Passive Insights

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Strategic Beta: GDP-Weighted All Countries Portfolio with ETFs

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Executive Summary

Over the last few years, investors have started to look at alternatively-weighted equity indices as a potential replacement for market-cap-weighted indices in their portfolio.

A particular focus has been put on fundamentally-weighted indices which rely on fundamental factors such as GDP and are deemed to be less market price sensitive than market capitalization indices. One of the goals for such an approach is to avoid some of the identified pitfalls of market-cap-weighted indices such as momentum and overvaluation biases.

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In this paper, we consider the construction of a fundamentally-weighted portfolio of country ETFs using GDP as the fundamental factor:

- The Portfolio we present here is allocated using country ETFs only,
- The Investment Universe is comprised of Developed and Emerging Countries.

This analysis is performed utilising the Model Portfolio methodology which has been developed within DeAWM Passive Asset Management.

Our analysis concludes that:

- **The design of a Strategic Beta methodology such as GDP-weighting is relatively straightforward and its implementation using ETFs can be cost efficient**,
- Weighting countries according to their GDP, as implemented within the **GDP-Weighted Portfolio,** would have led on a simulated basis to a **1.21% p.a. outperformance**[1] **-** net of ETF TER and transaction costs **- compared to the MSCI AC World Index** with volatility in line with MSCI AC World Index (17.7% vs. 17.5%).
- As compared to a benchmark GDP-Weighted index like MSCI AC World GDP-Weighted Index, our analysis shows that the GDP-Weighted Portfolio would have deliver on a simulated basis a performance[5] - net of ETF TER and estimated transaction costs – **very much in line with the benchmark** (6.17% vs. 6.34%).
- Our analysis suggests that the GDP-Weighted Portfolio demonstrates a **higher diversification** compared to MSCI AC World Index, as **measured by their respective Herfindahl Indices**.

Thanks to its large product offering and diversity of available wrappers (ETFs, Funds and Segregated Mandates), DeAWM Passive Asset Management can deliver flexible investable Portfolios Solutions built on such systematic strategies.

[1]Please note that the performance data shown for the ETF based GDP-Weighted Portfolio is simulated and has been calculated based on the historical performance of indices used as proxies for ETFs selected according to the methodology described in the paper. These Portfolio's simulated returns do not represent historical returns of any actual product or portfolio issued or managed in the past. In simulating the past performance of this hypothetical portfolio, an estimated annual rebalancing cost further specified in page 4 was assumed.

Introduction

Following client demand, we investigated a fundamentally-weighted investment in All Countries Equities (i.e. in both Developed and Emerging Markets) using-a weighted portfolio of country ETFs.

Where a market cap index like the MSCI All Country World usually weights its constituents on the basis of their free float-adjusted capitalisation, a fundamentally-weighted Index allocates its constituents' weights according to publicly available fundamental, non price-sensitive, factors.

In theory, a cap-weighted market portfolio is deemed to deliver the highest expected risk adjusted return and hence buying and holding this portfolio should represent an optimal strategy. However, this theory is based on quite a few strong assumptions, some of which have been shown to not hold in real markets conditions:

- Mayers [1976] has been one of the first academics to challenge the mean-variance efficiency of traditional equity indices.
- More recently, Markowitz [2005] also argued that cap-weighted market portfolios are not mean variance efficient when taking into account real world constraints.
- Multiple authors (Treynor [2005], Hsu [2006] as well as Siegel [2006]) have also argued that the efficient market hypothesis does not hold in the real world and that in such a case, prices do not reflect the true value of a company and therefore market-cap-weighted indices overweight overvalued stocks and underweight undervalued stocks creating a drag on performance.

Some investors claim fundamentally-weighted strategies are superior to market-cap-weighted indices in avoiding these issues. In particular, Arnott, Hsu and Moore (2005) illustrate that such indices have outperformed market cap in the US. They argue that capitalisation is an unstable way to measure the real value of a company and hence that using more stable, less volatile weights in an index should deliver better performance.

Potential benefits of implementing fundamentally-weighted indices

Fundamentally-weighted indices:

- Are deemed to be **less prone to momentum bias**.
- Have on average, **demonstrated a better risk return profile** compared to market-cap-weighted indices (Hsu and Campollo [2006]),
- Show **some exposure to the Value and Small Cap Factors**: investing stocks based on fundamental criteria tends to increase the weights of stocks with a smaller market capitalization and hence may allow the extraction of some small cap / value premium.
- May bring **potential additional relative returns** – as compared to market cap weighted indices - **from rebalancing**: Indices require periodic rebalancing to maintain fundamental weights which - relative to market cap - are a contrarian strategy. Such contrarian rebalancing may help to exploit reversal and idiosyncratic volatility of the stock returns.

Challenges in implementing fundamentally weighted indices

Fundamentally weighted indices:

- Do not represent the 'benchmark', i.e. as compared to market-cap-weighted indices, they **do not represent the investable opportunity set**,
- Demonstrate on average a **higher turnover**: periodical rebalancing of the portfolio may significantly increase the turnover which translates in higher transaction costs especially with regards to Emerging Markets.
- May present **challenges with regards to liquidity and** execution: EM countries in particular are very heterogeneous. From South Korea to Turkey, there is a marked difference in terms of free-float capitalization and daily volumes of all stocks. Hence, implementing an equal weight strategy can prove challenging execution-wise.

In this paper, we consider a GDP-weighted version of the MSCI AC World Index where each country is weighted according to the relative size of its GDP. Each country is represented by a market-cap-weighted index but the global Portfolio allocates a weight to each country which is not market price sensitive and is only linked to the size of its economy.

It may be relevant to use ETFs in building such a fundamentally-weighted Portfolio. Allocation into cost efficient and liquid ETFs (as opposed to a large portfolio of single stocks) leads to the relatively straightforward monitoring of an ETF Portfolio.

Country ETFs Mapping

The first stage of this analysis is to map all the countries represented in the MSCI ACWI Index Universe (the 'Investment Universe') using country ETFs.
For each country belonging to the Investment Universe, should multiple relevant ETFs be available (being on DeAWM platform or not), the selection methodology below has been followed by decreasing order of priority:

1. The ETF available on the DeAWM product range is selected, and if no such DeAWM ETF is available, an ETF available from another provider is selected.
2. ETF being managed using physical replication,
3. ETF being domiciled in Europe.

The following countries have been disregarded due to the absence of ETFs tracking their respective equity market: Argentina, Czech Republic, Hungary, Jordan, Morocco, Sri Lanka and Venezuela. No particular replacement or adjustment has been implemented to replace these countries.

Table 1 recaps the ETFs which have been retained for the simulation of the GDP Weighted Portfolio.

Country	ETF Ticker	ETF Name	TER (%)	Weights[2]
United states	XD9U GR Equity	db X-trackers MSCI USA	0.07	25.1%
China	XCS6 LN Equity	db X-trackers MSCI CHINA	0.65	12.7%
Japan	XMJP GY Equity	db X-trackers MSCI JAPAN	0.50	9.2%
Germany	XDAX GY Equity	db X-trackers DAX	0.09	5.3%
France	XCAC GY Equity	db X-trackers CAC 40	0.20	4.0%
Brazil	XMBR GY Equity	db X-trackers MSCI BRAZIL	0.65	3.5%
United Kingdom	XDUK LN Equity	db X-trackers FTSE 100	0.09	3.8%
Russia	XMRC GY Equity	db X-trackers MSCI RUSSIA	0.65	3.1%
Italy	XMIB GY Equity	db X-trackers FTSE MIB	0.30	3.1%
India	XCS5 GY Equity	db X-trackers MSCI INDIA	0.75	2.9%
Canada	D5BH GY Equity	db X-trackers MSCI CANADA	0.35	2.8%
Australia	XAUS LN Equity	db X-trackers S&P/ASX 200	0.50	2.4%
Spain	DXIBX SM Equity	db X-trackers IBEX 35 INDEX	0.30	2.0%
Mexico	D5BI GR Equity	db X-trackers MSCI MEXICO	0.65	1.8%
Korea	XMKO GY Equity	db X-trackers MSCI KOREA	0.65	1.7%
Indonesia	XMIN GR Equity	db X-trackers MSCI INDONESIA	0.65	1.4%
Turkey	XDTK GR Equity	db X-trackers MSCI TURKEY	0.65	1.2%
Netherlands	CH1 FP Equity	Amundi MSCI NETHERLANDS	0.25	1.2%
Switzerland	XSMI GY Equity	db X-trackers SMI	0.30	1.0%
Sweden	EWD US Equity	iShares MSCI SWEDEN	0.51	0.8%
Norway	ENOR US Equity	iShares MSCI NORWAY CAPPED	0.53	0.8%
Poland	IPOL LN Equity	iShares MSCI POLAND	0.74	0.8%
Belgium	EWK US Equity	iShares MSCI BELGIUM CAPPED	0.50	0.7%
Taiwan	XMTW GR Equity	db X-trackers MSCI TAIWAN	0.65	0.7%
Thailand	XCS4 GR Equity	db X-trackers MSCI THAILAND	0.50	0.6%
Austria	XB4A GY Equity	db X-trackers ATX	0.25	0.6%
Colombia	ICOL US Equity	iShares COLOMBIA ETF	0.61	0.6%
South Africa	SRSA LN Equity	iShares MSCI SOUTH AFRICA	0.65	0.6%
Denmark	EDEN US Equity	iShares MSCI DENMARK CAPPED	0.53	0.5%
Malaysia	XCS3 GR Equity	db X-trackers MSCI MALAYSIA	0.50	0.5%
Singapore	XBAS GR Equity	db X-trackers MSCI SINGAPORE	0.50	0.4%
Chile	X4MC GR Equity	db X-trackers MSCI CHILE	0.65	0.4%
Philippines	XPQP GR Equity	db X-trackers MSCI PHILIPPINNES	0.65	0.4%
Hong Kong SAR	EWH US Equity	iShares MSCI HONG KONG	0.51	0.4%
Finland	EFNL US Equity	iShares MSCI FINLAND CAPPED	0.53	0.4%
Egypt	EGPT US Equity	market Vectors EGYPT	0.94	0.4%
Israel	EIS US Equity	iShares MSCI ISRAEL CAPPED	0.61	0.4%
Greece	GRE FP Index	Lyxor FTSE ATHEX 20	0.45	0.4%
Ireland	EIRL US Equity	iShares MSCI IRELAND CAPPED	0.50	0.3%
Peru	EPU US Equity	iShares MSCI ALL PERU CAPPED	0.61	0.3%
Portugal	PPP PL Equity	Comstage PSI 20	0.35	0.3%
New Zealand	ENZL US Equity	iShares MSCI NEW ZEALAND CAPPED	0.51	0.3%
Qatar	QAT US Equity	iShares MSCI QATAR CAPPED	0.61	0.0%
United Arab Emirates	UAE US Equity	iShares MSCI UAE CAPPED	0.61	0.0%
Pakistan	XBAK GR Equity	db X-trackers MSCI PAKISTAN	0.85	0.0%

Table 1 : ETFs retained to form the GDP-Weighted Portfolio

[2] *As of End of Dec 2013, see weighting methodology further described below.*

Construction of the GDP-Weighted Portfolio

Introduction

ETF Track Record

An issue we were faced with is the relatively short track-record for some of the ETFs contemplated for inclusion in the Portfolio.

To overcome this issue we adopted the following approach: we approximated the ETF's returns where historical data was missing for the entire observation period by relying on the historical value of the ETF's benchmark and deducting from the benchmark performance an hypothetical index replication cost – in line with the Total Expense Ratio (TER) of the relevant ETF as well as an estimated portfolio rebalancing cost determined as described hereafter.

More precisely, in order to build the historical simulation and depending on various practicalities - among others the availability of a long history for each particular ETF benchmark - the following process has been applied to pick the relevant index to be used in the simulation :

1. Where possible, use the relevant benchmark index including Net dividends (i.e. total return index with withholding tax assumption) as proxies for the respective ETFs.
2. In the few cases where 1) is not achievable (usually related to a lack of historical data) an alternative proxy is selected according to a process described in Appendix.

Weights determination

The second step to building the Portfolio is the determination of the weight for each country belonging to the MSCI ACWI Index as of each end of year Rebalancing Date.

To do so we consider at the end of each year the list of countries in the MSCI ACWI as published by MSCI in December (for the next year) adjusted from the countries which have been previously disregarded (see page 3). For each of these countries we then gather the GDP data as published each September/October by the IMF for the previous year in its World Economic (WEI) Outlook report. We finally calculate the weights using the following formula:

$$w_i = \frac{GDP_i}{\sum_{All\ ACWI\ Countries} GDP_i}$$

Where

w_i is the weight of country i,

GDP_i is the GDP of country i in USD.

Considerations regarding historical GDP data: prior to 2003, the WEI outlook report did not include GDP data. Therefore in calculating the weights for the rebalancing in 2000, 2001 and 2002 we used the revised GDP data as published by the IMF in 2003 for each of these respective years. Such data is therefore more up to date than what one could actually have used to calculate these weights as of those rebalancing dates.

All Country GDP-Weighted Portfolio

Over time, we considered the following 45 market country indices:

Universe of Developed Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Israel, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, USA.

Universe of Emerging Countries: Brazil, Chile, China, Colombia, Egypt, Greece, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Qatar, Russia, South Africa, South Korea, Taiwan, Thailand, Turkey and UAE.

The results presented hereafter are shown in USD[3] and based on annual rebalancing and a transaction cost of 0.20%[4] is applied during rebalancing. Historical simulation period is from Dec 2000 to June 2014.

UAE and Qatar have been included in the MSCI AC World universe as of May 2014, however due to our yearly

[3] Please note that in all simulation results presented in this document, total return values and relevant performance metrics are calculated in USD and the risk arising from equities being traded in foreign currencies is not hedged here; such a FX hedge could be implemented in the case a particular passive management mandate.

[4] This is a deemed to be a conservative estimate of the cost of rebalancing the basket taking into account the average bid ask on each ETFs (observed as of the July 25. 2014) as well as their average weights in the portfolio.

rebalancing; they will not appear in the portfolio before end of December 2014.

Simulated Results[5]

Following the methodology described above, we ran a series of historical simulations of the GDP-Weighted Portfolio.

Figure 1 shows the historical performance, in absolute terms, and relative to the MSCI AC World Index.
Results show a fairly consistent outperformance during the observation window of this simulation[5] considering that these results are net of ETFs TER and estimated transaction costs.

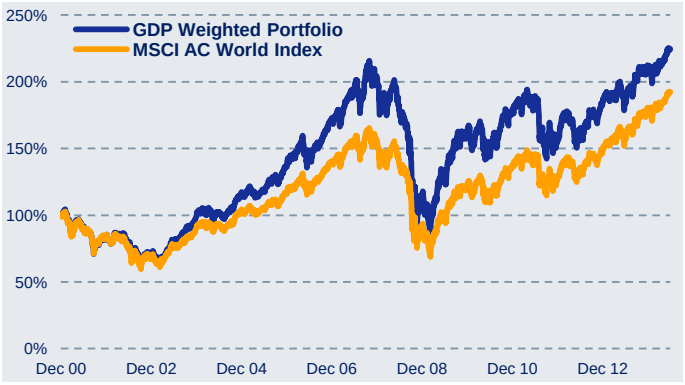

Figure 1 : Historical Performance of the GDP Weighted Portfolio[5]

Full statistics regarding volatility and IRR, on a relative and absolute basis are available through Table 2.

In order to give a deeper insight on the performance of the GDP-Weighted Portfolio, it is compared to a more relevant benchmark in Figure 2 and the right hand side of Table 2.

	GDP Weighted Portfolio	MSCI AC World Index TR Net
Returns	6.17%	4.96%
Volatility	17.70%	17.52%
Sharpe Ratio	0.24	0.17
Max Drawdown	-59.85%	-58.38%
Tracking Error	3.91%	

	GDP Weighted Portfolio	MSCI AC World GDP weighted TR Net
Returns	6.17%	6.34%
Volatility	17.70%	17.79%
Sharpe Ratio	0.24	0.25
Max Drawdown	-59.85%	-60.65%
Tracking Error	1.56%	

Table 2 : Performance Statistics of the GDP Weigthed Portfolio[5]

Results show that the GDP-Weighted Portfolio - again, net of TER and transaction costs estimates – is only lagging the MSCI GDP Weighted Index by 17bps pa, which is already less than the weighted TER of the ETFs of the Portfolio.
This limited performance drag may be explained by several factors:

- Relatively low TER of the ETFs within the GDP-Weighted Portfolio.
- Consistency of the applied methodology previously described to compile GDP data.
- Outperformance of the ETFs benchmarks ~~as~~ compared to the MSCI Country indices comprising the MSCI AC World GDP-Weighted over the Observation Window[5]. Obviously such outperformance can't be estimated or forecasted for the foreseeable future.

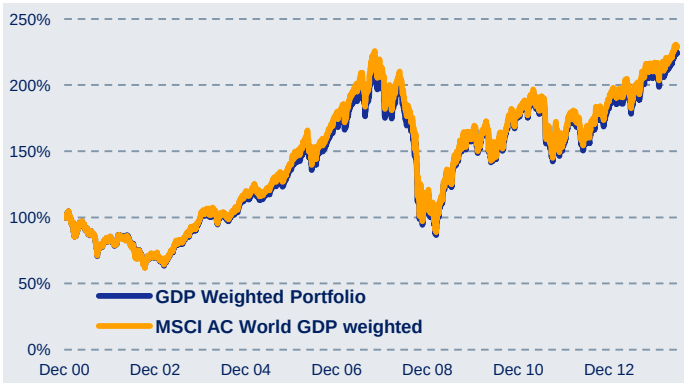

Figure 2: GDP Weighted Portfolio compared with MSCI AC GDP Weighted[3]

Figure 3 compares the respective volatility and Sharpe ratios of both the GDP-Weighted Portfolio and the MSCI AC World GDP Weighted Index5. The comparison yields very similar results, including very similar risk adjusted returns along with a nearly perfectly matched volatility.

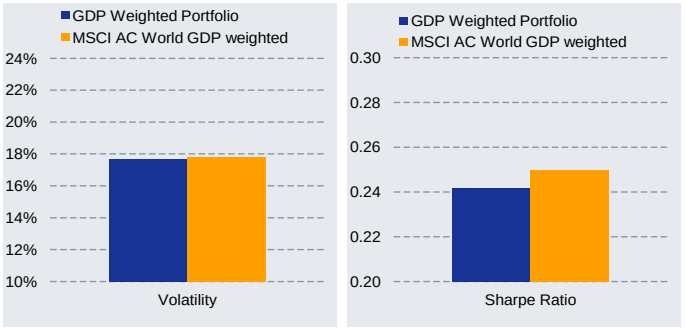

Figure 3 : Comparison of Volatility and Sharpe Ratio[3]

[5] *Source: Deutsche Bank, Bloomberg based on simulations performed on an observation window ranging from Dec 2000 to June 2014. Past Performance, actual or simulated, is not indicative of future results.*

A look at Country weights of the GDP-Weighted Portfolio[6]

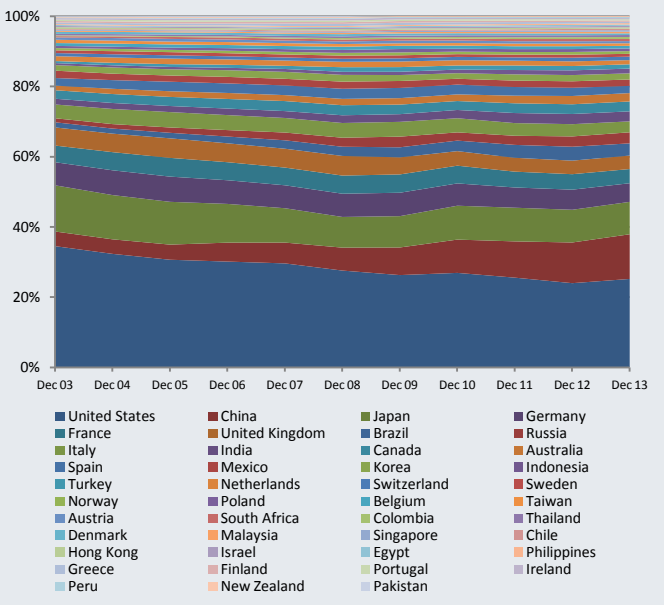

Figure 4 Historical country weights of the GDP Weighted Portfolio[7]

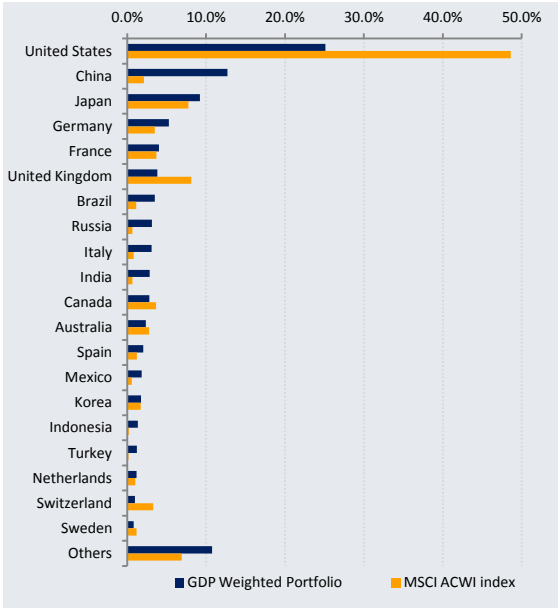

Figure 5 Country weights comparison[7]

A closer look at diversification[7]

The fact that GDP-weighting tends to reduce concentration in single equities and single countries compared to market cap indices is often considered as one of its most sensible features.

In order to validate this diversification benefit, we calculated the historical values of the Herfindahl Indices for market cap and GDP-weighted indices.
The Herfindahl Index is a common measure to appreciate the concentration of an Index towards its biggest components. A lower value of the Herfindahl Index reflects a lower concentration of the index towards its top components.

Figure 6 shows the **significantly improved diversification** brought by the GDP-Weighted Portfolio as compared to the MSCI AC World Index.

This is particularly true in the recent years, probably a consequence of the very sharp rally of the Equity markets.

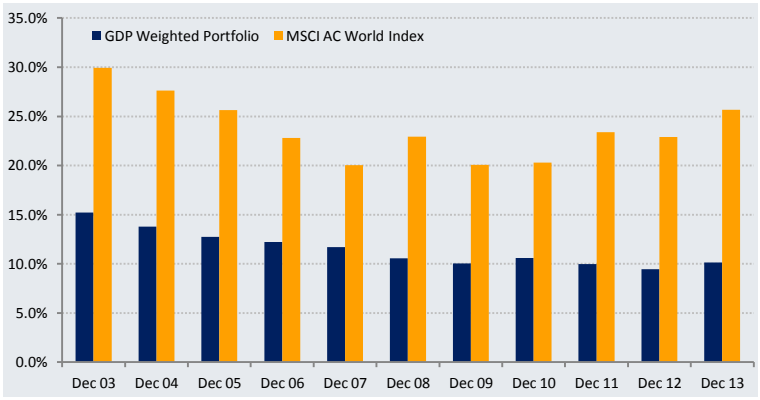

Figure 6 Historical changes of the Herfindahl Index for GDP Weighted Portfolio as compared to MSCI AC World Index[7]

[6] *Source: Deutsche Bank, Bloomberg based on simulations performed on an observation window ranging from Dec 2000 to June 2014. Past Performance, actual or simulated, is not indicative of future results.*

[7] *Source: Deutsche Bank, Bloomberg based on simulations performed on an observation window ranging from Dec 2000 to June 2014. Past Performance, actual or simulated, is not indicative of future results.*

Conclusions

In this paper, we analysed the design and implementation of a fundamentally-weighted strategy using ETFs.

Our analysis showed that:

- Designing a Strategic Beta methodology such as GDP-weighting is relatively straightforward and its implementation using ETFs can be **cost efficient**,
- Weighting countries according to their GDP, as implemented within the **GDP-Weighted Portfolio** would have led on a simulated basis[8] to a **1.21% p.a. outperformance** - net of estimated ETF TER and transaction costs - **compared to the MSCI AC World Index** with volatility staying in line with MSCI AC World (17.7% vs. 17.5%).
- Compared to a benchmark GDP-Weighted index like MSCI AC World GDP-Weighted, the GDP-Weighted Portfolio shows a performance - net of ETF TER and transaction cost – broadly i**n line with the benchmark** (6.17% pa vs. 6.34% pa).
- Our analysis shows that the GDP-Weighted Portfolio demonstrates a **higher degree of diversification** compared to the MSCI AC World Index, as measured by their respective Herfindahl Indices.

Thanks to its large product offering and diversity of available wrappers (ETFs, Funds and Segregated Mandates), DeAWM Passive Asset Management can deliver flexible investable Portfolios Solutions built on such systematic strategies.

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[8] *Source: Deutsche Bank, Bloomberg based on simulations performed on an observation window ranging from Dec 2000 to June 2014. Past Performance, actual or simulated, is not indicative of future results*

Appendix: Country ETF Mapping and Proxies

The list below represents the complete universe of indices used as proxies for the ETFs in the construction of the simulated GDP Weighted Portfolio. As mentioned on page 3, where possible the benchmark of the ETFs has been used or else a proxy index has been selected.
Please note that the use of these proxies, and the related practicalities explained in page 3 have created an estimated under performance at Portfolio level of around 5bps p.a. over the simulations previously presented.
For sake of clarity, all other things being equal or held constant, an investor in the Portfolio would not have experienced this performance differential between the proxy and the ETF's Benchmark.

ETF Ticker	Benchmark Name	Proxy used (if any)	Data Treatment (if any)	Annual Performance Differential[9]
XAUS LN	S&P ASX 200 TR Net			
XB4A GY	Austrian ATX TR Net			
EWK US	MSCI Belgium IMI 25-50 TR Net			
XMBR GY	MSCI Brazil TR Net			
D5BH GY	MSCI Canada TR Net			
X4MC GR	MSCI Chile TR Net			
XCS6 LN	MSCI China TR Net			
ICOL US	MSCI Colombia TR Net	MSCI Colombia IMI TR Net		-1.69%
EDEN US	MSCI Denmark IMI 25-50 TR Net	MSCI Denmark IMI TR Net		2.62%
EGPT US	Market Vectors Egypt TR	Market Vectors Egypt TR[10]	Deduction of estimated Dividend Withholding Tax[11]	
EFNL US	MSCI Finland IMI 25-50 TR Net	MSCI Finland IMI TR Net		-0.64%
XCAC GY	CAC 40 TR Net			
XDAX GY	DAX Index		Deduction of estimated Dividend Withholding Tax [11]	
GRE FP	FTSE Athens Stock Exchange Net TR		Reinvestment of Net Dividend[12]	
EWH US	MSCI Hong Kong TR Net			
XCS5 GY	MSCI India TR Net			
XMIN GR	MSCI Indonesia TR Net			
EIRL US	MSCI All IRELAND TR Net	MSCI Ireland IMI TR Net		0.94%
EIS US	MSCI Israel Capped TR Net	MSCI Israel TR Net		1.51%
XMIB GY	FTSE MIB TR		Deduction of estimated Dividend Withholding Tax[11]	
XMJP GY	MSCI Daily Japan TR Net			
XMKO GY	MSCI Daily South Korea TR Net			
XCS3 GR	MSCI Malaysia TR Net			
D5BI GR	MSCI Mexico TR Net			
CH1 FP	MSCI Daily Net TR Netherlands			
ENZL US	MSCI New Zealand IMI 25-50 TR Net	MSCI New Zealand IMI TR Net		0.25%
ENOR US	MSCI Norway IMI 25-50 TR Net	MSCI Norway IMI TR Net		0.37%
XBAK GR	MSCI Pakistan IMI TR Net	MSCI Pakistan TR Net		2.02%
EPU US	MSCI ALL PERU CAPPED TR Net	MSCI Peru IMI TR Net		2.12%
XPQP GR	MSCI Philippines IMI TR Net			
IPOL LN	MSCI Poland TR Net			
PPP PL	Portugal PSI 20 Price Index		Reinvestment of Net Dividend[12]	
QAT US	MSCI All Qatar TR Net	MSCI Qatar TR Net		1.55%
XMRC GY	MSCI Russia Capped TR Net	MSCI Russia IMI TR Net		0.25%
XBAS GR	MSCI SINGAPORE IMI Net	MSCI Singapore IMI USD Net		0.06%
SRSA LN	MSCI South Africa TR			
DXIBX SM	IBEX 35 TR Net			
EWD US	MSCI Daily TR Net Sweden USD			
XSMI GY	SMI TR Gross		Deduction of estimated Dividend Withholding Tax[11]	
XMTW GR	MSCI Taiwan TR Net			
XCS4 GR	MSCI Thailand TR Net			
XDTK GR	MSCI Turkey TR Net			
UAE US	MSCI All UAE Capped TR Net	MSCI UAE TR Net		-1.55%
XDUK LN	FTSE 100 TR Net			
XD9U GR	MSCI USD TR Net			

[9] *Source: Deutsche Bank, Bloomberg. For each Index which has been proxied, the Performance Differential shown here is calculated as the difference in annualized total return performance between the Benchmark and its Proxy from the launch of the Benchmark to June 2014 (Benchmark – Proxy). As positive number means that the Benchmark would have outperformed the Proxy on a simulated basis. Past Performance, actual or simulated, is not indicative of future results.[*
[10] *From End of December 2005, Market Vectors Egypt TR Net is used and before the MSCI Egypt TR Net has been used as proxy.*
[11] *When the Net Total Return version of an index not sponsored by MSCI is unavailable, such Net performance is estimated from gross index performance by taking into account dividend withholding tax. This is done by adjusting for the IRR difference between the MSCI TR Gross and the MSCI Net TR of the corresponding country over the simulation period.*
[12] *The performance of the price index is adjusted on a daily basis with the reinvestment of net dividend per share as provided by Bloomberg over the simulation period.*

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RISK FACTORS FOR ETFs:

- **ETFs are not capital protected, therefore investors should be prepared and able to sustain losses up to the total loss of the capital invested.**
- The value of an investment in ETFs may go down as well as up and past performance is not a reliable indicator of future performance.
- Investment in ETFs involve numerous risks including among others, general market risks relating to the relevant underlying index, credit risks of the counterparties used by ETFs when entering into OTC derivative transactions, including credit risks on the provider of index swaps utilized in the case of swap-based ETFs, , exchange rate risks, interest rate risks, inflationary risks, liquidity risks and legal and regulatory risks.
- ETFs shares may be denominated in a currency different to that of the traded currency on the stock exchange in which case exchange rate fluctuations may have a negative effect on the returns of the ETF. The value of any investment involving exposure to foreign currencies can be affected by exchange rate movements.
- There may be tracking difference between the ETF and the underlying index due to the impact of annual fund management fees. The returns on the ETF may not be directly comparable to the returns achieved by direct investment in the underlying assets of the ETF or the underlying index.
- Shares purchased on the secondary market cannot usually be sold directly back to the ETF. Investors must buy and sell shares on a secondary market with the assistance of an intermediary (e.g. a stockbroker) and may incur fees for doing so. In addition, investors may pay more than the current net asset value when buying shares and may receive less than the current net asset value when selling them.
- The price of ETFs traded on the secondary market will depend, on market supply and demand, movements in the value of the ETFs as well as other factors such as prevailing financial market, corporate, economic and political conditions. However, in certain abnormal market conditions liquidity may be affected.
- Tax treatment ETFs depends on the individual circumstances of each investor. The levels and bases of, and any applicable relief from, taxation can change.
- DB Affiliates significant holdings: Investors should be aware that Deutsche Bank or its affiliates ("DB Affiliates") may from time to time own interests in any individual db X-trackers UCITS ETF which may represent a significant amount or proportion of the overall investor holdings in the relevant db X-trackers UCITS ETF. Investors should consider what possible impact such holdings by DB Affiliates may have on them. For example, DB Affiliates may like any other Shareholder ask for the redemption of all or part of their Shares of any Class of the relevant db X-trackers UCITS ETF in accordance with the provisions of this Prospectus which could result in (a) a reduction in the Net Asset Value of the relevant db X-trackers UCITS ETF to below the Minimum Net Asset Value which might result in the Board of Directors deciding to close the db X-trackers UCITS ETF and compulsorily redeem all the Shares relating to the db X-trackers UCITS ETF or (b) an increase in the holding proportion of the other Shareholders in the db X-trackers UCITS ETF beyond those allowed by laws or internal guidelines applicable to such Shareholder
- For further information regarding risk factors, please refer to the risk factors section of the prospectus, or the Key Investor Information Document of the relevant ETF you are considering investing in.
- Please consult your financial advisor before you invest in an ETF since not all ETFs are suitable for all investors.

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