

# Synthetic Benchmark Replication

Managing Currency Exposure



## Currency considerations when replicating benchmarks

### Executive Summary

There is a common misconception that all synthetic (derivative) instruments used for fixed income and equity benchmark replication, such as market index futures or total return swaps, have both market and currency exposure embedded in their return. While certain instruments do have a combination of currency and market returns, such as with a variety of MSCI index futures, this is notably an exception and not the rule. Thankfully, there are a suite of tools available to institutional investors to ensure they can effectively replicate both market and currency components of their desired exposure. In this short paper, we review different approaches to access currency and market exposure, while addressing some of the nuances around managing currency overlays and instruments that contain exposure to an investor's non-base currency.

## Why worry about currency exposure when replicating benchmarks?

For investors looking for foreign fixed income or equity exposure the currency component of any investment can be an essential element of their strategic decision. When allocating capital to investment vehicles such as pooled funds, segregated accounts or ETFs, investors are buying both the underlying market exposure as well as the underlying currency exposure related to those assets. For example, a EUR-based investor buys units in a pooled fund benchmarked to the S&P 500 Index (Bloomberg Ticker: SPX) to gain exposure to the US equity market and exposure to USD. The desire to access both currency and market exposure should be no different when using synthetic instruments to replicate a benchmark - such as when using futures or total return swaps.

Synthetic instruments are also valuable tools for managing risk within portfolios. For example, accessing market exposure through an overlay to tactically hedge or strategically manage a given asset allocation is key to ensuring that investors have full control over their portfolio. Furthermore, replicating fixed income and equity benchmarks synthetically is an effective liquidity management strategy, as cash can be preserved for investors' operational requirements. Due to the depth of liquidity available within derivative markets, positions and portfolio exposures can be adjusted almost instantaneously, without having to wait for long liquidation cycles or settlement periods.

However, just like any other investment within an investor's portfolio, exposure replicated synthetically aims to adhere to a client's asset allocation (AA) and in-line with the plan's currency hedging policy<sup>1</sup>. If not, there is a risk that investors could introduce undesired risk and possibly even breach their own investment guidelines. As a result, investors must consider and understand both the market and currency elements of their exposures when using synthetic instruments.

## Replicating the total exposure of a target benchmark

The return characteristics of fixed income and equity benchmarks, such as the Bloomberg Barclays Global Aggregate Index (Bloomberg Ticker: LEGATRUU) or the MSCI World Index (Bloomberg Ticker: MXWO), are made up of two main components:

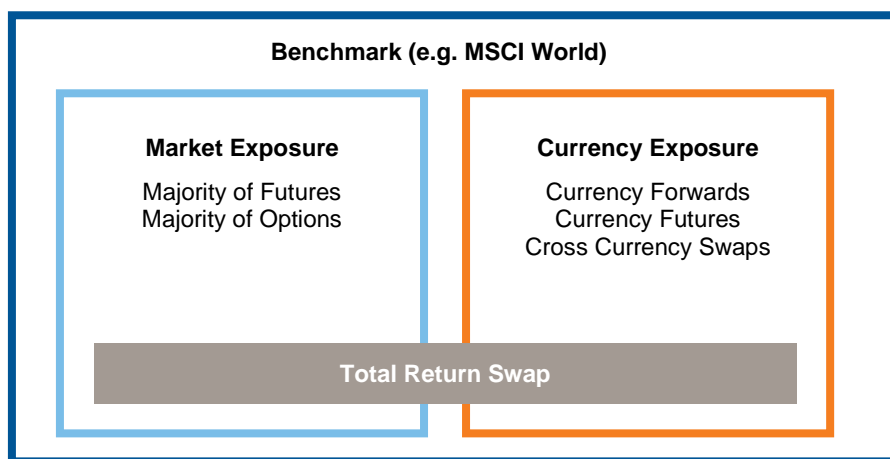
<sup>1</sup> Invariably, investors will also place tactical allocation decisions that might deviate from a plan's AA or hedge ratio. However, this paper focuses on common strategies that focus on passive benchmark replication.

market risk (e.g., equity, credit or interest rates) and currency risk (e.g., exposure to fluctuations in non-base currency). Therefore, to replicate the benchmark returns, investors must ensure the instruments they use are appropriate to obtain both return characteristics.

Some of the most common instruments employed to replicate market exposure synthetically are exchange traded futures, total return swaps, and index options. Investors can use a combination of these instruments to replicate their target benchmark, such as using a basket of regional or country index futures to replicate the MSCI World benchmark. For these types of futures, it is important to understand that many of the contracts available only provide market exposure which is simply delivering the index return of the underlying region or country, rather than the currency return of each regional component of the benchmark. As a result, instruments without any currency return embedded are often referred to as 100% currency hedged, meaning that just like with a 100% hedged share class in a pooled fund, investors receive market return but not the foreign currency return.

If the investor's benchmark is unhedged, (meaning the corresponding non-base currency exposure is intended, they can use a variety of synthetic instruments including currency forwards, exchange-traded futures, cross-currency swaps), or negotiate to have the currency exposure embedded in a total return swap. However, most institutional investors will use a basket of currency forwards due to the flexibility, low cost, and liquidity to obtain currency exposure in the context of a benchmark replication overlay. Exhibit 1 provides an illustration of the two main elements of a benchmark along with typical synthetic instruments used to replicate exposure.

### Exhibit 1: Typical synthetic instruments for benchmark replication



Source: Russell Investments. For illustrative purposes only and not meant to be an exhaustive list.

For the remainder of this paper we focus on the common benchmark replication strategy of using exchange traded futures to access market exposure, coupled with a basket of currency forwards to access currency exposure. By using this approach investors are easily able to tailor an overlay to meet their specific requirements in accordance with their desired AA and currency hedge ratio.

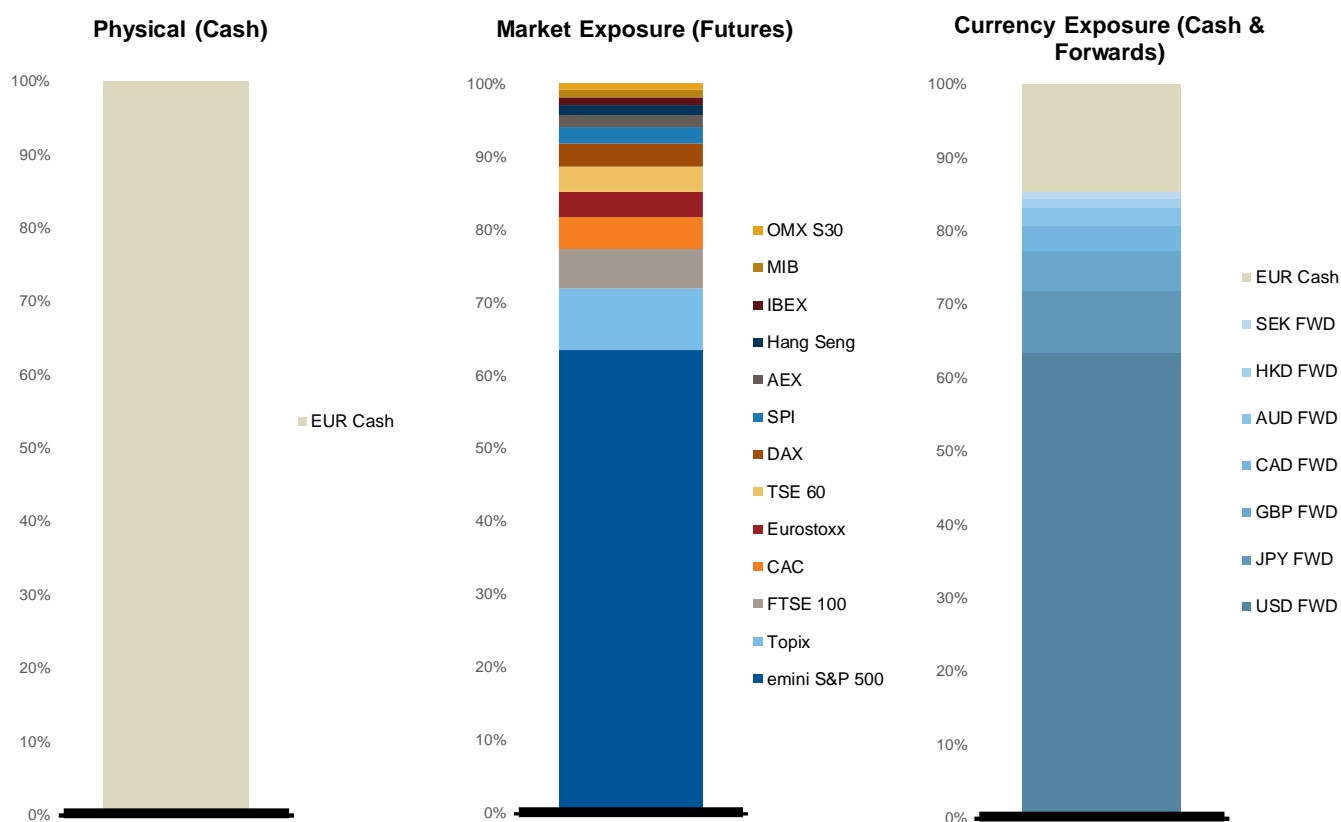
### Example I: Replicating MSCI World unhedged

To provide a practical example, imagine that a EUR-based investor wishes to overlay €100 million of cash in line with the MSCI World Index over a three-month period while they finalise legal documentation to invest in a 3<sup>rd</sup> party manager. The investor has *no* currency hedge ratio (e.g., 100% unhedged) and therefore wants 100% exposure to the underlying currencies of the benchmark.

To replicate the benchmark return, the investor will purchase *both* a basket of country and regional index futures as well as a basket of currency forwards. The futures basket can also be optimised by taking into account the investor's preference around cost (e.g., primarily liquid contracts in the basket) versus tracking error reduction (e.g., a greater number of contracts in the basket). To access the currency component of the benchmark, the investor would use a basket of non-base currency forwards in accordance with the country allocation weights of the index being replicated. Combining both the market and currency exposures ensures that the return received from this synthetic overlay will proxy what would have been achieved by the MSCI World target benchmark.

Exhibit 2 provides an example of the portfolio construction used to replicate the MSCI World Index for a EUR-based investor. An important aspect to note is that the investor would not need to purchase a EUR currency forward as the cash supporting the benchmark replication strategy is already providing the desired EUR exposure.

## Exhibit 2: Replicating MSCI World with 100% currency exposure (100% unhedged)



Source: Russell Investments. For illustrative purposes only.

## Managing currency hedge ratios for benchmark replication

One of the most beneficial aspects of using synthetic instruments to replicate benchmarks is their flexibility. Because most derivative instruments used for benchmark replication have no currency exposure embedded in their return, investors can be flexible in how much currency exposure they ultimately add. This means that any stipulated currency hedge ratio can be taken into account by simply adjusting the size of any currency basket exposure used as part of the benchmark replication.

To account for an investor's hedge ratio, it is important to think first about the starting point. As most index futures are inherently hedged instruments, to achieve a desired hedge ratio, an investor would need to add currency exposure. Because the portfolio starts at 100% hedged, an investor will need to add currency exposure at a rate of  $[100\% - \text{Target Hedge Ratio}]$ . This means that an investor with a 70% target currency hedge ratio would need to put on 30% of the portfolio value in currency exposure.

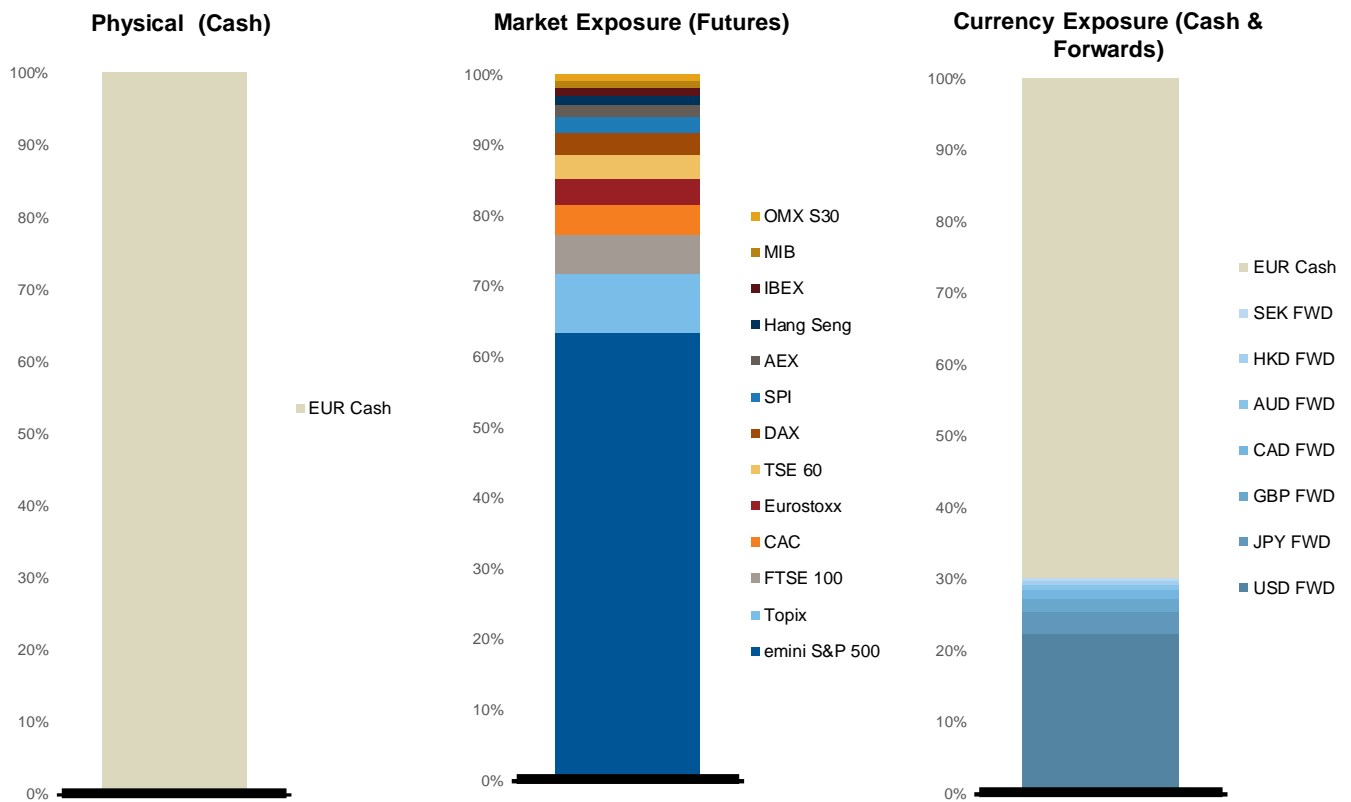
Any synthetic replication strategy is normally kept in line with the overall desired AA and currency hedging strategy. This ensures that the exposures at a plan level adhere with the investment guidelines of the plan and are not breached. All too often, a failure to recognise the importance of matching currency exposure accurately leads to additional unwanted risk in the portfolio.

### Example II: Replicating MSCI World with a 70% currency hedge ratio

Assume the EUR-based investor with €100 million cash desires exposure to MSCI World Index (of which, the U.S. comprises a 63% weight) but with a 70% currency hedge ratio. To replicate a U.S. regional exposure with a 70% currency hedge ratio, the investor would simply use a U.S. market index futures contract (such as the e-mini S&P 500) to target the full 63% allocation (e.g., €63 million of U.S. equity exposure) as well as use a USD/EUR forward contract to target 30% (1-70% hedge ratio) of the regional currency exposure, or 19% (e.g., €19 million of USD currency exposure). As the U.S. equity futures contract essentially has 100% currency hedged exposure for non-U.S. investors, adding additional exposure through a USD/EUR forward contract ensures they maintain their target currency exposure which, in this case, is a 70% hedge ratio.

The following diagram illustrates how a basket would look in practice for a EUR-based investor looking to maintain a 70% currency hedge ratio:

**Exhibit 3: Replicating MSCI World with 30% currency exposure (70% hedged)**



Source: Russell Investments. For illustrative purposes only.

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## Managing futures with embedded currency exposure

The above discussion covers the majority of futures contracts; however, there are a select few synthetic instruments that include both market and currency exposure in their return. A good example of these types of instruments are the commonly traded MSCI futures contracts: the MSCI EAFE (Europe Australasia and the Far East) future (Bloomberg Ticker: MFSA Index),; and the MSCI Emerging Markets future (Bloomberg Ticker: MESA Index). Because the underlying index for these futures is a composite unhedged index itself, these instruments will essentially have 100% of the underlying currency exposure embedded within the return. However, the underlying index is priced against USD and therefore these futures also assume a base currency in USD, meaning to access local currency exposure for the benchmark against an investor's base currency, an investor will need to ensure they are long USD.

For those investors that are USD-based, simply holding the futures contract will ensure they are exposed to the underlying local currencies. For those investors that are non-USD based, they will need to add additional USD exposure via a forward contract. For example, a EUR-based investor wanting both market and currency exposure for the MSCI EAFE index would buy an MSCI EAFE futures contract as well as a USD/EUR forward.

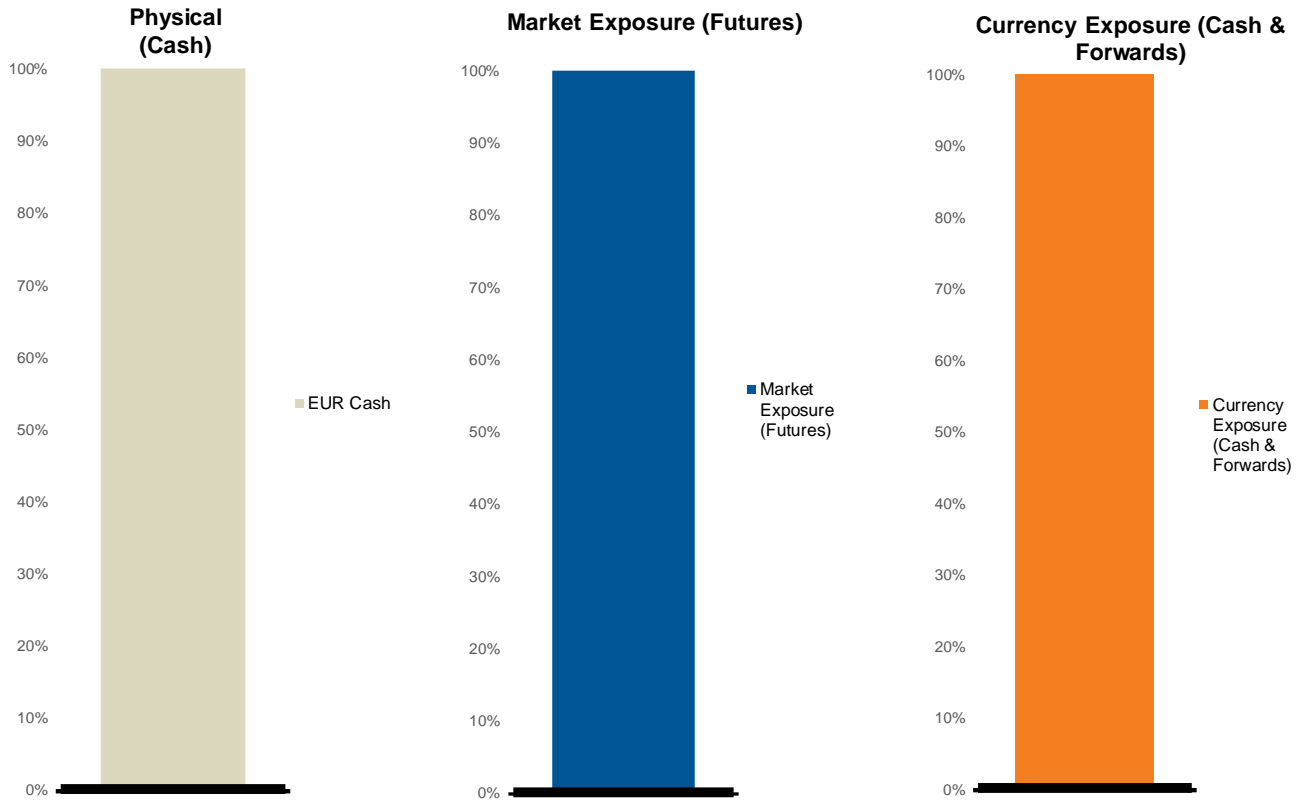
Another aspect to consider is that there are significant differences in how currency exposure is embedded across certain contracts. These differences ultimately depend on the underlying reference index. Often, the reference index currency exposure used to create the futures contract will be different from the quoted currency of the futures contract itself. For example, while the MSCI Taiwan future (Bloomberg Ticker: TWA Index) is quoted in USD, the reference index used is still in TWD. This means that to access both market and currency exposure when using the MSCI Taiwan contract, a TWD currency forward would still be required – despite the contract being quoted in USD. Understanding how currency return is managed in a synthetic instrument is essential to ensure that investors are not adding unintended risk to their portfolio. Ultimately, it will be important for investors to work closely with their implementation partner to ensure they are accessing the appropriate currency exposure.

### Example III: Replicating MSCI Emerging Market unhedged exposure

As a final example, imagine that our EUR-based investor with €100 million of cash wants to replicate the MSCI Emerging Market index (100% unhedged), retaining full exposure to the underlying regional currencies. To achieve this, the investor would simply buy both an MSCI Emerging Market futures contract as well as a USD/EUR forward. If an investor wanted to apply a currency hedge ratio for the local currency exposure (e.g., 50% hedge), investors will normally use a basket of individual country index futures with no embedded currency exposure in lieu of the MSCI Emerging Market future, alongside corresponding regional currency forwards.

Exhibit 4 illustrates how a basket would look in practice for a EUR-based investor desiring to replicate the MSCI Emerging Market index using a single contract with unhedged currency exposure:

#### Exhibit 4: Replicating MSCI Emerging Market unhedged with a single contract



Source: Russell Investments. For illustrative purposes only.

### Concluding thoughts

It is important that any synthetic benchmark replication approach is in line with the overall investment strategy for both the desired market and currency exposures. Thankfully, as outlined in this paper, there are a variety of solutions to ensure that both these exposure elements are managed effectively, while keeping any target hedge ratio in place. Regardless of the approach used to replicate an investor's target benchmark, and considering the nuances involved, it is important to work with your implementation partner to ensure that any synthetic benchmark replication strategy is effective.

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