas returns in GBP of a UK-based investor (and vice versa).

Over the period examined, UK equities in sterling terms and overseas equities in local currency terms have registered similar returns. However, the performance of overseas equities in sterling terms has been much higher, benefiting from sterling depreciation.

**Chart 22: Cumulative total returns of the FTSE UK Index and the FTSE All-World ex UK Index (GBP & local currency), rebased – Absolute**



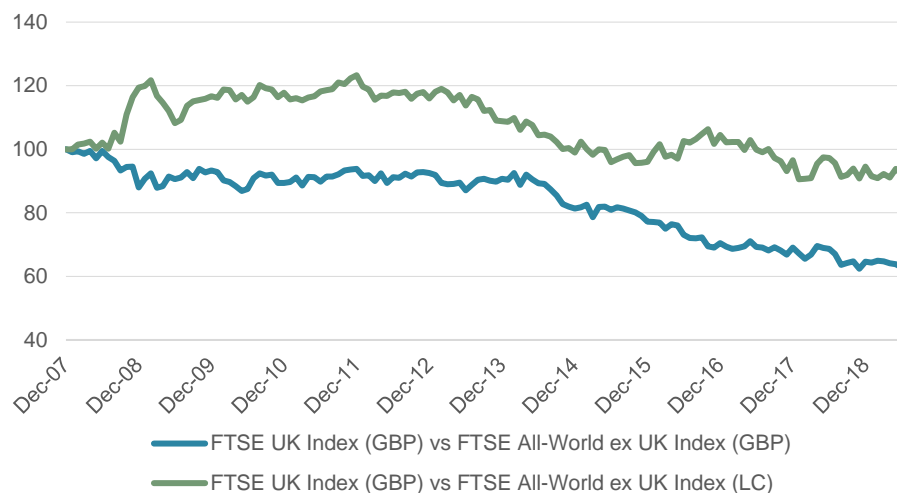
Over the past 12 years, UK equities, in sterling terms, and overseas equities, in local currency terms, have registered similar returns...

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Looking more closely at the relative performance in Chart 23, we see that between 2008 and 2013, the FTSE UK outperformed overseas equities in local currency terms (green line), and then underperformed thereafter. In sterling (blue line), however, the underperformance of UK equities versus their overseas peers was more pronounced than in local currency terms and extended over nearly the entire period.

**Chart 23: Relative total returns of the FTSE UK Index relative to the FTSE All-World ex UK Index (GBP & local currency), rebased**

...But in sterling terms, the FTSE All-World ex UK has significantly outperformed the FTSE UK.

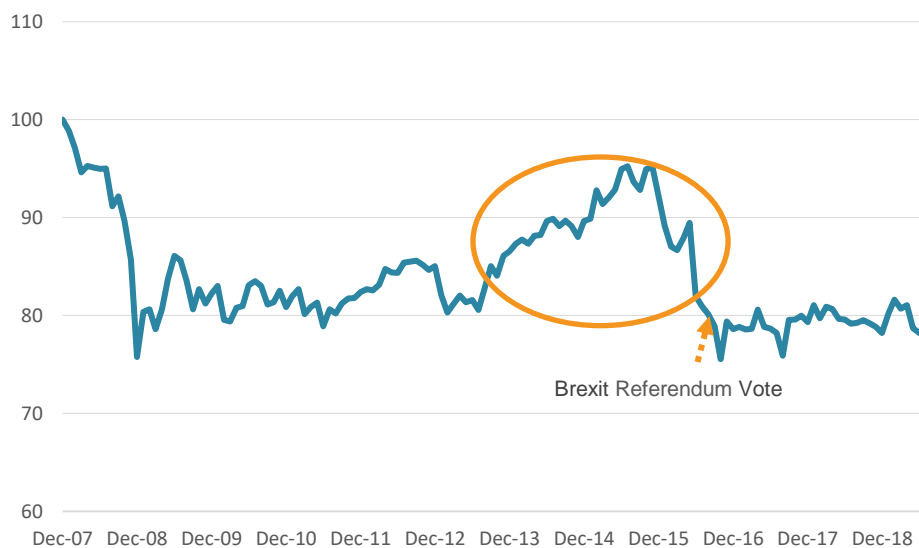


Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

We can examine the shift in sterling on UK equity returns in Chart 24. After a period of relative stability from 2008 through 2013, sterling has become much more volatile. After an initial period of appreciation (2013 and 2015), the currency steadily depreciated as markets began factoring in Brexit as a risk variable.

**Chart 24: Trade-Weighted GBP Index, rebased**

Sterling has been mostly range bound against other currencies, except in 2013-16.

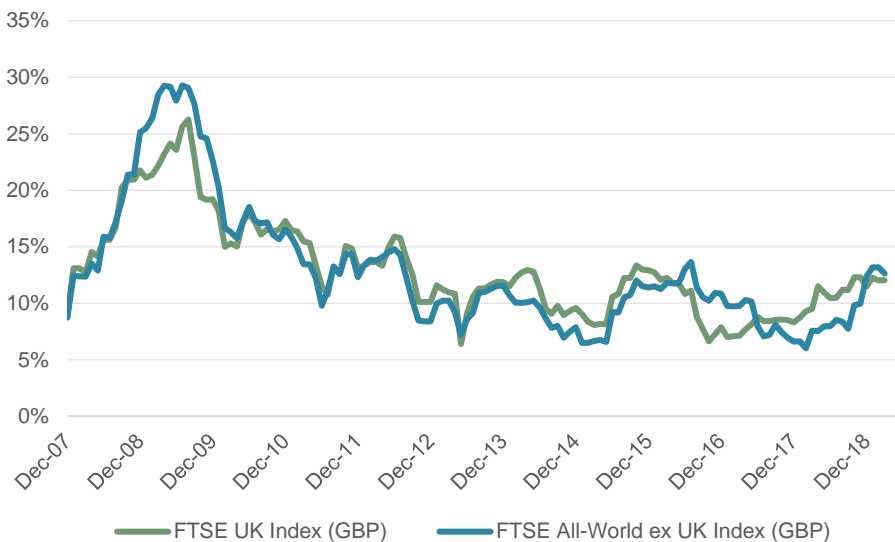


Source: Refinitiv from December 31, 2007 to June 28, 2019; the trade-weighted GBP Index is a measure of the value of sterling relative to a basket of foreign currencies.

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

Chart 25 shows that UK and overseas equities have exhibited similar levels of volatility for much of the past 12 years.

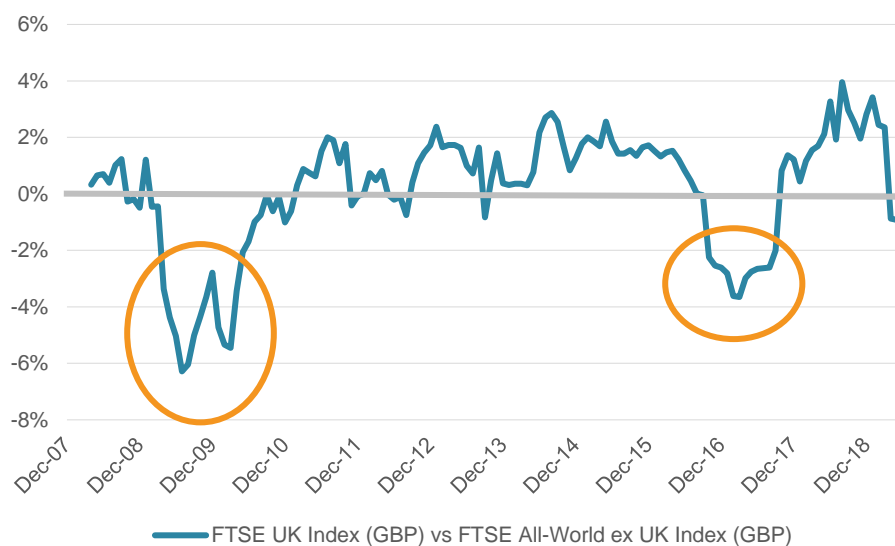
**Chart 25: 1Y rolling annualized volatility of the FTSE UK Index and the FTSE All-World ex UK Index (GBP) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

The relative volatility data in Chart 26 provides a better view. It highlights that UK equities have been marginally more volatile than overseas equities for most of the period, except during 2008-2009, 2016-2017 and more recently.

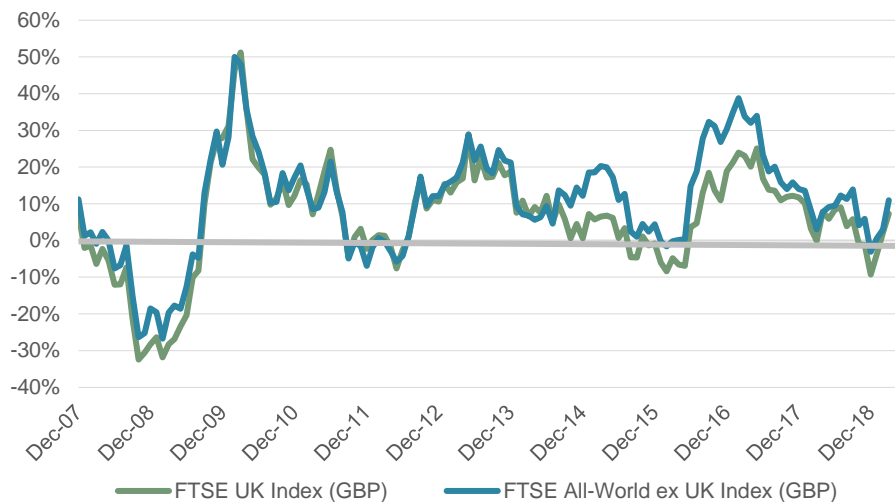
**Chart 26: 1Y rolling annualized volatility difference of the FTSE UK Index and the FTSE All-World ex UK Index (GBP) – Relative**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

At the same time, the rolling returns in sterling terms indicate that the UK and global indexes registered roughly equivalent rolling returns (in sterling terms) between 2009-2014. Overseas equities have visibly outperformed UK equities ever since (Chart 27).

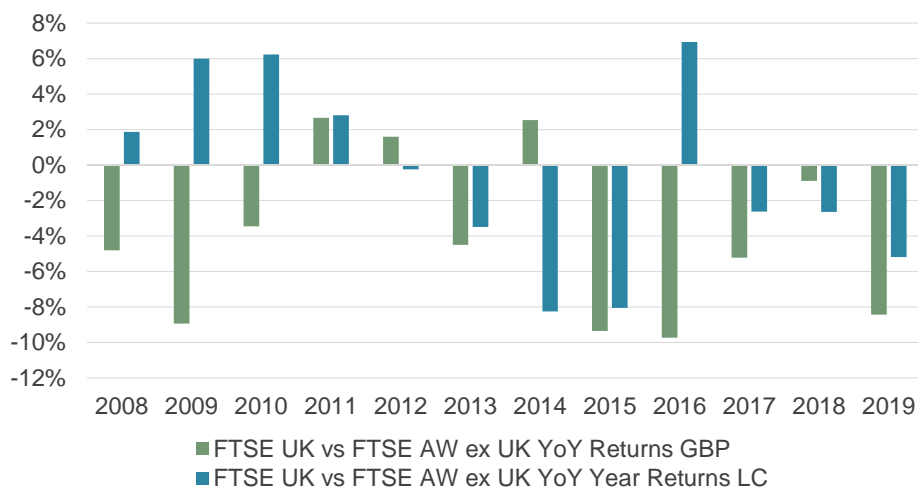
**Chart 27: 1Y rolling returns of the FTSE UK Index and the FTSE All-World ex UK Index (GBP) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 28 illustrates this difference in performance more clearly. Although UK equities outperformed overseas equities in local currency terms (blue bars) in five of the 12 years examined, they performed more poorly in sterling terms (green bars), significantly underperforming overseas equities in nine of the 12 years. This means that 75% of the time, UK investors would have been worst off for having a bias to UK equities. These disparities in relative returns (between blue and green bars) were most stark between 2008 and 2010, and in 2016, reflecting sterling weakness.

**Chart 28: Year-on-year returns of the FTSE UK Index and the FTSE All-World ex UK Index in GBP and LC – Relative**

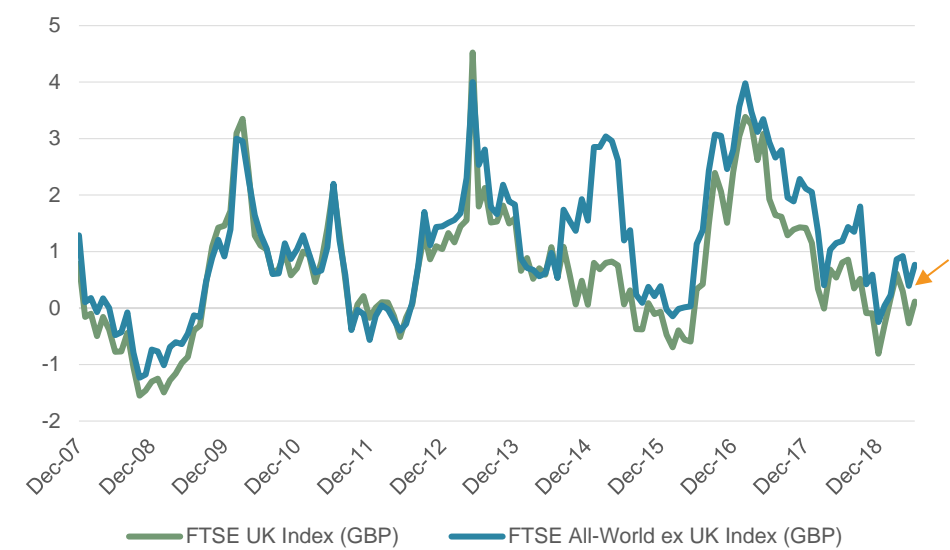


Despite UK equities outperforming overseas equities in five of the 12 years in local currency terms, for sterling investors, returns were significantly reduced by sterling weakness between 2008-2010 and 2016.

Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Combining volatility and return in Chart 29 shows that overseas equities have produced higher return/risk ratios than UK equities for most of the period examined.

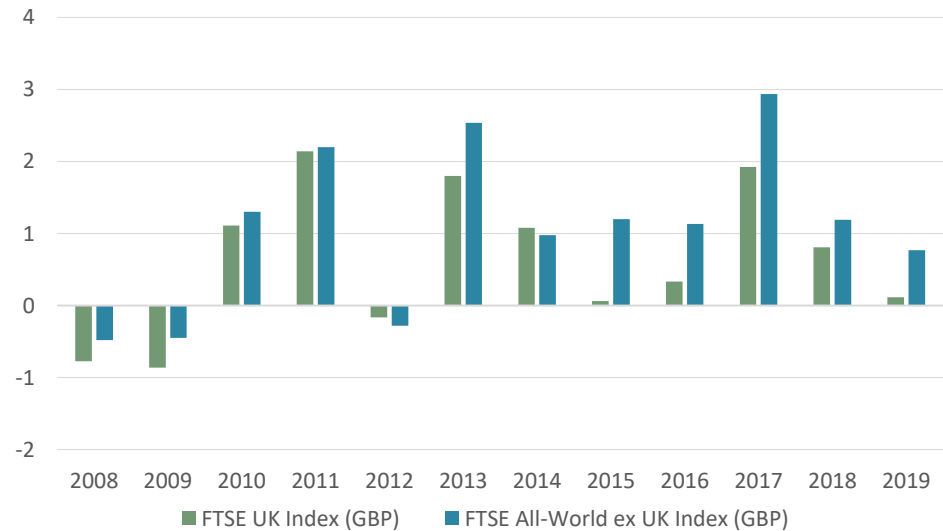
**Chart 29: 1Y rolling return/risk ratios of the FTSE UK Index and the FTSE All-World ex UK Index – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Examining the yearly performance since 2008 in Chart 30, the discreet periods reveal that overseas equities have generated higher returns per unit of volatility in 10 of the past 12 years (80% of the period). UK equities outperformed overseas equities on a risk-adjusted basis in only 2012 and 2014.

**Chart 30: Year-on-year return/risk ratios of the FTSE UK Index and the FTSE All-World ex UK Index – Absolute**



Overseas equities have generated higher risk-adjusted returns for over 80% of the period examined.

Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

## Conclusion

With UK equities trailing their overseas peers on a risk-adjusted for more than 80% of the period examined, a six-times home bias has represented a significant opportunity cost for UK-based investors. The general weakness in sterling was responsible for reducing returns in 75% of that period.

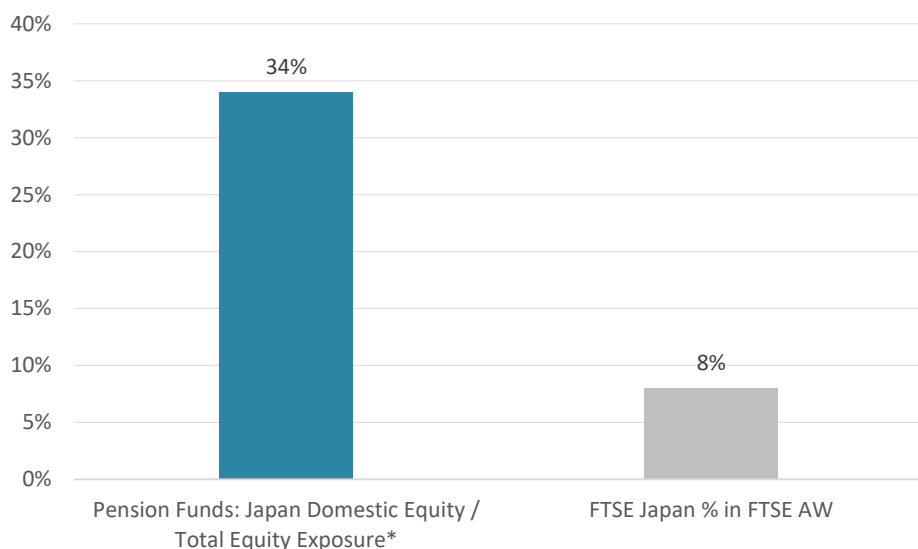


## Regional analysis

### Japan

In Chart 1, we saw that pension funds in Japan had allocated about 25% of their total assets to equities in 2018, of which 34% was in the domestic market. Dividing this number by the weight of Japan equities in the FTSE All-World Index (8%) gives a home-bias ratio of 4.3 times (Chart 31).

**Chart 31: Japan's home-bias level versus its weight in the FTSE All-World Index**



The home-bias ratio for Japan is 4.3 times its weight in the FTSE All-World Index.

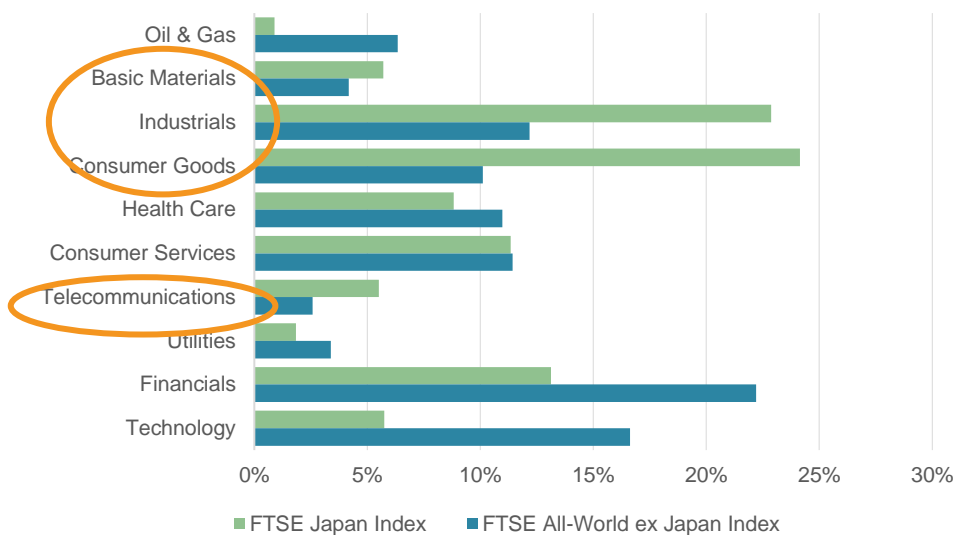
Source: \*Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019"<sup>4</sup>, FTSE Japan and FTSE All-World Index as of December 31, 2018.

### Understanding the Japanese equity market

To better understand how home bias affects performance, it is important to examine both the Industry Group (ICB) exposures and the composition of corporate revenue sources.

As Chart 32 shows, the Japanese equity market (represented by FTSE Japan) is overweight industrials, consumer goods, basic materials and telecommunications relative to the global index (FTSE All-World ex Japan), and underweight financials, health care and technology. Industrials and consumer goods are Japan's largest industries, accounting for about 47% of the total market.

**Chart 32: Japan and overseas industry weights (%)**

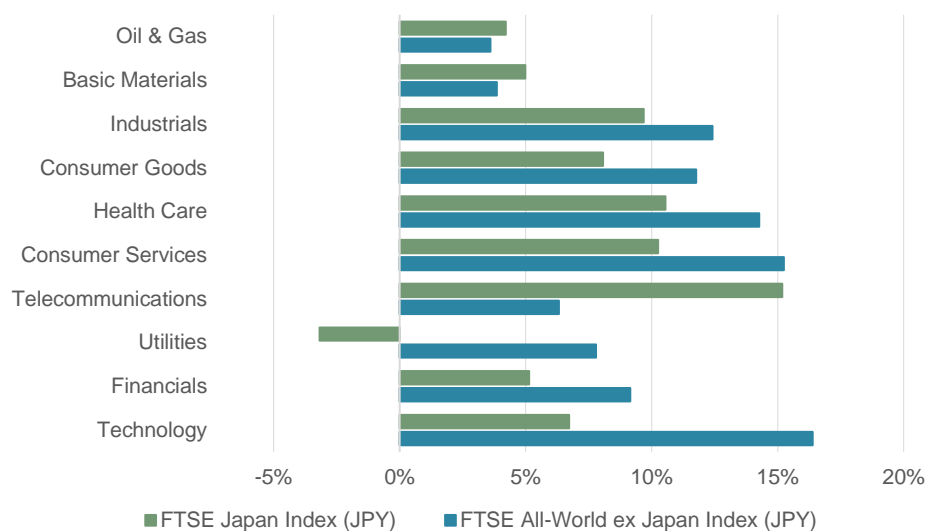


Industrials and consumer goods are Japan's largest industries, accounting for nearly half of the market.

Source: FTSE Russell; data using FTSE Japan Index and FTSE All-World ex Japan Index as June 28, 2019.

As shown in Chart 33, few industries in Japan outperformed overseas equities in the 2008-2019 period, with telecommunications, oil & gas and basic materials being the exceptions.

**Chart 33: Japan and overseas average annualized industry returns % (2008-2019)**

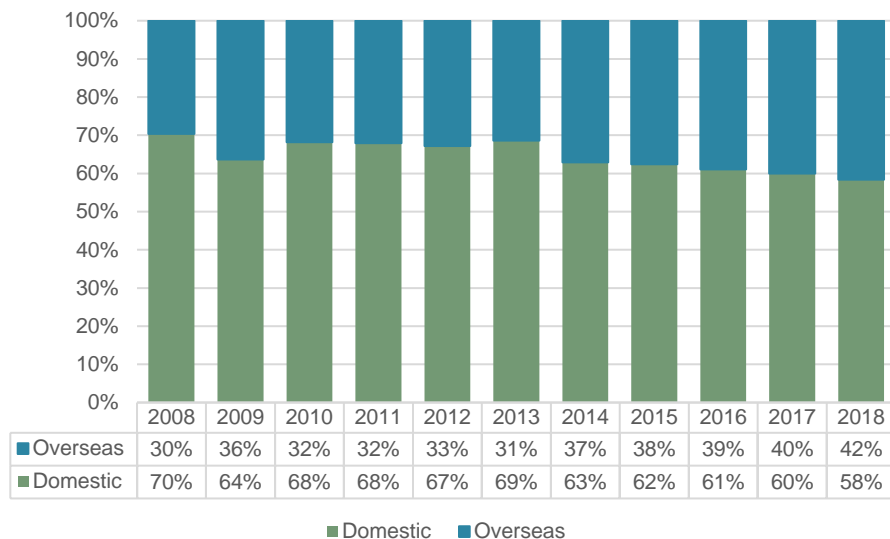


Only Japanese telecommunications, oil & gas and basic materials outperformed their overseas counterparts.

Source: FTSE Russell; data using FTSE Japan Index and FTSE All-World ex Japan Index, total returns in JPY from Industry Classification benchmark between December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Comparing revenue sources, the Japanese equity market has a significant domestic tilt, with companies deriving 60% of their revenues domestically in 2018 (Chart 34). Moreover, the percentage has decreased since 2008, when it was closer to 70%.

**Chart 34: Breakdown of overseas and domestic revenues in Japan (average %)**

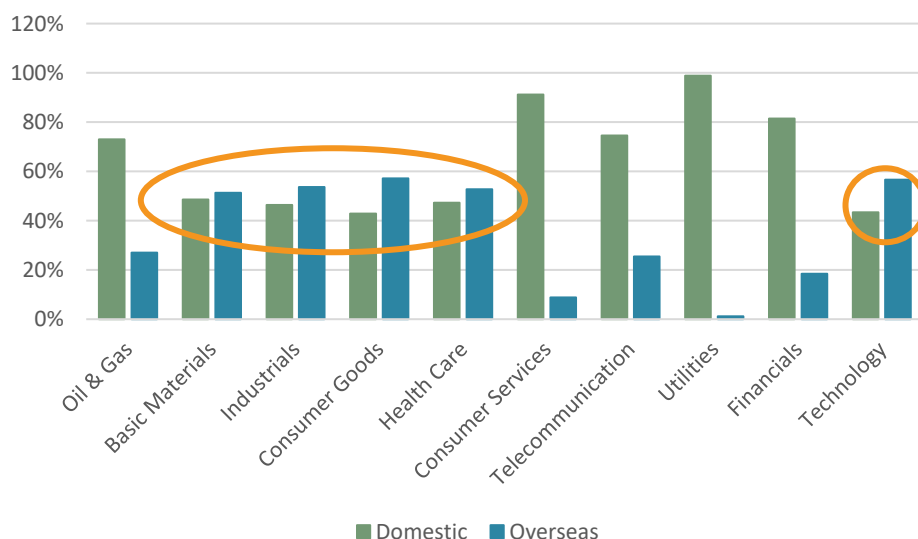


FTSE Japan derives about 60% of its revenues domestically.

Source: FTSE Russell as of December 31, 2018.

Examining the revenue breakdowns by industry, we find that basic materials, consumer goods, industrials, health care and technology companies are the most dependent on overseas business among Japanese industries (Chart 35).

**Chart 35: FTSE Japan Index domestic and overseas revenues breakdown by industry (%)**



Japanese consumer goods, industrials, basic materials, health care and technology companies have the largest exposures to overseas revenues.

Source: FTSE Russell as of December 31, 2018 using Industry Classification Benchmark.

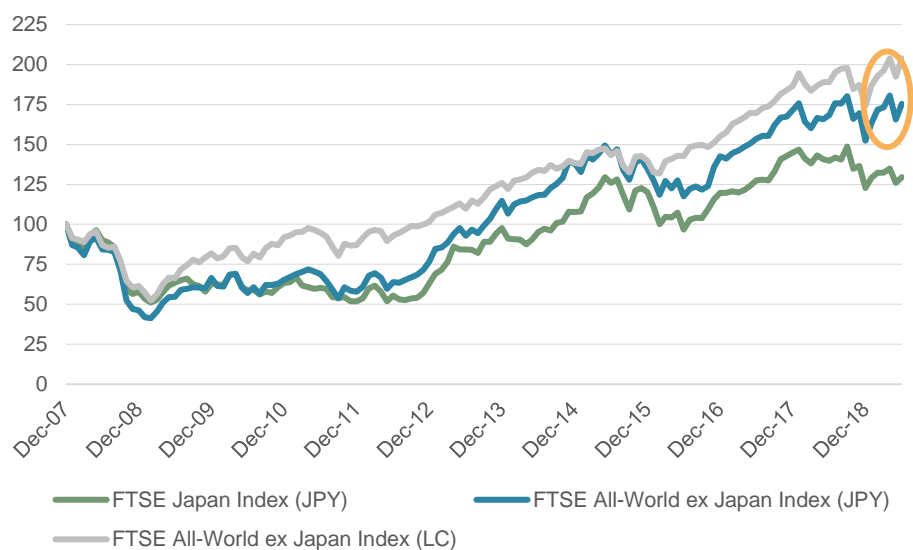
## Assessing the effect of Japanese home bias: performance

In Chart 36, we review the performance of Japanese equities (FTSE Japan) and overseas equities (FTSE All-World ex Japan) in Japanese yen and in local currency terms, with the latter stripping away the currency effect. An appreciating currency diminishes the overseas returns in JPY of a Japanese-based investor (and vice versa).

Reviewing the cumulative performance since the end of 2007, we observe that overseas equities have outperformed Japanese equities by some margin, both in local currency (grey line) and in yen (blue line).

**Chart 36: Cumulative total returns of the FTSE Japan Index and the FTSE All-World ex Japan Index (JPY & local currency), rebased**

Overseas equities have outperformed Japanese equities by some margin.



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 37 shows the different phases of the Japanese yen movements against a traded-weighted basket of foreign currencies over period. The yen strengthened between 2008 and 2012, weakened (2012 and 2015) and appreciated to the end of June 2019.

**Chart 37: Trade-Weighted JPY Index, rebased**



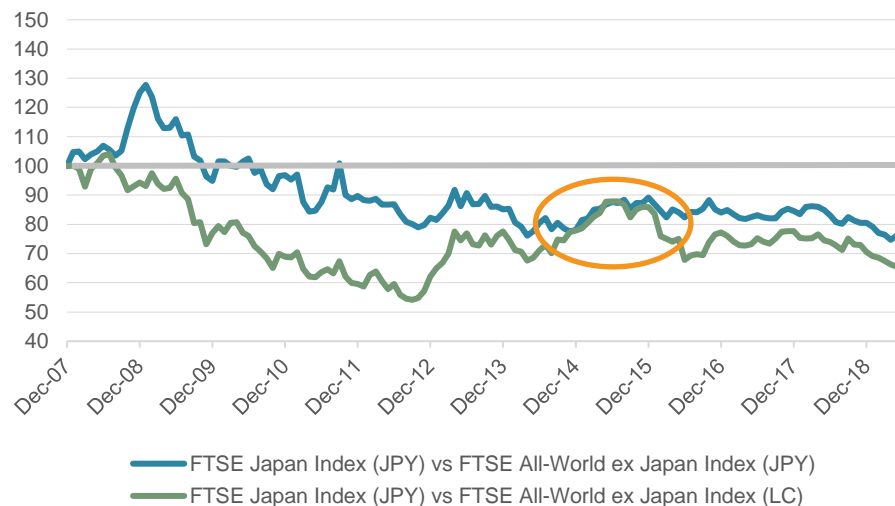
Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

Japanese equity underperformance was worse, in local currency terms than in yen, reflecting currency effects.

Reviewing the performance of Japanese and overseas equities on a relative basis allows us to see the significant underperformance of Japanese equities, with both green and blue lines finishing the period well below 100.

Moreover, Japanese equity underperformance versus global peers has been more pronounced in local currency terms than in yen, except for a brief period between 2012 and 2015.

**Chart 38: Relative total returns of the FTSE Japan Index versus the FTSE All-World ex Japan Index (JPY & local currency), rebased**



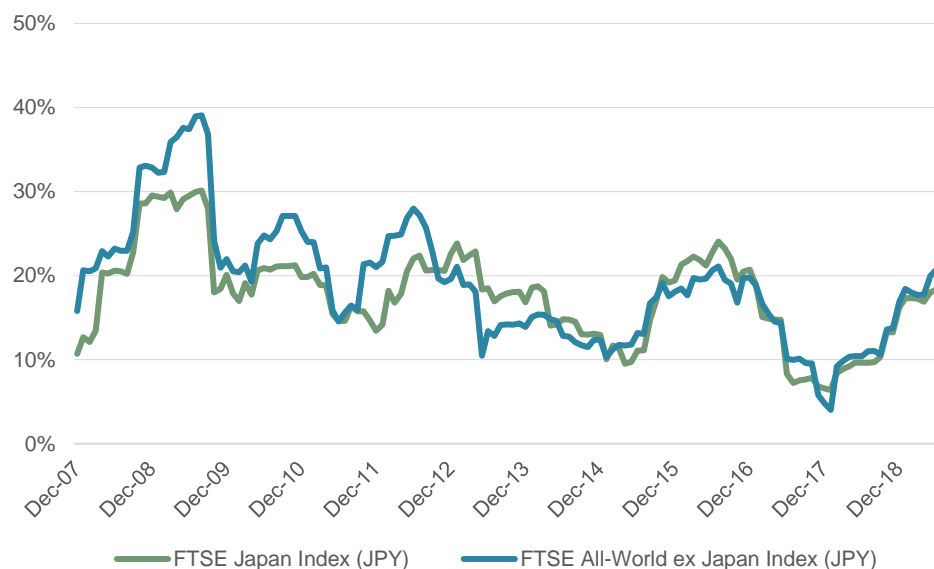
Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

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

Inspecting the volatility between Japanese and overseas equities, Chart 39 shows Japanese equities were noticeably less volatile than overseas equities until 2012, then exhibited similar levels of volatility thereafter – even as it has steadily declined for both since 2008.

Japanese equities have been less volatile than overseas equities up to 2012 and became similarly volatile thereafter.

**Chart 39: 1Y rolling annualized volatility of the FTSE Japan Index and the FTSE All-World ex Japan Index (JPY) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

We observe the same patterns in Chart 40, which shows the relative volatility of Japanese equities versus overseas equities.

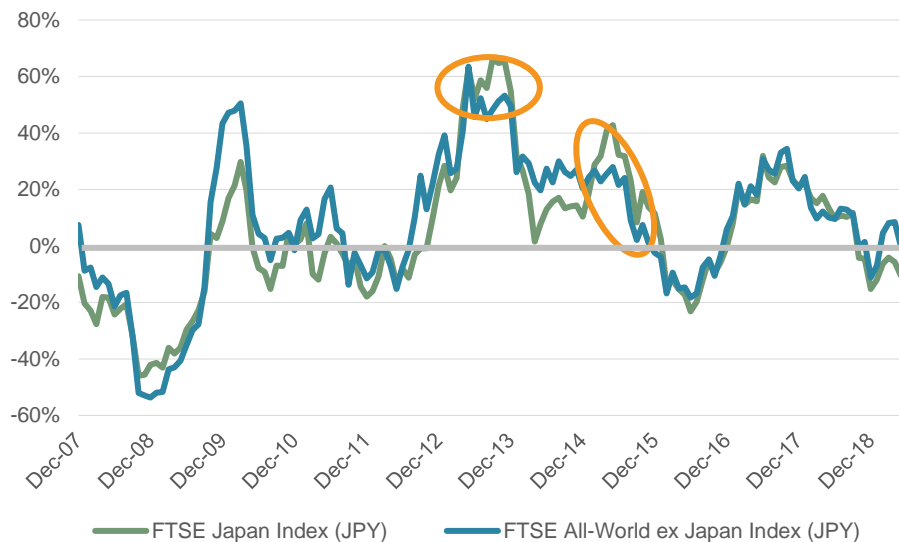
**Chart 40: 1Y rolling annualized volatility difference of the FTSE Japan Index and the FTSE All-World ex Japan Index (JPY) – Relative**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

From a rolling-return basis, Chart 41 highlights that, with few exceptions, overseas equities have mostly outperformed Japanese equities in yen terms since 2008 – although the picture is more mixed than in other markets. The largest upturn in Japanese equities occurred during 2015, when the Bank of Japan stepped up its purchases of domestic equities and other assets.

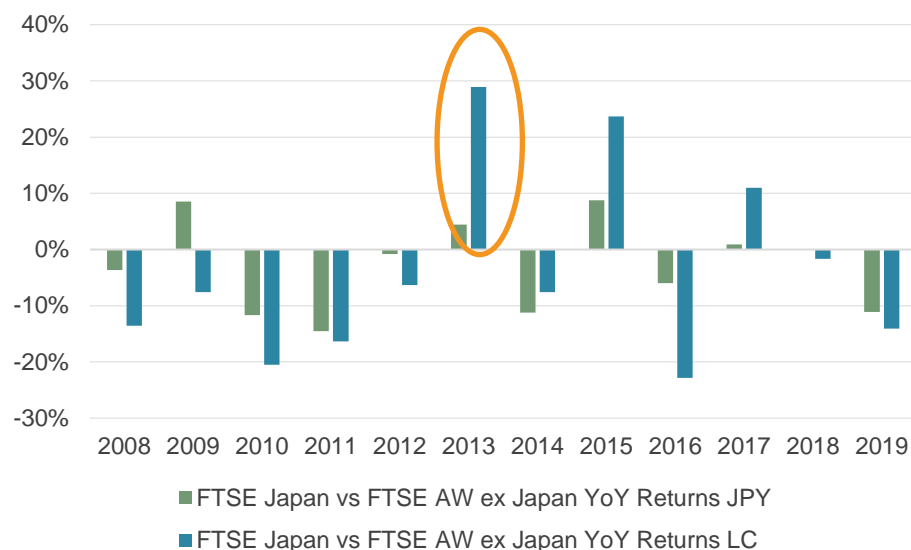
**Chart 41: 1Y rolling returns of the FTSE Japan Index and the FTSE All-World ex Japan Index (JPY) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 42 plots the year-on-year relative performance of Japanese equities versus overseas equities in yen (green bars) and local currency (blue bars). As shown in yen terms, Japanese equities underperformed overseas equities in all, but three years and two performed in line during 2017 and 2018. While Japanese outperformance was strongest in 2013 and 2015, relative returns were significantly higher in local currency terms than in yen, reflecting the weak yen in those years. This contrasts with the market's performance in 2008, when the strengthening yen improved returns in yen, and since 2016, another period of strong yen appreciation.

**Chart 42: Year-on-year returns of the FTSE Japan Index and the FTSE All-World ex Japan Index in JPY and local currency – Relative**

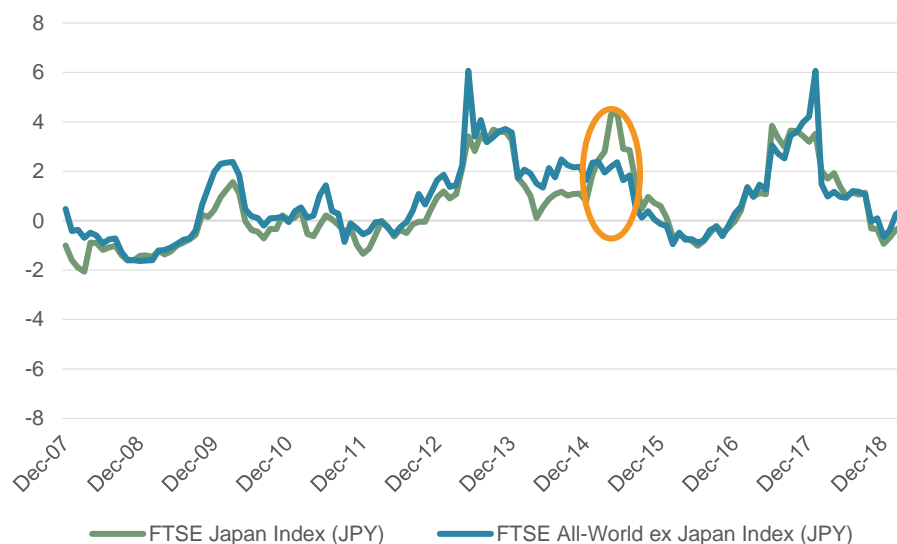


Japanese outperformance was strongest in 2013, but the weak yen significantly reduced returns for Japanese yen investors.

Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

As the next return/risk chart shows, overseas equities delivered marginally better risk-adjusted returns than Japanese equities for most of the period examined.

**Chart 43: 1Y rolling return/risk ratios of the FTSE Japan Index and the FTSE All-World ex Japan Index (JPY)**

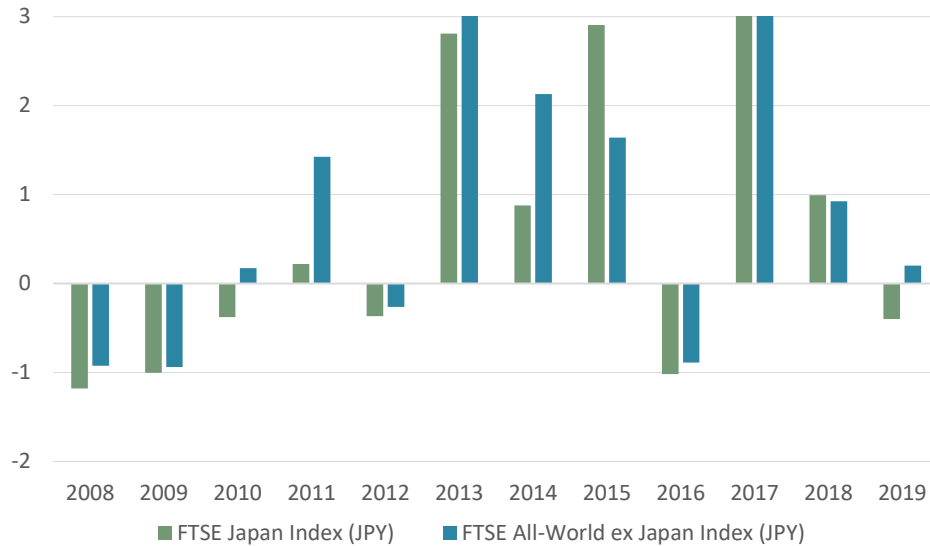


Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.



A review of the discreet periods in Chart 44 shows that overseas equities have generated better or equal risk-adjusted returns in 10 out of 12 periods. The only two exceptions were in 2015 and 2018, although the difference in 2018 was marginal.

**Chart 44: Year-on-year return/risk ratios of the FTSE Japan Index and the FTSE All-World ex Japan Index – Absolute**



Our research indicates that a 4.3-times home bias would have been negative overall for Japanese investors, as Japanese equities underperformed overseas equities in all but three years.

Source: FTSE Russell June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

## Conclusion

With Japanese equities underperforming overseas equities on a risk-adjusted basis in 10 of the 12 years reviewed, we conclude that a 4.3-times home bias would have represented a significant opportunity cost for Japanese investors over this period.

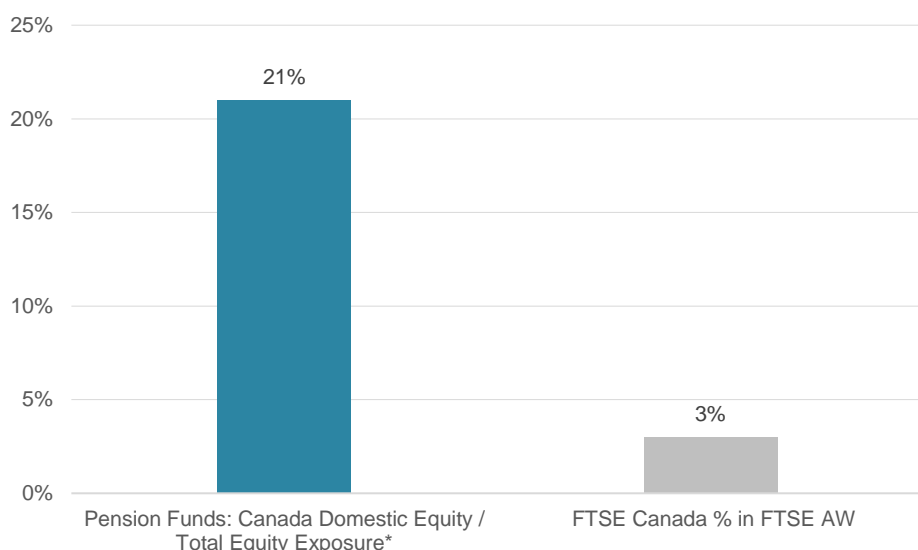
## Regional analysis

### Canada

In Chart 1, we saw that pension funds in Canada had allocated about 38% of their total assets to equities in 2018, of which just 21% was invested in the domestic market. Dividing this number by the weight of Canada in the FTSE All-World Index (3%) gives a home-bias ratio of seven times (Chart 45).

Canada has a home-bias ratio of seven times its weight in the FTSE All-World.

**Chart 45: Home-bias ratio for Canada**



Source: \*Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019,"<sup>4</sup> FTSE Canada and FTSE All-World Index as of December 31, 2018.

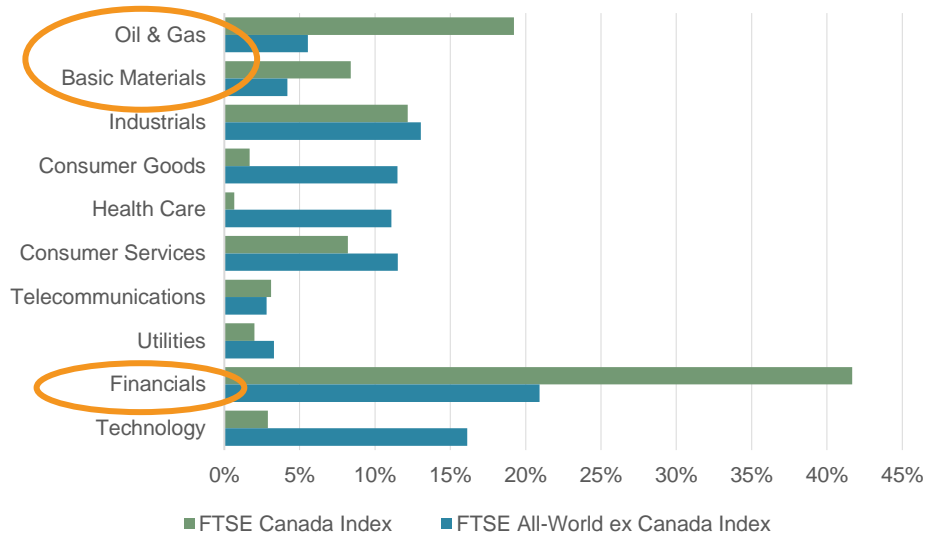
### Understanding the Canadian equity market

To better understand how home bias affects performance, it is important to examine, both the Industry Group (ICB) exposures and the composition of corporate revenue sources.

As seen in Chart 46, the breakdown by industry demonstrates that the Canadian equity market (represented by the FTSE Canada) is heavily skewed toward commodities and financials compared to its international peers (represented by the FTSE All-World ex Canada). Combined, oil & gas, basic materials and financials make up about 70% of the total market. A home bias to the Canadian domestic market would result in a substantial exposure to these industries.

**Chart 46: Canada and overseas industry weights (%)**

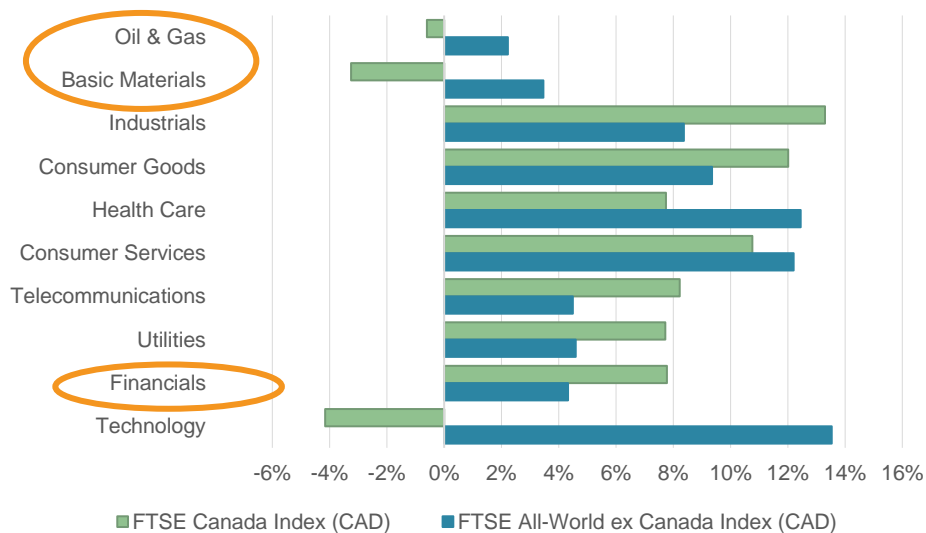
Financials, oil & gas and basic materials represent about 70% of the FTSE Canada.



Source: FTSE Russell; data using FTSE Canada and FTSE All-World ex Canada as of June 28, 2019.

Chart 47 shows that Canadian oil & gas and basic materials, among the market's largest overweights, have underperformed their overseas peers over the last 12 years, while Canadian financials has outperformed.

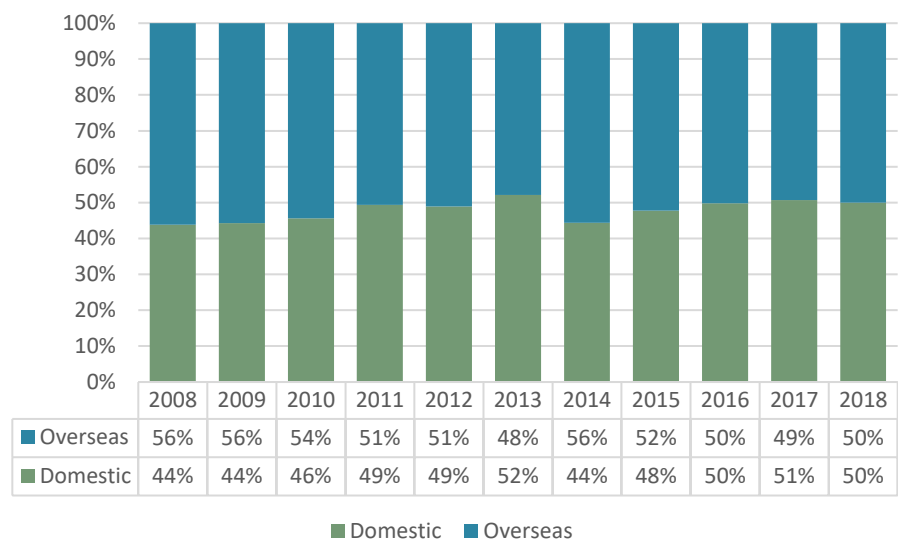
**Chart 47: Canada and overseas average annualized industry returns in Canada % (2008-2019)**



Source: FTSE Russell; Industry Classification benchmark using FTSE Canada Index and FTSE All-World ex Canada Index, total returns in CAD from between December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Returns shown prior to index launch represent hypothetical, historical data. Please see the end for important legal disclosures.

By comparing revenue sources, we see that Canadian equities have derived their revenues equally between domestic and overseas over the last 10 years (Chart 48).

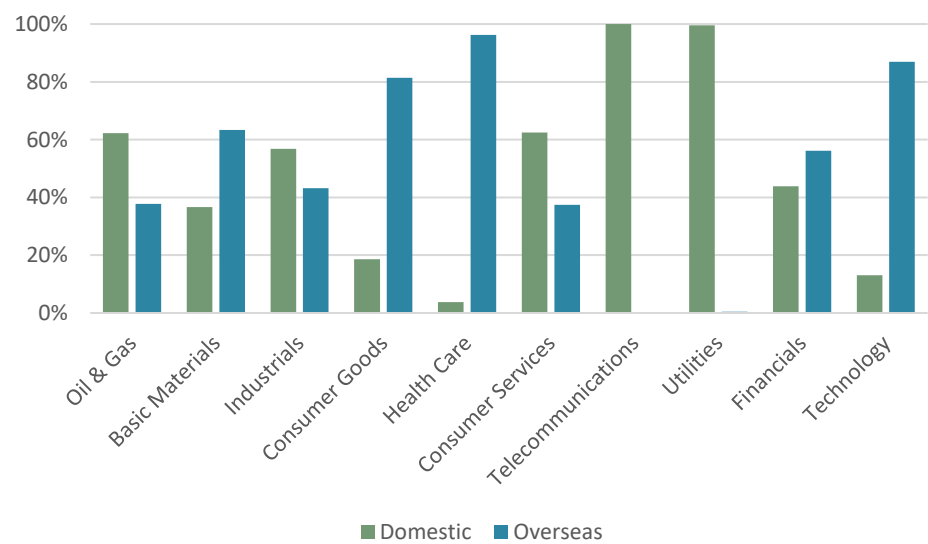
**Chart 48: Breakdown of the FTSE Canada Index by domestic and overseas revenues (%)**



Source: FTSE Russell as of December 31, 2018.

Examining the revenue breakdowns by industry, we find that Canadian basic materials, consumer goods, health care, financials and technology companies have the highest exposure to overseas revenues (Chart 49).

**Chart 49: FTSE Canada Index domestic and overseas revenues breakdown by industry (%)**



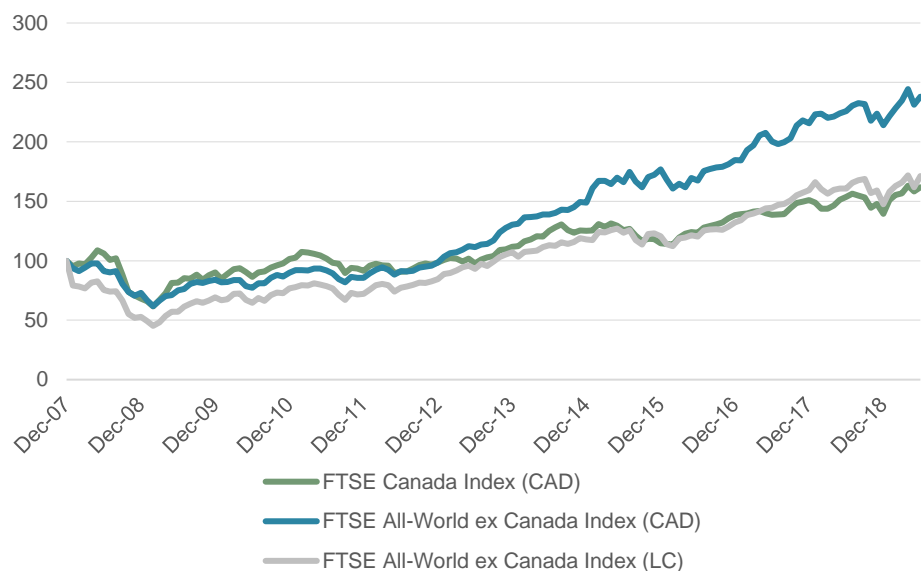
Source: FTSE Russell's Industry Classification Benchmark (ICB) as of December 31, 2018.

## Assessing the effect of Canadian home bias: performance

Chart 50 compares the performance of Canadian equities (FTSE Canada) with that of overseas equities (FTSE All-World ex Canada), expressed in Canadian dollar and local currency terms, to strip out the currency effect. An appreciating currency diminishes the overseas returns (in CAD) of a Canadian-based investor (and vice versa).

On a cumulative basis, overseas equities have outperformed Canadian equities since 2008, indicating that a home bias would have been negative for Canadian investors. Between 2008 and 2011, Canadian and overseas equities have performed in line, with Canadian equities outperforming for a brief period. However, the performance diverged from 2013, when Canadian equities underperformed overseas equities as the weak Canadian dollar significantly boosted overseas equity returns, in Canadian dollar terms.

**Chart 50: Cumulative returns of the FTSE Canada Index and the FTSE All-World ex Canada Index in CAD & local currency, rebased**

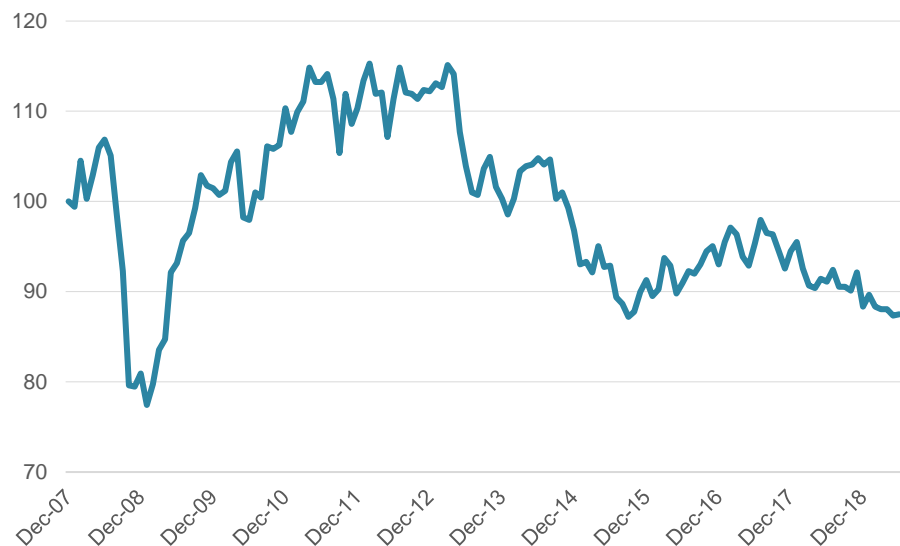


The performances of FTSE Canada and FTSE All-World ex Canada began to diverge in 2013, reflecting the weaker Canadian dollar.

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

In Chart 51, the trade-weighted performance of the Canadian dollar against a basket of foreign currencies shows that the Canadian dollar has weakened since 2013, after appreciating earlier in the period.

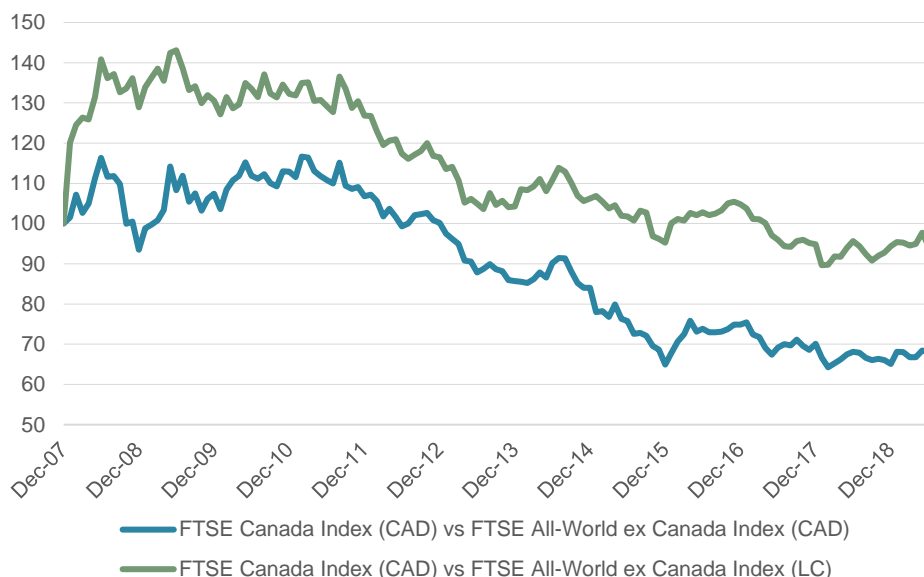
**Chart 51: Trade-Weighted CAD Index, rebased**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

Another way of looking at performance is on a relative basis. Chart 52 underscores the impact of Canadian dollar fluctuations on relative performance. As shown, Canadian equities began trailing overseas equities in 2012-2014, with the underperformance being far more pronounced in Canadian dollar terms (blue line) than in local currency terms (green line). However, in local currency terms, Canadian equities had a more modest underperformance.

**Chart 52: Relative total returns of the FTSE Canada Index versus the FTSE All-World ex Canada Index (CAD & local currency), rebased**



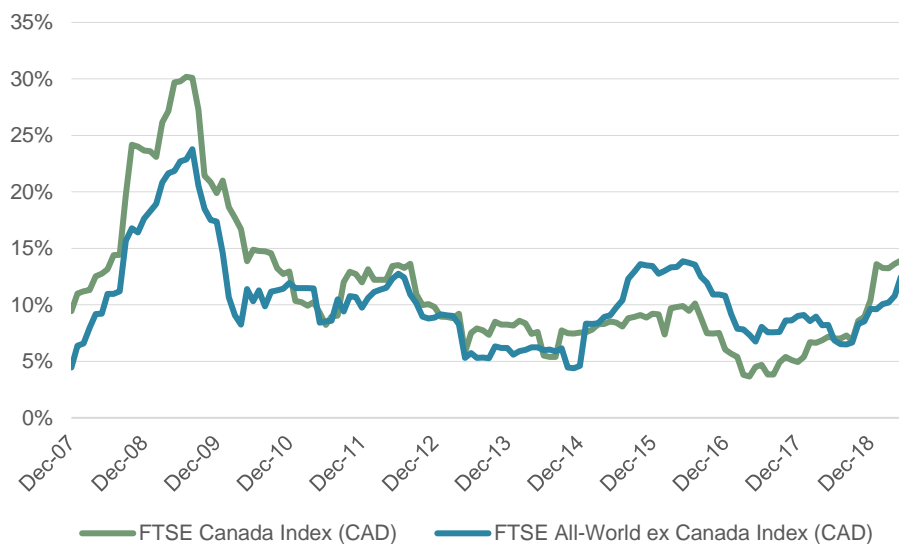
Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Canadian equity underperformance versus global peers since 2013 has been far more pronounced in Canadian dollar than in local currency, reflecting the weak Canadian dollar.

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

Chart 53 shows that Canadian and overseas equities have had similar levels of volatility for most of the post-crisis period.

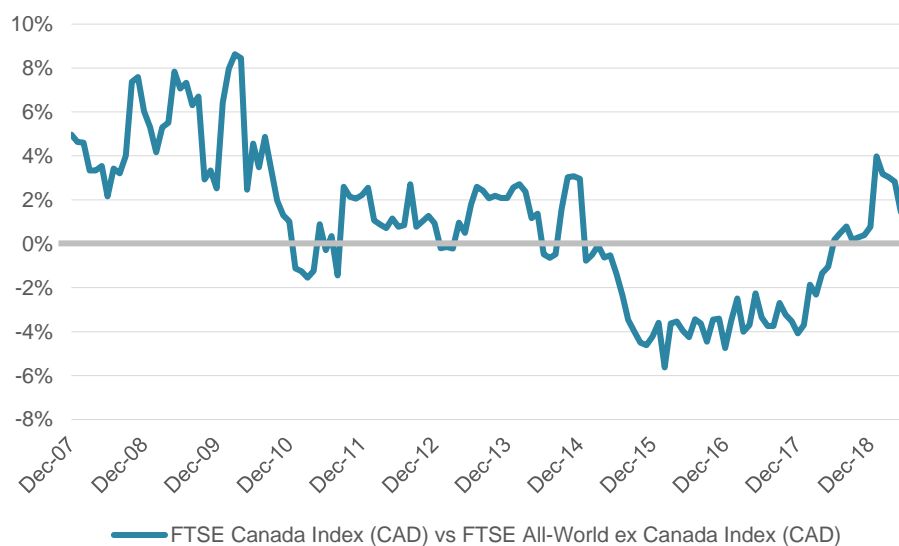
**Chart 53: 1Y rolling annualized volatility of the FTSE Canada Index and the FTSE All-World ex Canada Index (CAD) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

Viewed from a relative perspective (Chart 54), Canadian equities were more volatile than their overseas peers between 2008 and 2011, similarly volatile between 2011 and 2015 and less volatile between 2015 and 2018, although the differences have been confined within narrow bounds.

**Chart 54: 1Y rolling annualized volatility difference of the FTSE Canada Index and the FTSE All-World ex Canada Index (CAD) – Relative**

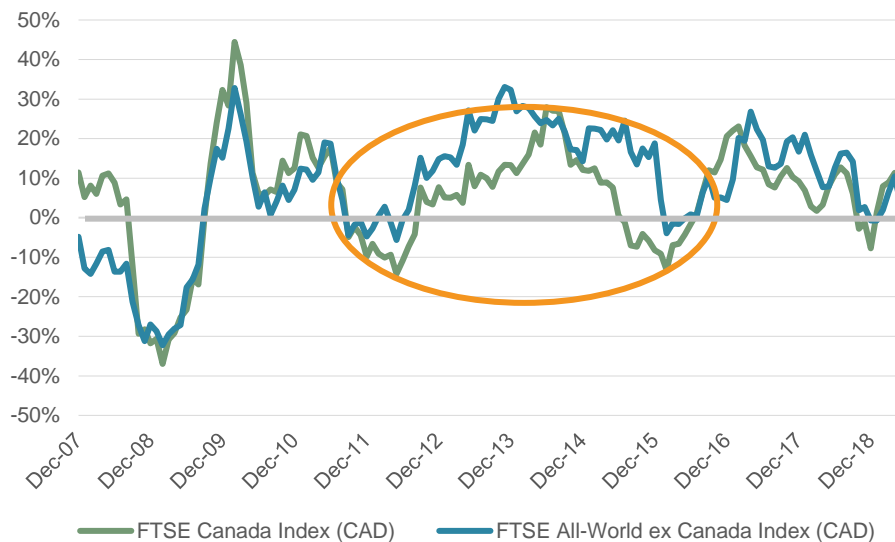


Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

Following the global financial crisis, the difference between Canadian and overseas equity volatility has not been large, although Canadian equities have been generally less volatile since 2011.

On a rolling-returns basis, overseas equities have outperformed Canadian equities (in CAD) for most of the period, except between 2008 and 2010 (in the aftermath of global financial crisis, when Canadian equities were also more volatile). The more painful periods for Canadian-based investors occurred in 2010-2015, when overseas equities outperformed.

**Chart 55: 1Y rolling returns of the FTSE Canada Index and the FTSE All-World ex Canada Index (CAD) – Absolute**

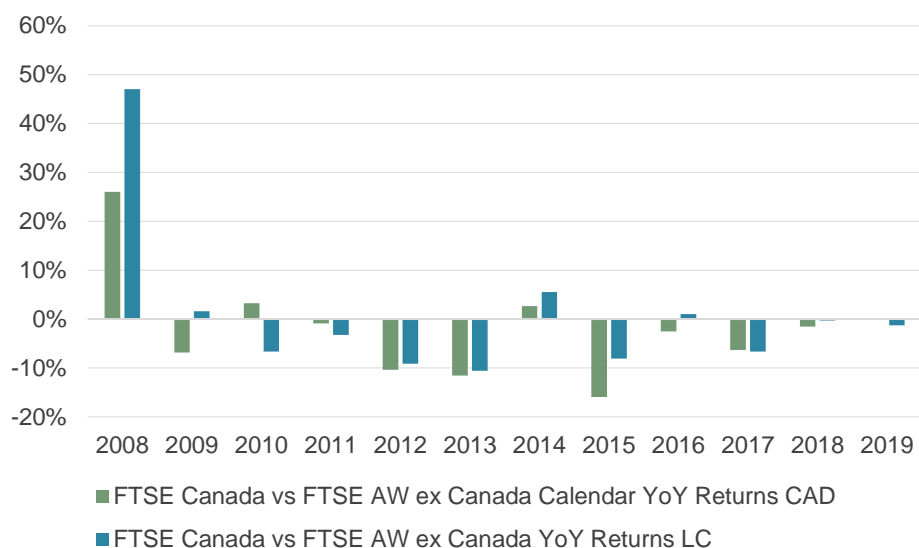


Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 56 plots the discreet relative performances of Canadian equities versus overseas equities, in both Canadian dollar (green bars) and local currency (blue bars). The period saw overseas equities outperforming Canadian equities in nine of the 12 years, or 75% of the time. Moreover, the currency effects of the weak Canadian dollar reduced returns for Canadian investors (difference between the green and blue bars) in seven of the 12 periods. The only year in which Canadian equities outperformed their overseas peers with some magnitude was in 2008, although returns were lower for Canadian investors, reflecting Canadian dollar depreciation.



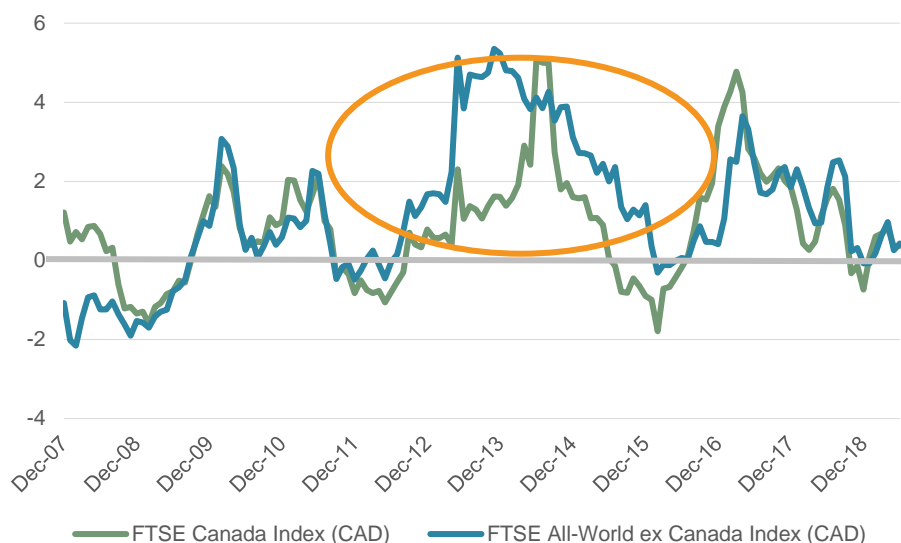
**Chart 56: Year-on-year returns of the FTSE Canada Index and the FTSE All-World ex Canada Index (CAD & local currency) – Relative**



Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

As Chart 57 illustrates, Canadian equities generated similar or lower returns per unit of risk than overseas equities for most of the period. The period between 2012 and 2016 was particularly painful for Canadian investors with a home bias.

**Chart 57: 1Y rolling return/risk ratios of the FTSE Canada Index and the FTSE All-World ex Canada Index – Absolute**

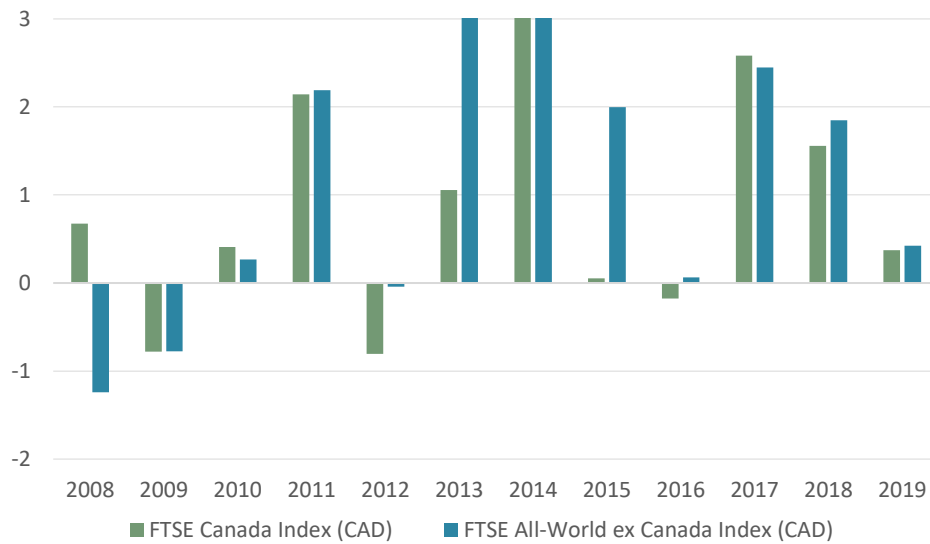


Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

A review of risk-adjusted returns over discreet periods reinforces the observations from the time series above. Canadian equities generated higher risk-adjusted returns than overseas equities, in all, but three years (2008, 2010 and 2017), although only marginally so marginal in the last two periods.

**Chart 58: Year-on-year return/risk ratio of the FTSE Canada Index and the FTSE All-World ex Canada Index (CAD) – Absolute**

Home bias did not pay off for Canadian investors in nine of the 12 years.



Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

## Conclusion

Therefore, given the underperformance of Canadian equities for most of the last 12 years, the home bias of seven times would have been a negative for Canadian investors, especially during the 2012-2016 period.

## Regional analysis

### Australia

In Chart 1, we saw that pension funds in Australia had allocated 47% of their total asset allocation to equities in 2018, of which an estimated 52% was invested in the domestic market. Dividing the latter number by the weight of Australia in the FTSE All-World Index (2%) produces a ratio of 26 times, by far the largest of the five markets we studied.

**Chart 59: Home-bias ratio for Australia**



The 26 times home-basis ratio for Australia is by far the largest of the five markets we studied.

Source: \*Thinking Ahead Institute, Willis Towers Watson "Global Pension Assets Study 2019,"<sup>4</sup> and FTSE All-World as of December 31, 2018.

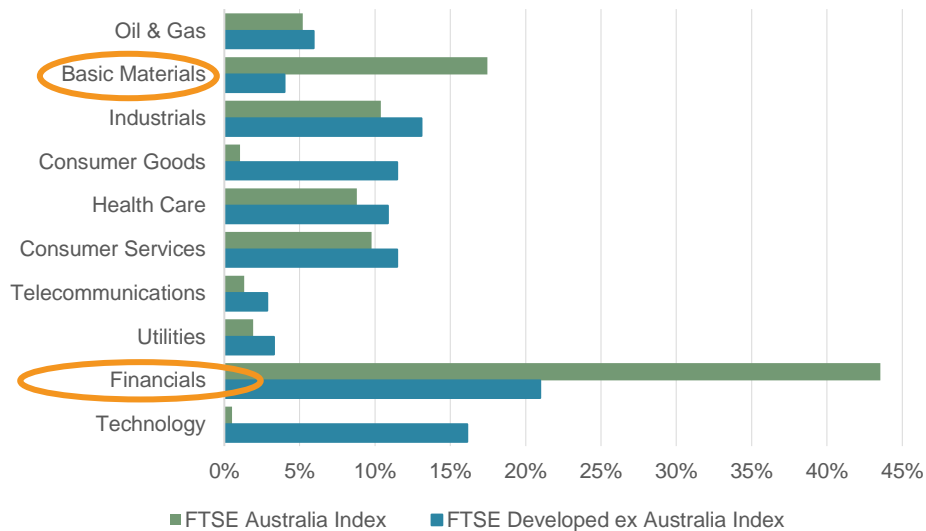
### Understanding the Australian equity market

To better understand how home bias affects performance, it is important to examine both the Industry Group (ICB) exposures and the composition of corporate revenue sources.

As seen in Chart 60, the Australian equity market (represented by the FTSE Australia Index) is heavily concentrated in two prominent industries – basic materials and financials (including real estate, which account for about 7% of financials). The two industries account for more than 60% of the total market cap. The FTSE Australia Index is also significantly underweighted in technology and consumer goods.

**Chart 60: Australia and overseas industry weights (%)**

The Australian equity market is concentrated in basic materials and financials relative to the global index.

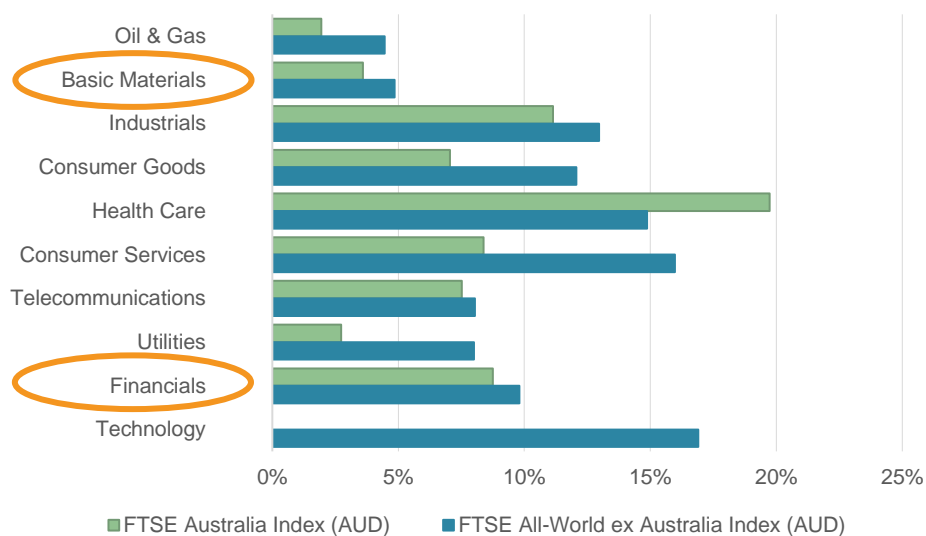


Source: FTSE Russell; data using FTSE Australia Index and FTSE All-World ex Australia Index as June 28, 2019.

As Chart 61 shows, Australian basic materials and financials have both underperformed their overseas counterparts over the period examined. Australian health care was the only outperforming industry.

**Chart 61: Australia and overseas average annualized industry returns % (2008-2019)**

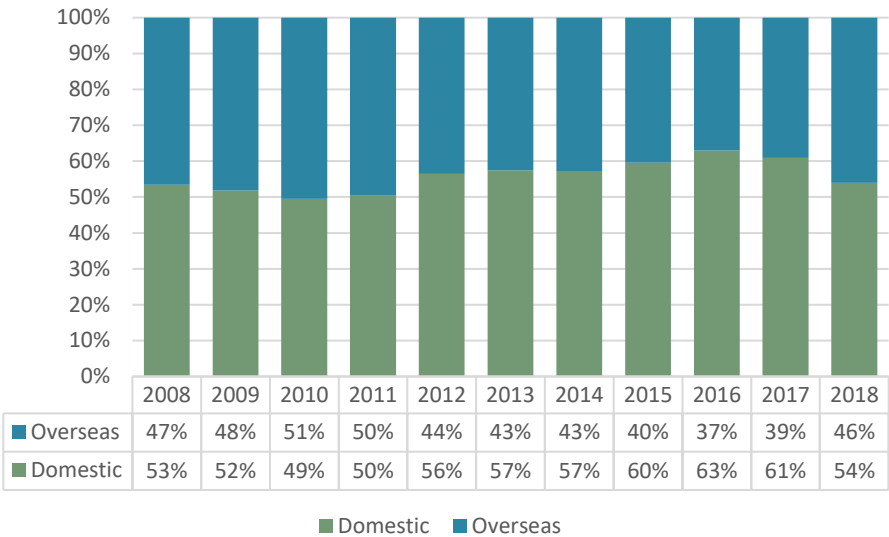
Australian basic materials and financials have underperformed their overseas counterparts.



Source: FTSE Russell; data using FTSE Australia and FTSE Developed ex Australia total returns in AUD from Industry Classification Benchmark between December 31, 2007 and June 28, 2019 (Q2). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

By comparing revenue sources, we see that Australian equities have derived their revenues evenly between domestic and overseas over the last 10 years (Chart 62).

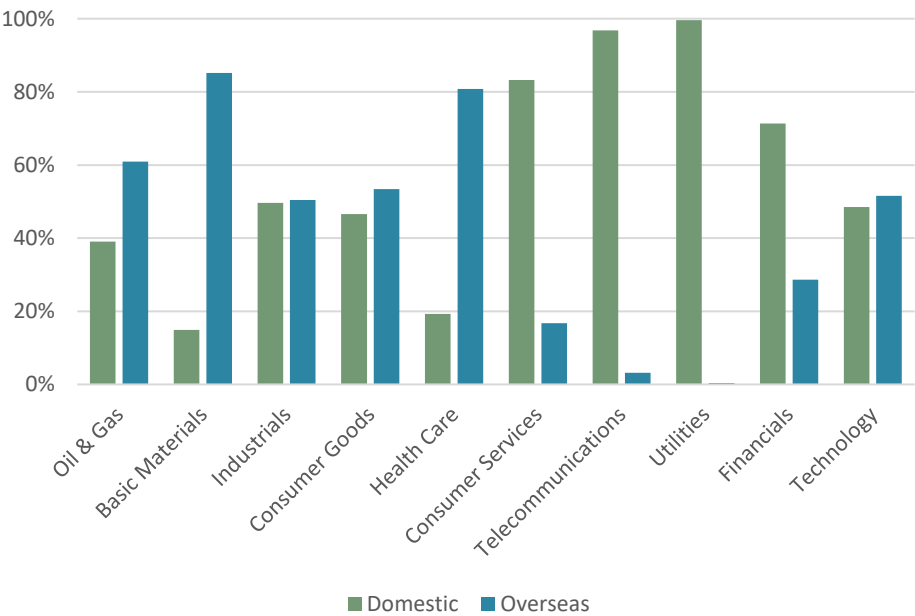
**Chart 62: Breakdown of the FTSE Australia Index by domestic and overseas revenues (%)**



Source: FTSE Russell as of December 31, 2018.

Examining the revenue breakdowns by industry, we find that Australian basic materials, oil and gas and health care companies are heavily dependent on overseas revenues (Chart 63).

**Chart 63: FTSE Australia Index domestic and overseas revenues breakdown by industry (%)**



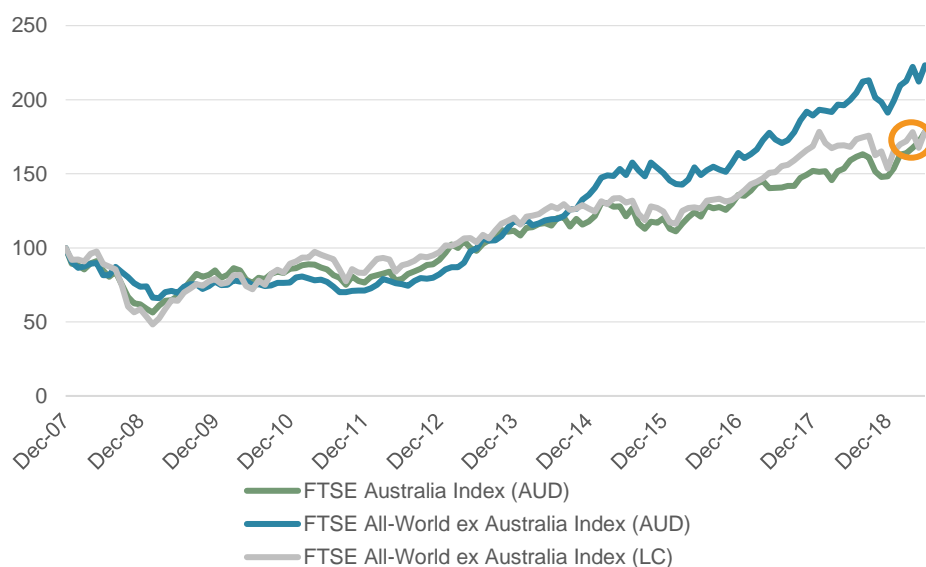
Source: FTSE Russell as of December 31, 2018 using Industry Classification Benchmark.

## Assessing the effect of Australian home bias: performance

In Chart 64, we compare the performance of Australian equities (FTSE Australia) against the global index (FTSE All-World ex Australia), in Australian dollar and local currency terms, to strip out the currency effect. A depreciating currency improves the overseas equities returns (in AUD) of an Australian-based investor (and vice versa).

On a cumulative basis, overseas equities have outperformed Australian equities over the last decade or so. In Australian dollar terms, overseas equity returns began diverging from those of Australian equities in 2014. However, the cumulative performance of both Australian and overseas equity markets has been similar, in local currency terms, during the period.

**Chart 64: Cumulative total returns of the FTSE Australia Index (AUD) and the FTSE All-World ex Australia Index (AUD & local currency), rebased**

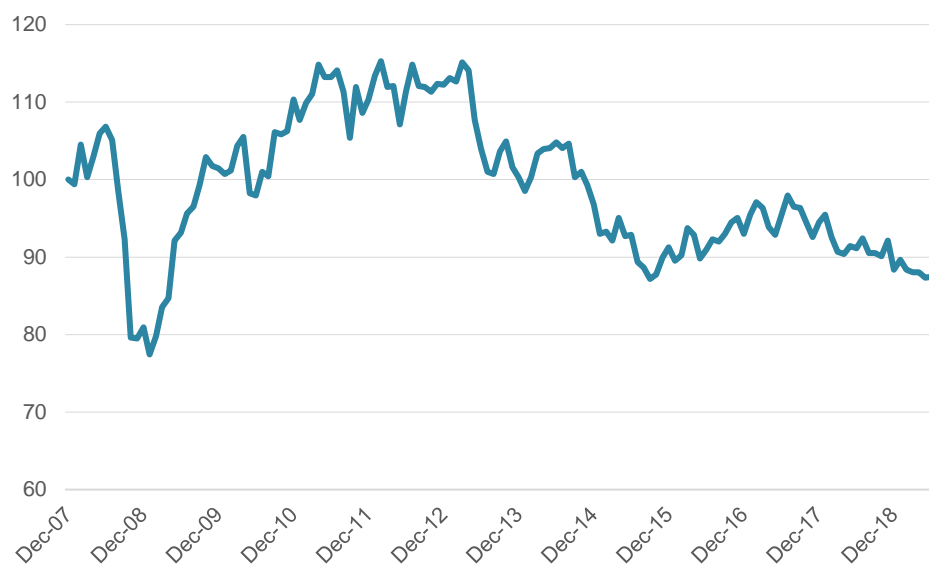


The performance of Australian equities has been similar to overseas equities during the last 12 years but was significantly lower than that of overseas equities (in AUD), due to the weak Australian dollar.

Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Looking at the trade-weighted movements of the Australian dollar against a basket of foreign currencies, Chart 65 shows that the Australian dollar appreciated up until 2012-2013 and has weakened since then.

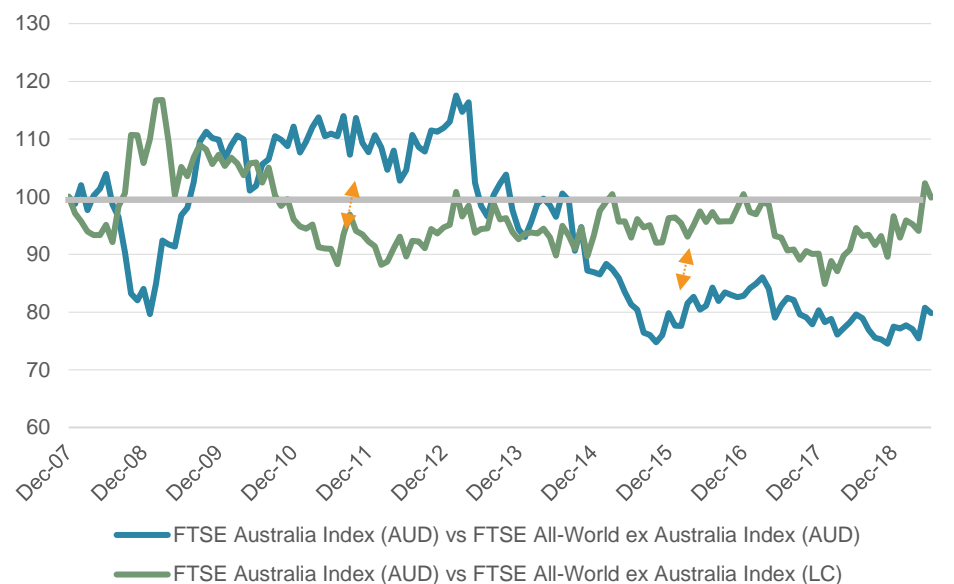
**Chart 65: Trade-Weighted AUD Index, rebased**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

A closer inspection, however, reveals variations in performance during the period. In Australian dollar terms, Australian equities outperformed overseas equities until 2013 and underperformed thereafter. In local currency terms, except for the period immediately after the global financial crisis, returns for both overseas and Australian equities have been similar. The underperformance of Australian equities since 2013 has been more pronounced in Australian dollars (blue line) than in local currency terms (green line), reflecting the negative effects from the weak Australian dollar.

**Chart 66: Relative total returns of the FTSE Australia Index (AUD) versus the FTSE All-World ex Australia Index (AUD & local currency), rebased**



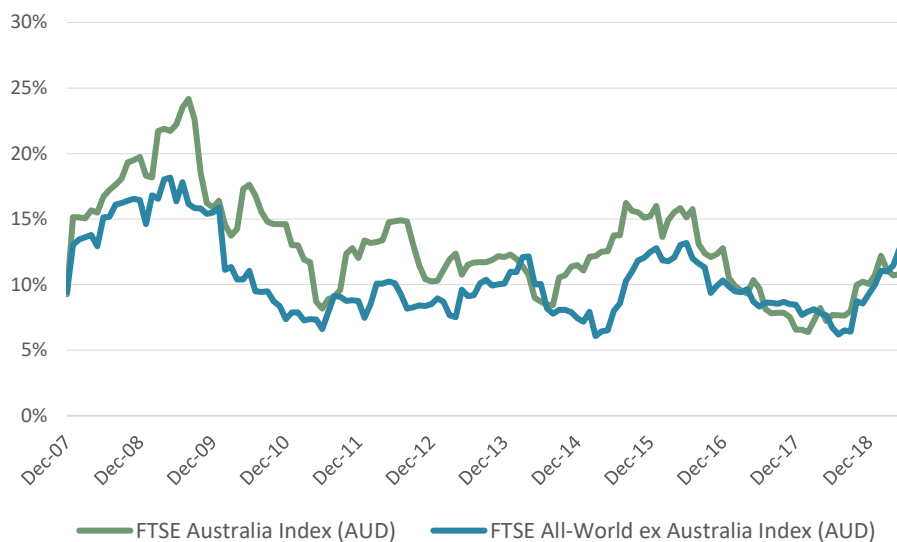
Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The trade-weighted performance shows the Australian dollar appreciating up to 2012, then depreciating thereafter.

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

Moreover, Australian equities have also been more volatile than their overseas peers during the period examined (Chart 67).

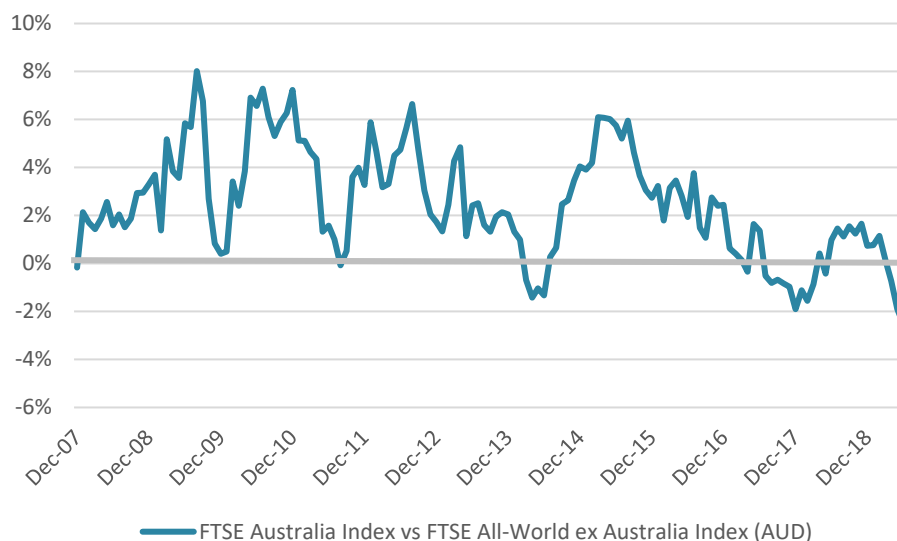
**Chart 67: 1Y rolling annualized volatility of the FTSE Australia Index (AUD) and the FTSE All-World ex Australia Index (AUD) – Absolute**



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019).

Chart 68 compares the relative volatility between overseas and Australian equities. Australian equities have generally been more volatile than overseas equities during the period, except in 2014, 2017 and 2019.

**Chart 68: 1Y rolling annualized volatility difference of the FTSE Australia Index (AUD) and the FTSE All-World ex Australia Index (AUD) – Relative**

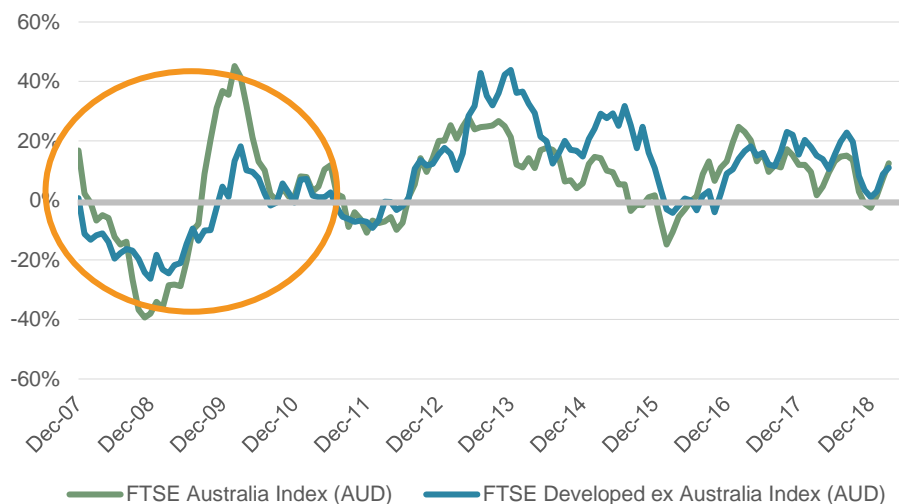


Source: FTSE Russell from December 31, 2007 June 28, 2019 (Q2 2019).



On a rolling-returns basis, Australian equities mostly outperformed overseas equities until 2011, and generally underperformed thereafter (Chart 69).

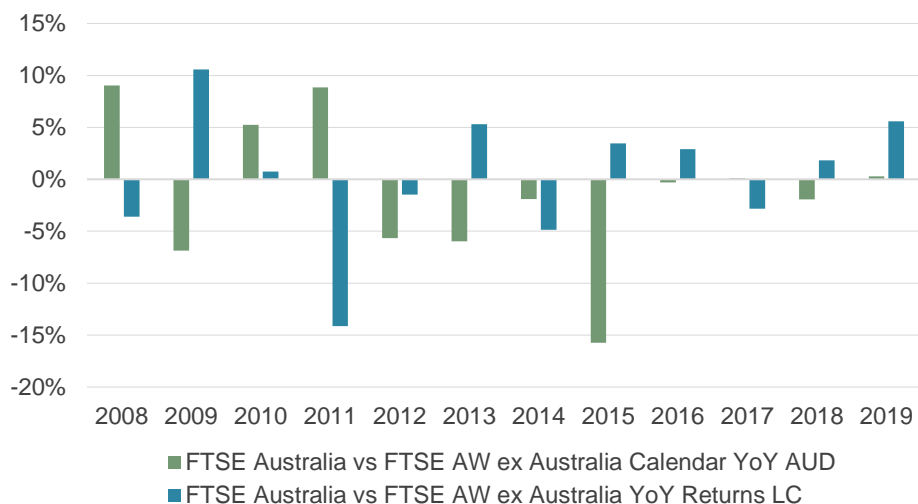
**Chart 69: 1Y rolling returns of the FTSE Australia Index vs the FTSE All-World ex Australia Index, AUD – Absolute**



Source: FTSE Russell December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 70 illustrates the profound impact of fluctuations in the Australian dollar on relative Australian equity performance, as evidenced by the wide disparity in returns in Australian dollars (green bars) and local currency (blue bars). Australian equities outperformed their overseas peers in Australian dollars in 2008, 2010 and 2011, coinciding with periods of Australian dollar appreciation. The strong Australian dollar also helped limit the underperformance of Australian equities for domestic investors in 2014 and 2017. Nonetheless, the weaker currency reduced relative returns in half of the years from 2012 onwards (especially in 2015).

**Chart 70: Year-on-year returns of the FTSE Australia Index (AUD) vs the FTSE All-World ex Australia Index (AUD & local currency) – Relative**

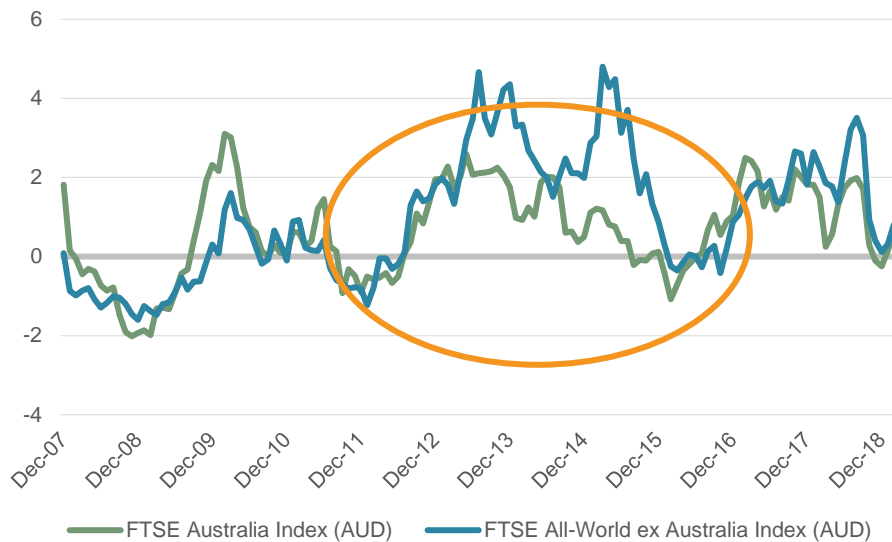


Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Chart 71 reaffirms that the period between 2012 and 2016 was the most painful for Australian investors, when the risk-adjusted returns of Australian equities were lower than those of overseas equities, in Australian dollar. Both markets registered similar risk-adjusted returns in the interval periods.

**Chart 71: 1Y rolling return/risk ratios of the FTSE Australia Index and the FTSE All-World ex Australia Index (AUD)**

Australian equities significantly underperformed and were more volatile than overseas equities for most of the period examined.



Source: FTSE Russell from December 31, 2007 to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

The histogram in Chart 72 clearly shows that overseas equities had better risk-adjusted returns than Australian equities from 2012 onwards, with 2013 and 2015 being the standout years. This means for nearly half of the period examined, overseas equities had better risk-adjusted returns than Australian equities.

**Chart 72: Year-on-year return/risk ratios of the FTSE Australia Index and the FTSE All-World ex Australia Index (AUD) – Absolute**



Source: FTSE Russell to June 28, 2019 (Q2 2019). Past performance is no guarantee of future results. Please see the end for important legal disclosures.

## Conclusion

By this analysis, we can conclude that a home bias to Australian equities would have been costly for Australian investors, mostly in the last eight years of the period reviewed. We also note that currency movements have had a material impact on relative performance, with about half of the period seeing returns suffer as a result of Australian dollar weakness, which improved overseas returns for Australian investors.

## 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

Data-driven classification at a granular level.  
The confluence of top-down and bottom-up analysis

MARKET STATUS		SIZE		STYLE		SECTOR (ICB®)	
Developed	Advanced Emerging	Large	Mid	Growth	Value	Industries	Sectors
Secondary Emerging	Frontier	Small	Micro	Defensive	Dynamic	Supersectors	Subsectors

FTSE GEIS is divisible into modular subcomponents, 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-capitalization 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:

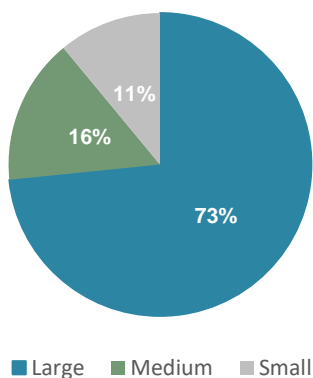
Index	FTSE Global Total Cap	FTSE Global All Cap	FTSE All-World	FTSE Global Small Cap	FTSE Global Micro Cap
<b>Include cap segments</b>	Large, Mid, Small, Micro	Large, Mid, Small	Large, Mid	Small	Micro
<b>%of FTSE Global Total Cap Index</b>	100%	98%	87%	11%	2%
<b>Net Mcap (USDt)</b>	54.0	52.8	47.0	5.8	1.1
<b>Number of constituents</b>	17,294	8,910	3,928	4,982	8,384

Source: FTSE Russell, data as of June 28, 2019.

### Summary of the FTSE Global All Cap Index features

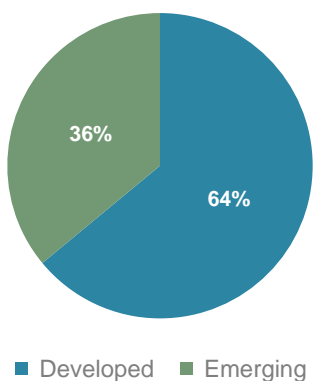
Charts 73 and 74 show the size and regional breakdown of the FTSE Global All Cap Index and Table 2 provides more granular segmentation, including the number of constituents. For the FTSE Global All Cap Index, 73% of the index is made up of large companies and 64% is classified as Developed.

**Chart 73: FTSE Global All Cap Index – percentage of total market cap by size**



Source: FTSE Russell as of June 28, 2019.

**Chart 74: FTSE Global All Cap Index – percentage of total market cap segmented by Developed and Emerging companies**



Source: FTSE Russell as of June 28, 2019.

**Table 2: Further size and constituent numbers breakdown by Developed and Emerging**

FTSE Global All Cap Index Composition Breakdown		
Index	%	Constituent numbers
<b>Developed (of which)</b>	<b>64%</b>	<b>5,711</b>
Large	73%	911
Medium	16%	1,266
Small	11%	3,534
<b>Emerging (of which)</b>	<b>36%</b>	<b>3,199</b>
Large	80%	865
Medium	11%	886
Small	9%	1,448
<b>Total</b>	<b>100%</b>	<b>8,910</b>

Source: FTSE Russell as of June 28, 2018.

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