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Is the UK an "averagely lucky country"?

Executive summary

This report is divided into four sections:

- (i) Analysis of whether historical returns are a good guide to expected future returns
- (ii) Consideration of the correlation between equity returns and economic growth over the 20th Century
- (iii) Analysis of the stability of real equity returns
- (iv) Implications of our analysis on our best estimate of the ex-ante world returns

This paper argues that when calculating the long-run expected return on equity (and consequently the cost of equity), international returns data should be referenced too, rather than purely focusing on the returns data of the country being assessed. This paper therefore expands on the analysis in the UKRN (2018) report which was asked to focus on UK equity returns.

Provided capital is internationally mobile and that markets are efficient, risk-adjusted equity returns in common currency terms should be similar across markets with the global numeraire usually taken as the USD. Another reason for looking at real USD returns is that there are huge uncertainties in the inflation data not only for the UK (see our response to the NERA report) but for countries such as Germany, Austria and Japan that have experienced hyper-inflation. We believe that real USD returns are therefore likely to be more reliable than local currency real returns.

Investors in the UK market should only expect lower returns than global markets if the UK is fundamentally less risky than other markets. When measured in US dollar terms we find that the UK market's equity beta is slightly above unity, with the US market's equity beta being lower than unity. This would suggest that investors should demand slightly higher returns from UK equities than US equities.

However, according to the Dimson Marsh and Staunton (DMS) dataset's compound (geometric) annual rate of return (also known as "CAGR"), real USD return on US equities is distinctly higher than real USD return on UK equities: 6.39% v 5.07% (the real sterling returns of UK equities are slightly higher than the real USD returns as there has been a significant real depreciation of sterling against the dollar over the period, although this may partly be due to the DMS dataset underestimating inflation).

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The US equity market is the best documented market available. However, whilst returns data on the US market is of better quality, its use as the best guide to expected returns is sometimes rejected on the basis of a "survivorship" bias. However, there might also have been a "disaster bias" in the global data. The C20th was an extraordinary century. Germany, Japan, Italy, Spain, Portugal, and Austria, all countries in the DMS database, suffered from huge capital destruction due to wars or revolutions. Whilst rational investors should always place a small probability on these types of events, we doubt a reasonable investor at the start of the C20th would have anticipated their realised frequency and severity.

The UK's market is in-line with the rest of the world, returning 5.07% p.a. in real USD terms from 1899 to 2016, whilst the global equity markets returned 5.05% p.a. in real USD terms. Consequently, the UK could be described as being an "averagely lucky country". Whilst the UK escaped the large-scale capital destruction experienced elsewhere, the early 20th Century performance of the UK market was also poor, a reflection, of the significant damage caused by both wars and the poor relative economic performance in the early 1920s. If "disaster bias" is accepted for the returns in the early C20th then the world was also unlucky during the period and consequently the UK could be considered as also having been "averagely unlucky" in the early C20th.

The ex-ante probability of war or revolution is of course unobservable but their unpredictable nature also means that they are rarely accounted for in projections of future cashflows either. One way of correcting for this bias is to take a discount rate, which is slightly higher than the "true" expected return on equities (i.e. the expected return conditional on no disasters occurring). This is likely to be best informed by the second half of the DMS return set, where significant disasters have been largely avoided. Whether we take returns from the middle of the DMS dataset (i.e. from 1957) or from 1945, this would suggest a global geometric return (or CAGR) of above 6% in real USD terms. This paper also argues that extending US returns data to before 1900 is also supportive of a higher longer-term geometric return.

Therefore, we believe that the average of the world ex-US real returns from 1957 onwards, and the US real return from 1800 onwards, will provide a better estimate of the conditional (on no disaster) geometric expected return. This leads us to our best estimate of the long-term international return of 6.5% per annum.

(i) Historical returns as a guide for future returns

The cost of equity is an expected return, and hence unobservable. However, we can split out realised returns on any asset into two components:

$$\text{Actual Return} = \text{Expected Return} + \text{"Surprise"}$$

In the short-term the surprise component dominates but if we look over a long enough time horizon we would hope that surprises should start to cancel out:

$$\text{Average Return} = \text{Average Expected Return} + \text{Average "Surprise"}$$

However, it is important to note that not all surprises cancel out. Some surprises can be very large, and will not necessarily be compensated for by surprises of the opposite sign.

It is also worth noting that these large surprises tend to be asymmetric in nature. In ratio or log terms (where a 100% increase is comparable to a 50% fall), big negative surprises are more common than big positive surprises. Big negative surprises are known in the financial economics literature as "peso risks"¹ or "black swans"².

Why are big shocks asymmetric? Whilst "total war" and confiscatory nationalisations can nearly wipe investors out, at the market-wide level it would be unusual to get shocks where the size of the capital stock can double. On occasions where returns have been greater than 100% for a market over the course of a year it has typically been because they have gone from very cheap valuations, and not because there has been a comparable positive shock to the real economy. This asymmetry in shocks is particularly important for depressing returns outside the US in the first half of the 20th Century. Much of continental Europe and Japan had their capital stocks largely destroyed in the Second World War. This ends up depressing the geometric global returns for the entire period, arguably creating a "disaster bias". It is important to note that whilst in emerging markets similar albeit less extreme shocks in recent history, these have been idiosyncratic. The shocks in the first half of the 20th Century were more global in nature and harder to diversify against.

In the table below, we have also extended the US returns further back in time, using Jeremy Siegel's data-set. This suggests that US real returns were higher in the 19th Century than in the 20th Century. We also note that there is a substantial improvement in the UK returns.

Global Real USD Returns (geometric, annualised)

	World	World ex-US	US	UK
1801-2016	-	-	6.87%	-
1899-2016	5.05%	4.33%	6.39%	5.07%
1945-2016	6.05%	5.71%	6.69%	6.26%
1957-2016	6.00%	6.09%	6.44%	7.23%

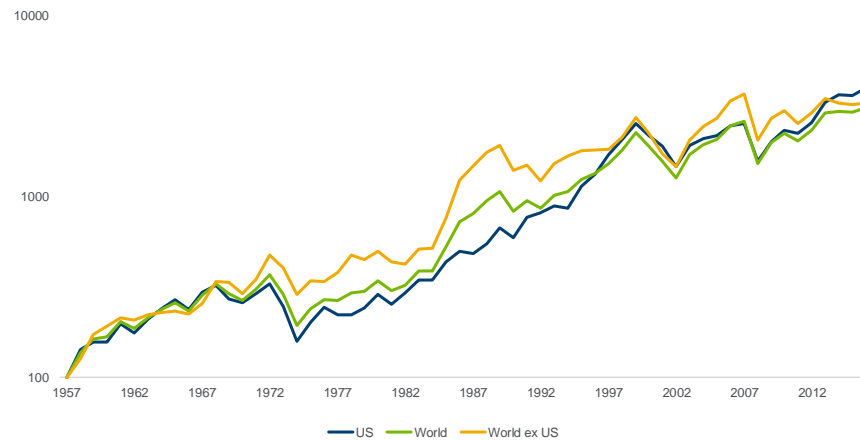
Source: DMS, Siegel. We follow our usual convention of taking end of year to end of year. In our paper on UK long-term consumer price indices we followed NERA in taking the dates as being inclusive.

¹ The problem is named after the Mexican Peso. In the mid-1970s the Peso was fixed versus the USD, so the volatility of the USDMXN exchange rate was very small. Then in August 1976 there was a 46% devaluation. Using the historical experience of the exchange rate change would therefore have given investors a very misleading view about the probability distribution for the exchange rate. Interest rate differentials between the countries suggested that investors recognised that even over a short horizon there was some probability assigned to a large devaluation.

² See N. Taleb: "The Black Swan" (2007) and "Fooled by Randomness" (2001).

One puzzle with the DMS dataset is that the world's equity return data seem puzzlingly low, with returns between 1957 to 2016 being lower for the world than for either the World ex-US or the US. Without the annual weights that DMS used, we have been unable to resolve what drives this apparent discrepancy, although it could be due to inopportune rebalancing.

Real USD Equity Returns



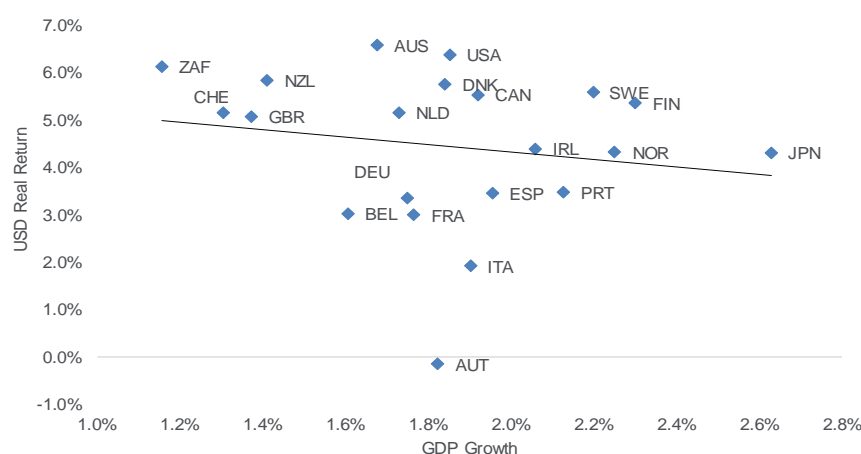
Source: DMS. Cumulative real returns shown, rebased to 100 at the start of the period.

We think that the discrepancies in the DMS dataset, together with the "disaster bias" in global returns data, create a reasonable argument that very long-term US equity returns from 1801 should be used for estimating long-run returns, or at least the long-run return conditional on there being no capital destruction or confiscatory revolution.

(ii) Can the 20th Century be seen as a 'lucky' century?

We have argued that global returns likely understate ex-ante expected returns because of the disaster bias. However, it is also worth considering potential arguments which can be made, that the 20th Century was in fact a lucky century. One argument that is commonly made is that economic growth and stock market returns are positively correlated. As shown by Maddison (2013), the 20th Century saw global economic growth accelerate. Per capita compound annual GDP growth between 1820 and 1900 was 0.9% and 1.3% per annum in Western Europe and Western offshoots (US, Australia and Canada) respectively. These then accelerated to 1.9% and 2.0% over the course of the 20th Century. However, in reality there is very little correlation between stock market returns and economic growth, as shown in the chart below. As the table in part (i) showed, US equity returns decelerated in the 20th Century despite the acceleration in per capita GDP growth.

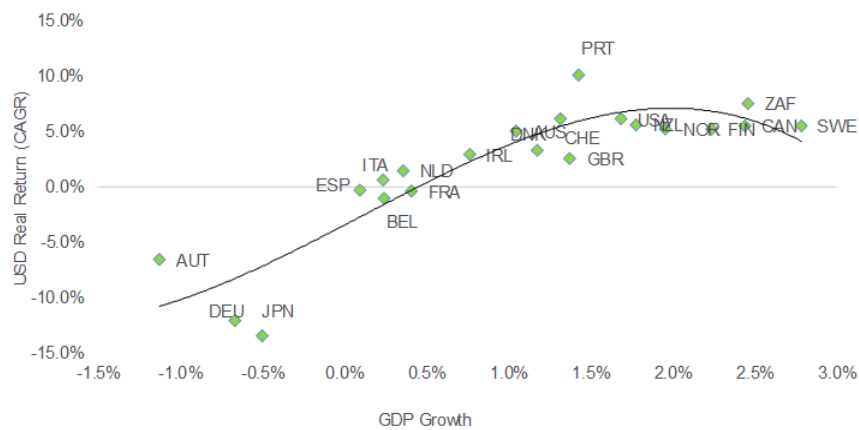
Returns versus per capita GDP growth (1899-2016)



Source: DMS, Maddison. Annualised growth of per GDP capita in real USD terms shown.

Why is the relationship between growth and returns so weak if higher growth is associated with higher profit growth? If the corporate sector grows rapidly (in line with the broader economy) then this requires investment in its capital stock. Higher growth means either that retained earnings would have to be higher (constraining dividend pay-out ratios) or that companies would have to issue more shares, diluting aggregate profit growth. When we divide the DMS dataset up in to shorter subperiods (these subperiods were determined by years when we have per capita GDP estimates available), it is possible to find some periods when there has been a positive correlation between growth and returns, for example between 1923 and 1947. However, we suspect it is the capital destruction associated with war that drives the relationship. Countries that experienced capital destruction had both poor returns and poor growth but once those countries are excluded there is little relationship between growth and returns.

Returns versus per capita GDP growth (1923-1947)

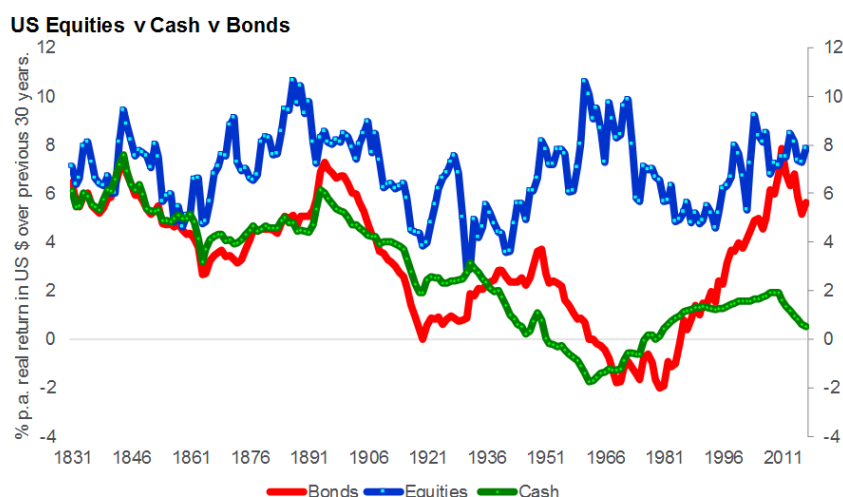


Source: DMS, Maddison (we have subdivided the DMS dataset in to 5 roughly equal subperiods, the 1923-1947 period has one of the strongest associations between growth and returns). Annualised growth of per GDP capita in real USD terms shown.

(iii) The stability of Real Equity Returns

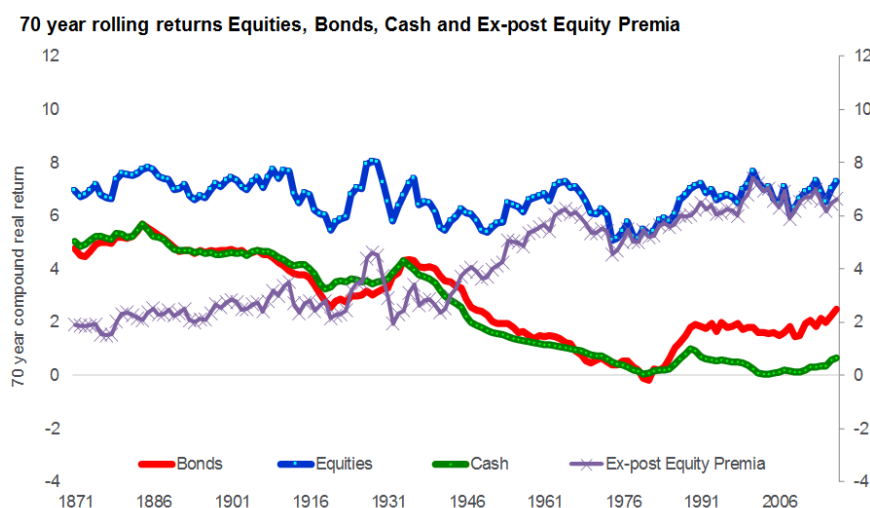
The average return itself may not be stable for some markets, implying a similar lack of stability in the average expected return, and consequently its suitability for use as a cost of equity. The stability of realised returns is most evident when examining US equity real returns from 1800 onwards and comparing it to the real returns on cash and bonds.

Stability of 30 year rolling returns



Source: Dimson Marsh and Staunton (DMS), Siegel.

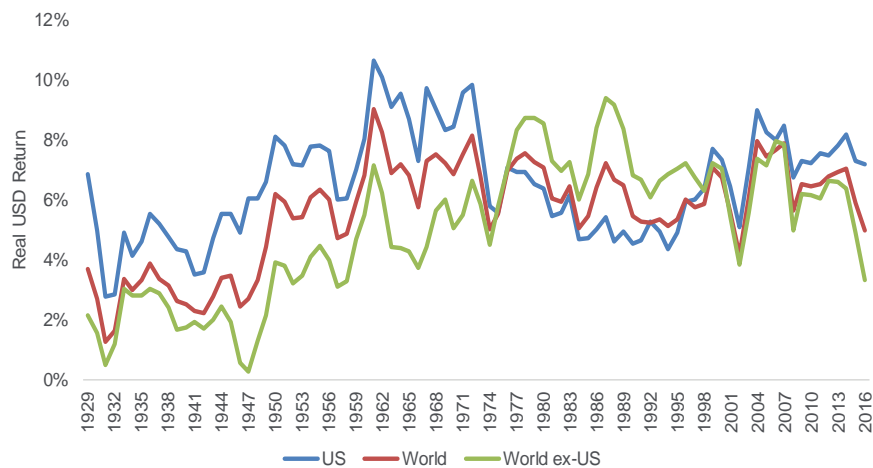
The stability becomes even more apparent when shifting to 70-year rolling (geometric) returns.



Source: Dimson Marsh and Staunton (DMS), Siegel. USD real returns shown.

The stability of equity returns can be contrasted with the ex-post equity premia, where a clear upward trend can be seen (the counterpart to a downward trend in real cash returns). If we look at global equity returns the stability of real return on equities becomes less evident.

30 year rolling real returns: US, World, World ex-US



Source: DMS

As we explained in part (i), we believe that it is the early 20th century's adverse shocks which caused the instability in international returns. The difficulties of "disaster bias" lead Smithers & Wright (2011) in their report for OFGEM to suggest focusing on the second half of the DMS returns dataset for non-US markets.

(iv) Our best estimate of ex-ante world returns

We think the disaster bias suggests that the second half of the DMS returns data for the world is likely to give a better guide to the ex-ante expected return, conditional on no disasters occurring. Our concerns about the DMS dataset's world returns, which is lower than both the returns of the world ex-US or the US, lead us to think that an average of the world ex-US real returns from 1957 onwards, and the US real return from 1800 onwards, is a better estimate of this conditional geometric returns, at 6.48%. What does this mean for UK's ex-ante returns? When we look at 10-year betas with respect to the MSCI World in USD terms, we find that the UK market has a marginally higher beta than unity. However, given the uncertainties in beta estimates and the underlying ex-ante returns, any beta adjustment would imply a false level of precision. We conclude that a long-term expected real USD geometric return of around 6.5% on both global and UK equities is reasonable. Whilst we have attempted to adjust for "disaster bias" we caution that such adjustments are inherently uncertain. By putting more weight on long-term US returns it is possible that it is now tilted towards being a 'conditional' return i.e. a return conditional on the country not experiencing any large scale capital destruction or confiscatory nationalisations.

³ <https://www.ofgem.gov.uk/ofgem-publications/86100/wrightsmithersequitymarketreturnpdf>

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