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Credit Suisse Global Investment Returns Yearbook 2021 Summary Edition

Elroy Dimson, Paul Marsh, Mike Staunton

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Summary Edition
Extract from the Credit Suisse Global Investment Returns Yearbook 2021

Important information

This report is a summary version of the full 244-page Credit Suisse Global Investment Returns Yearbook 2021, which is available in hardcopy upon request.

Coverage of Summary Edition

This report contains extracts from the full hardcopy Credit Suisse Global Investment Returns Yearbook. In the Yearbook, renowned financial historians Professor Elroy Dimson, Professor Paul Marsh and Dr. Mike Staunton assess the returns and risks from investing in equities, bonds, cash, currencies and factors in 23 countries and in five different composite indexes since 1900. This year, the database is broadened to include 90 developed markets and emerging markets, and the Yearbook presents an in-depth analysis of nine new markets.

This Summary Edition provides excerpts from the printed Yearbook and spotlights Chapter 8 of the book. The summary starts with a historical perspective on the evolution of equity and sovereign debt markets over the last 121 years, and the industrial transformation that accompanied this. The next section explains why a long-term perspective is important and summarizes the long-run returns on stocks, bonds, bills and inflation since 1900. This is followed by a discussion on currencies and their impact on investment returns. The section on investment risk looks at dispersion in stock and bond markets – on both the upside and downside – culminating with global evidence on the historical risk premium.

The Summary Edition then moves to prospective returns, showing how returns vary with real interest rates, looking at how expected returns vary over time and across markets, reflecting interest and inflation rates. In a discussion of factor investing, there is an overview of the historical rewards from size, value, income, momentum, volatility and other factors. Chapter 8 of the printed Yearbook examines emerging markets in detail and this chapter is reproduced in this Summary Edition. Topics include the nature, importance, evolution and profitability of emerging market investing, and studies of factor investing and rotation strategies within the developing world.

The hardcopy publication provides an in-depth historical analysis of the investment performance of the 32 Yearbook countries and five composite indexes, providing data sources and references. This Summary Edition includes an overview of the investment performance of some of the world's most important markets since 1900, including Australia, China, Switzerland, the United Kingdom and the United States. It also includes analysis of three of the Yearbook's composite indexes (developed markets, emerging markets and the World) and a list of references.

Details on how to access the full Credit Suisse Global Investment Returns Yearbook or the underlying DMS dataset are provided on page 70.

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See page 70 for copyright and acknowledgement instructions, guidance on how to gain access to the underlying data, and for more extensive contact details.

Message from the Chairman

We are delighted to publish the 13th edition of the Credit Suisse Global Investment Returns Yearbook produced in collaboration with Professor Elroy Dimson of Cambridge University, and Professor Paul Marsh and Dr. Mike Staunton of London Business School. The long-term perspective this unique annual study provides has rarely seemed more valuable after a truly remarkable year in financial markets, with the COVID-19 pandemic and the economic and scientific responses to it the defining influences.

We have seen equities plumb the depths of a severe bear market, with US equities falling by more than a third at their lows last March, but to then recover almost as swiftly as they fell and set new all-time highs – all within the same calendar year. While no perfect parallel for prevailing events exists, the Yearbook, bringing a historical perspective that stretches across 32 countries and up to 121 years, provides extensive examples to learn from as to the impact on markets from crises and economic policy, and technology responses to them. As is often said, "history may not repeat itself, but it rhymes." This is the essence of the Yearbook.

A legacy of this crisis is record-low real interest rates and now-burgeoning fiscal deficits as governments have sought to soften the blow of the pandemic. Pulling this combination of policy levers has of course been to the benefit of financial assets. However, the policy dilemma of if, and how, to unwind these crisis measures looms large, particularly with inflation expectations hardening. The Yearbook underlines the constraints for returns that a base line of low real rates poses if rates have indeed bottomed. The historical precedent would be for more modest real equity returns in their wake, but perhaps even greater challenges for bonds after their "equity-like" returns.

By way of new thematic content, the 2021 edition of the Yearbook brings to the table a highly topical deep-dive into emerging markets, reflecting the ever greater importance to global markets they reflect. Only 20 years ago, emerging markets made up less than 3% of world equity market capitalization and 24% of gross domestic product. Today, they comprise 14% of the free-float investable universe and 43% of gross domestic product, with their influence only likely to grow further.

To help investors frame assumptions for future returns and valuation, the study presents a substantial extension of the Dimson, Marsh and Staunton dataset. Nine new emerging markets have been added providing for each at least 50 years of performance of equities, bonds, bills, currencies and inflation. The markets include seven from Asia – India, Hong Kong SAR, South Korea, Singapore, Taiwan (Chinese Taipei), Malaysia, and Thailand – and two from Latin America – Brazil and Mexico. We also carry historical data on a further 58 countries, if less comprehensive in nature and longevity.

Are emerging market equities a route to outperform in a low-return world? The authors see a superior prospective equity risk premium on offer compared to that in developed markets. However, an irony arguably emerges. In markets often perceived as "growth" opportunities, factor investing and rotation strategies reveal "value" is the factor to unlock the superior performance that investors may be seeking.

We hope you enjoy this year's Yearbook and find its insights instructive as we all look to navigate an investment world beyond the pandemic.

Urs Rohner
Chairman of the Board of Directors
Credit Suisse Group AG

Introduction and historical perspective

Years seldom match their start-year expectations. In 2020, this was true on an epic scale. The year started with guarded optimism, but ended defined by the COVID-19 pandemic. The pandemic had global reach, extending to every continent, even Antarctica. It took its place in history for the lives lost and the extraordinary measures taken to mitigate the spread of the virus. Households everywhere felt its impact – lockdowns, damage to livelihoods, joblessness, illness, death and fear. Many companies were hard hit, with shutdowns or severe restrictions on businesses involving human contact and social mixing.

It was an extraordinary year for investors. It started well for equities and bonds, with many markets hitting all-time highs in February. Then, within a month, equity markets plummeted, typically by a third or more, while bonds gained in the flight to safety. Market volatility hit extreme levels, higher even than in the global financial crisis.

Markets then rallied strongly, fueled by massive monetary and fiscal stimulus. In the fourth quarter, the market started looking through the increase in COVID-19 cases to the eventual full reopening of the global economy on news of two viable vaccines. From its March low until the year-end, the all-important US market rose by 77%.

By end-2020, US equities were up 21% on the year, while bonds returned 17%. The Yearbook's world equity and bond indexes recorded returns of 17% and 12%. Equity volatility had fallen back almost to its long-run average. The year 2020 was indeed a year of surprises.

The purpose of the Yearbook

For many, 2020 was a year to forget. One result, however, is that it has caused investors to reach for their history books to see what they could learn from the past.

The Yearbook documents and analyzes global investment returns over the last 121 years since 1900. Its aim is to use financial history to shed light on the issues facing investors today. As Winston Churchill said, "The longer you can look back, the farther you can look forward."

The lengthy period spanned by the Yearbook saw two world wars, civil wars, revolutions, crises, slumps, bear markets, the Great Depression and pandemics. It also saw times of recovery, growth and booms; extended periods of peace, prosperity and technological advance.

Using the past to illuminate the present needs careful analysis. It is not simply a matter, for example, of checking the market's reaction to past pandemics and extrapolating. Not least, this is because even with 121 years of history, we have experienced only one pandemic as severe as COVID-19, namely the Spanish 'flu of 1918–19.

The two pandemics have had much in common. The world and medical science were unprepared. Disease control initially had to rely on hygiene, social distancing and face coverings, quarantines, lockdowns and partial closure of the economy. The Spanish 'flu came in three waves, the second being the worst. Sadly, this lesson was largely forgotten after the first wave of COVID-19.

Despite these similarities, equity markets were surprisingly resilient during the Spanish 'flu, with the US market rising by 7% over this period. An obfuscating factor was that the Spanish 'flu coincided with good news about the end of World War I. It is thus hard to learn much about market reactions to pandemics. That said, the stock market's measured reaction was still of interest, despite contamination from other events. The Spanish 'flu was also a reminder of human resilience, and that "this, too, shall pass."

More generally, there is much to learn from history. As is often said, "History does not repeat itself, but it rhymes." The Yearbook provides extensive evidence on the market impact of crises, the duration of market declines and their time to recovery, the impact of fiscal and monetary stimuli on stock and bond prices, the effects of increases and decreases in real interest rates and the impact of low real interest rates on future expected returns, the speed with which we can expect market volatility to revert to "normal" and, finally, the impact of changes in technology. The pandemic has accelerated many existing trends in the use of technology. Many of these changes will be permanent, often for the better.

The contents of the Yearbook

The core of the Credit Suisse Global Investment Returns Yearbook is the long-run DMS database (Dimson, Marsh, and Staunton, 2021) covering investment returns in 32 countries over periods of up to 121 years. We believe the unrivalled breadth and quality of its underlying data make the Yearbook the global authority on the long-run performance of stocks, bonds, bills, inflation and currencies. The Yearbook updates and extends the key findings from our book "Triumph of the Optimists."

The full printed Yearbook provides detailed analysis of long-term trends, so a review of its contents may be helpful. It provides historical perspective on the evolution of equity markets and sovereign debt over the last 121 years, and the industrial transformation that accompanied this. In the hardcopy book, Chapter 2 explains why a long-run perspective is important and summarizes the long-run returns on stocks, bonds, bills and inflation since 1900. Chapter 3 focuses on currencies, looking at long-run exchange rate changes, purchasing power parity and the case for hedging.

Continuing with the full Yearbook that underpins this summary, Chapter 4 deals with equity and bond risk. It looks at extreme periods of history and examines equity and bond drawdowns and time-to-recovery, and presents data on the historical equity risk premium around the world. Chapter 5 moves from historical to prospective returns, and shows how returns vary with the real interest rate and estimates the prospective equity premium. It looks at how volatility and risk premiums vary over time. It provides estimates of expected stock and bond returns, comparing these with returns over recent decades.

Chapter 6 of the full book presents evidence on factor investing around the world. It documents the historical premiums from size, value, income, momentum, volatility and other factors. Chapter 7 addresses prospective factor premiums. It reviews the statistical evidence and theoretical basis for factor premiums and discusses whether they are likely to persist. Chapter 8 looks at emerging markets, their nature, importance, evolution and long-run performance. It examines factor investing and rotation strategies within the emerging world.

Finally, Chapter 9 of the full printed Global Investment Returns Yearbook presents a detailed historical analysis of the performance of each of our 32 Yearbook countries and five composite indexes, providing data sources and references.

The Yearbook database

The global database that underpins the Yearbook contains annual returns on stocks, bonds, bills, inflation, and currencies for 32 countries. Of these, 23 (the DMS 23) have 121-year histories from 1900 to 2020. This year, we have added a further nine markets, with start dates in the second half of the 20th century, and typically more than 50 years of data. Together with the DMS 23, these make up the DMS 32. These are the 32 individual markets that we refer to later in this document in **Figure 17** and in the accompanying discussion.

The DMS 23 countries, all with 1900 start dates, comprise the United States and Canada, ten eurozone countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, and Spain), six other European countries (Denmark, Norway, Russia, Sweden, Switzerland, and the United Kingdom), four Asia-Pacific markets (Australia, China, Japan, and New Zealand) and one African market (South Africa).

Of the nine new markets, seven are from Asia-Pacific and two from Latin America. The markets and their start dates are: Brazil (1951), Hong Kong SAR (1963), India (1953), Malaysia (1970), Mexico (1969), Singapore (1966), South Korea (1963), Taiwan (Chinese Taipei) (1967) and Thailand (1976). There are 58 further countries for which we have equity returns, inflation and currency data, but not yet bond or bill returns. These start later, with the period covered ranging from 11 to 45 years.

The DMS database also includes five composite indexes for equities and bonds denominated in a common currency, here taken as US dollars. These cover the World, World ex-USA, Europe, Developed markets and Emerging markets. The equity indexes are based on the full DMS 90 universe, and are weighted by each country's market capitalization. The bond indexes are based on the DMS 32 and are weighted by gross domestic product (GDP).

Together, at the start of 2021, the 32 Yearbook markets (the DMS 32) make up 98.5% of the investable equity universe for a global investor, based on free-float market capitalizations. Our 90-country world equity index spans the entire investable universe. We are not aware of any other world index that covers as many as 90 countries.

Most of the DMS 32, and all of the DMS 23 countries experienced market closures at some point, mostly during wartime. In almost all cases, it is possible to bridge these closures and construct a returns history that reflects the experience of investors over the closure period. Russia and China are exceptions. Their markets were interrupted by revolutions, followed by long periods of communist rule. Markets were closed, not just temporarily, but with no intention of reopening, and assets were expropriated.

For 21 countries, we thus have a continuous 121-year history of investment returns, for which we present summary statistics in the next chapter. For Russia and China, we have returns for the pre-communist era, and for the period since these markets reopened in the early 1990s.

The expropriation of Russian assets after 1917 and Chinese assets after 1949 could be seen as wealth redistribution, rather than wealth loss. But investors at the time would not have warmed to this view. Shareholders in firms with substantial overseas assets may also have salvaged some equity value, e.g. Chinese companies with assets in Hong Kong (now Hong Kong SAR), and Formosa (now Taiwan (Chinese Taipei)). Despite this, when incorporating these countries into our composite indexes, we assume that shareholders and bondholders in Russia and China suffered total losses in 1917 and 1949. We then re-include these countries in the indexes after their markets re-opened in the early 1990s.

The DMS 23 series all commence in 1900, and this common start date aids international comparisons. Data availability and quality dictated this start date, which proved to be the earliest plausible date that allowed broad coverage with good quality data (see Dimson, Marsh, and Staunton, 2007).

Financial markets have changed and grown enormously since 1900. Meanwhile, over the last 121 years, the industrial landscape has changed almost beyond recognition.

In the following sections, we look at the development of equity markets over time, and at the Great Transformation that has occurred in industrial structure due to technological change.

The evolution of equity markets

Although stock markets in 1900 were rather different from today, they were by no means a new phenomenon. The Amsterdam exchange had already been in existence for nearly 300 years; the London Stock Exchange had been operating for over 200 years; and five other markets, including the New York Stock Exchange, had been in existence for 100 years or more.

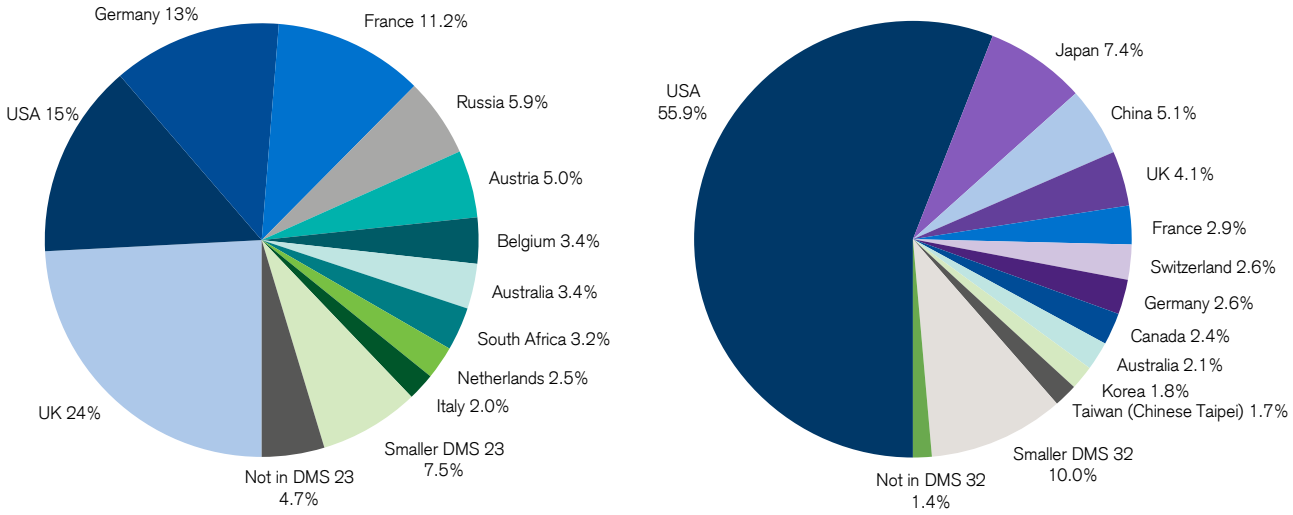
Figure 1 overleaf shows the relative sizes of world equity markets at our starting date of end-1899 (left panel) and how they had changed by end-2020 (right panel). The right panel shows that the US market dominates its closest rival and today accounts for nearly 56% of total world equity market value. Japan (7.4%) is in second place, ahead of China (5.1%) in third place, and the United Kingdom (4.1%) in fourth position. France, Switzerland and Germany each represent just under 3% of the global market, followed by Canada, Australia, South Korea and Taiwan (Chinese Taipei), all with close to 2% weightings.

In **Figure 1**, eleven of the Yearbook countries – all those accounting for around 2% or more of world market capitalization – are shown separately, with the remaining 21 Yearbook markets grouped together as "Smaller DMS 32," with a combined weight of 10%. The remaining area of the right-hand pie chart labelled "Not in DMS 32" shows that the 32 Yearbook countries now cover all but 1.4% of total world market capitalization. This remaining 1.4% is captured within the DMS 90 and is made up almost entirely of emerging and frontier markets.

Note that the right-hand panel of **Figure 1** is based on the free-float market capitalizations of the countries in the FTSE All-World index, which spans the investable universe for a global investor. Emerging markets represent a higher proportion of the world total when measured using full-float weights or when investability criteria are relaxed.

The left panel of **Figure 1** shows the equivalent breakdown at the end-1899 start of the DMS database. The chart shows that, at the start of the 20th century, the UK equity market was the largest in the world, accounting for almost a quarter of world capitalization, and dominating

Figure 1: Relative sizes of world stock markets, end-1899 (left) versus start-2021 (right)



Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021; FTSE Russell All-World Index Series Monthly Review, December 2020. Not to be reproduced without express written permission from the authors.

even the US market (15%). Germany (13%) ranked in third place, followed by France, Russia, and Austria-Hungary. Again, 11 Yearbook countries are shown separately, while the remaining 12 countries for which we have data for 1900 are grouped together and labelled "Smaller DMS 23" countries.

In total, the DMS database covered over 95% of the global equity market in 1900. The countries representing the missing 4.7% labelled as "Not in DMS 23" have been captured in later years by the nine new markets added in 2021, and by the full DMS 90 database. However, we do not have returns data for these markets back in 1900.

A comparison of the left- and right-hand sides of **Figure 1** shows that countries had widely differing fortunes over the intervening 121 years. This raises two important questions. The first relates to survivorship bias. Investors in some countries were lucky, but others suffered financial disaster or dreadful returns. If countries in the latter group are omitted, there is a danger of overstating worldwide equity returns.

Austria and Russia are small markets today, accounting for just 0.05% and 0.34% of world capitalization. Similarly, China was a tiny market in 1900, accounting for 0.34% of world equities. In assembling the DMS database, it might have been tempting to ignore these countries, and to avoid the considerable effort required to assemble their returns data back to 1900.

However, Russia and China are the two best-known cases of markets that failed to survive, and where investors lost everything. Furthermore, Russia was a large market in 1900, accounting for some 6% of world market capitalization. While Austria-Hungary was not a total investment disaster, it was the worst-performing equity market and the second worst-performing bond market of our 21 countries with continuous investment histories.

Ensuring that the DMS database contained returns data for Austria, China, and Russia from 1900 onward was thus important in eliminating survivorship and "non-success" bias. The second and opposite source of bias, namely success bias, is even more serious.

The USA is by far the world's best-documented capital market. Prior to assembly of the DMS database, the evidence cited on long-run asset returns was almost invariably taken from US markets and was typically treated as being universally applicable. Yet organized trading in marketable securities began in Amsterdam in 1602 and London in 1698, but did not commence in New York until 1792.

Since then, the US share of the global stock market has risen from zero to 56%. This reflects the superior performance of the US economy, the large volume of IPOs, and the substantial returns from US stocks. No other market can rival this long-term accomplishment. But this makes it dangerous to generalize from US asset returns since they exhibit "success bias." This is why our focus in the Yearbook is on global returns.

The great industrial transformation

At the start of 1900 – the start date of our global returns database – virtually no one had driven a car, made a phone call, used an electric light, heard recorded music, or seen a movie; no one had flown in an aircraft, listened to the radio, watched TV, used a computer, sent an e-mail, or used a smartphone. There were no x-rays, body scans, DNA tests, or transplants, and no one had taken an antibiotic; as a result, many would die young.

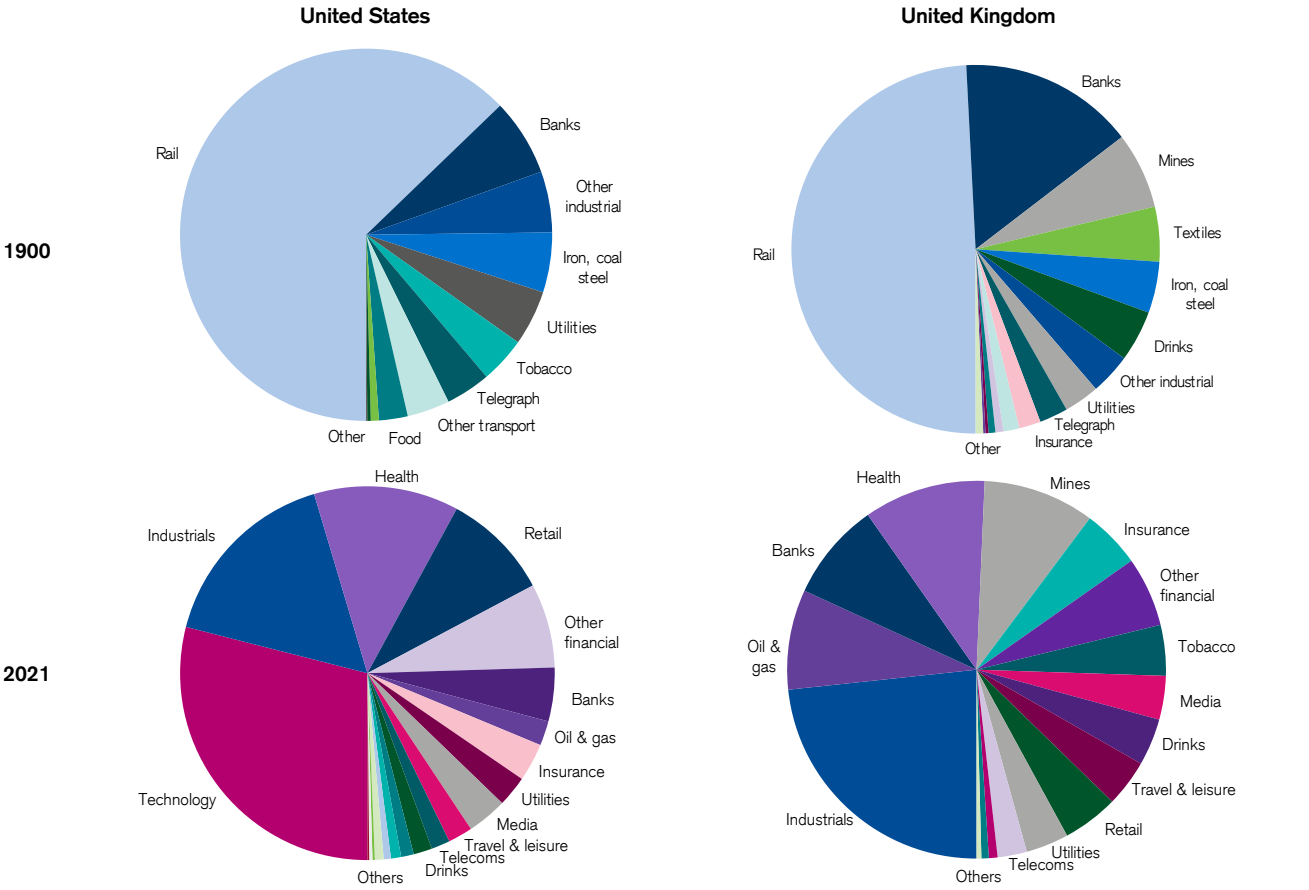
Mankind has enjoyed a wave of transformative innovation dating from the Industrial Revolution, continuing through the Golden Age of Invention in the late 19th century, and extending into today's information revolution. This has given rise to entire new industries: electricity and power generation, automobiles, aerospace, airlines, telecommunications, oil and gas, pharmaceuticals and biotechnology, computers, information technology, and media and entertainment.

Meanwhile, makers of horse-drawn carriages and wagons, canal boats, steam locomotives, candles, and matches have seen their industries decline. There have been profound changes in what is produced, how it is made, and the way in which people live and work.

These changes can be seen in the shifting composition of the firms listed on world markets. **Figure 2** shows the industrial composition of listed companies in the USA and the UK. The upper two charts show the position at the start of 1900, while the lower two show the beginning of 2021. Markets at the start of the 20th century were dominated by railroads, which accounted for 63% of US stock market value and almost 50% of UK value. More than a century later, railroads declined almost to the point of stock-market extinction, representing less than 1% of the US market and close to zero in the UK.

Of the US firms listed in 1900, more than 80% of their value was in industries that are today small or extinct; the UK figure is 65%. Besides railroads, other industries that have declined precipitously are textiles, iron, coal, and steel.

Figure 2: Industry weightings in the USA (left) and UK (right), 1900 compared with 2021



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These industries still exist, but have moved to lower-cost locations in the emerging world. Yet similarities between 1900 and 2021 are also apparent. The banking and insurance industries continue to be important. Similarly, such industries as food, beverages (including alcohol), tobacco, and utilities were present in 1900 just as they are today. And, in the UK, quoted mining companies were important in 1900 just as they are in London today.

But even industries that initially seem similar have often altered radically. For example, compare telegraphy in 1900 with smartphones in 2021. Both were high-tech at the time. Or contrast other transport in 1900 – shipping lines, trams, and docks – with their modern counterparts, airlines, buses, and trucking. Similarly, within industrials, the 1900 list of companies includes the world's then-largest candle maker and the world's largest manufacturer of matches.

Another statistic that stands out from **Figure 2** is the high proportion of today's companies that come from industries that were small or non-existent in 1900: 63% by value for the USA and 44% for the UK. The largest industries in 2021 are technology (in the USA, but not the UK), the catch-all group of industrials, healthcare, oil and gas, banking, mining (for the UK, but not the USA), insurance, other financials and retail. Of these, oil and gas, technology, and healthcare (including pharmaceuticals and biotechnology) were almost totally absent in 1900. Telecoms and media, at least as we know them now, are also new industries.

Our analysis relates only to exchange listed businesses. Some industries existed throughout the period, but were not always listed. For example, there were many retailers in 1900, but apart from the major department stores, these were often small local outlets rather than national and global retail chains like Walmart or Tesco, or online global giant, Amazon. Similarly, in 1900, a higher proportion of manufacturing firms were family-owned and unlisted.

In the UK and other countries, nationalization has also caused entire industries – railroads, utilities, telecoms, steel, airlines, and airports – to be delisted, often to be re-privatized at a later date. We included listed railroads, for example, while omitting highways that remain largely state-owned. The evolving composition of the corporate sector highlights the importance of avoiding survivorship bias within a stock market index, as well as across indexes (see Dimson, Marsh and Staunton, 2002).

In the 2015 Yearbook, we asked whether investors should focus on new industries – the emerging industries – and shun the old declining sectors. We showed that both new and old industries can reward as well as disappoint. It all depends on whether stock prices correctly embed expectations. For example, we noted above that, in stock-market terms, railroads were the ultimate declining industry in the USA in the period since 1900. Yet, over the last 121 years, railroad stocks have beaten the US market, and outperformed both trucking stocks and airlines since these industries emerged in the 1920s and 1930s.

Indeed, the research in the 2015 Yearbook indicated that, if anything, investors may have placed too high an initial value on new technologies, overvaluing the new, and undervaluing the old. We showed that an industry value rotation strategy helped lean against this tendency and had generated superior returns.

Summary

This year, we added nine new markets, and two new composite indexes to our database. The Yearbook now covers in detail 32 markets and five composite indexes. Twenty-three of the countries and all five indexes span the 121-year period since 1900. This year, we have also added more recent supplementary data on equity returns for a further 58 countries, thus expanding our coverage to 90 markets.

We believe the unrivalled breadth and quality of its underlying database make the Yearbook the global authority on stocks, bonds, bills, inflation and currencies.

Photo: Rio de Janeiro, Brazil; Getty Images, Emir Terovic

Long-run asset returns

Many people consider long term to be ten or 20 years. We begin by explaining why much longer periods than this are needed to understand risk and return in stocks and bonds. This is because markets are so volatile. The long-run returns on stocks, bonds, bills and inflation over the last 121 years provide the context needed to assess returns over the recent past and to consider likely returns in the future.

Why a long-term perspective is needed

To understand risk and return, we must examine long periods of history. This is because asset returns, and especially equity returns, are volatile. This is readily illustrated by recent history. The 21st century began with one of the most severe bear markets in history. The damage inflicted on global equities began in 2000 and, by March 2003, US stocks had fallen 45%, UK equity prices had halved, and German stocks had fallen by two-thirds. Markets then staged a remarkable recovery, with substantial gains that reduced, and in many countries eliminated, the bear market losses.

World markets hit new highs at the end of October 2007, only to plunge again in another epic bear market fueled by the global financial crisis.

Markets bottomed in March 2009 and then staged another impressive recovery. Yet, in real terms, it took until 2013 for many of the world's largest markets to regain their start-2000 levels. Global equities then rose, with relatively few setbacks, for more than a decade. Meanwhile, volatility remained remarkably low, albeit with occasional spikes. The enduring picture, however, was one of low volatility. When markets are calm, we know there will be a return to volatility and more challenging times; we just cannot know when.

"When" proved to be in March 2020 as soon as the COVID-19 pandemic sent stocks reeling once again, falling by more than a third in many countries. Volatility sky-rocketed to levels even higher than seen during the global financial crisis. The world experienced its third bear market in less than 20 years. Markets then staged a remarkable recovery and volatility fell once again.

The volatility of markets means that, even over periods of as long as 20 years, we can still experience "unusual" returns. Consider, for example, an investor at the start of 2000 who looked back over the previous twenty years, regarding this as "long-run" history, and hence providing guidance for the future. At that point in time, the historical real annualized return on global equities over the previous 20 years had been 10.5%. But, over the next decade, our investor would have earned a negative real return on world stocks of –0.6% per annum.

The demons of chance are meant to be more generous. Investors who hold equities require a reward for taking risk. At the end of 1999, investors cannot have expected, let alone required, a negative real return from equities; otherwise they would have avoided them.

Looking in isolation at the returns over the first two decades of the 21st century tells us little about the future expected risk premium. In the first decade, investors were unlucky and equity returns were attenuated by two deep bear markets.

This was a brutal reminder that the very nature of the risk for which they sought a reward means that events can turn out poorly, even over multiple years. In the second decade, investors were lucky; markets recovered quickly from the global financial crisis, which was followed by more than a decade of strong returns. They then recovered even faster from the initial falls during the COVID-19 pandemic.

At the same time, the returns over the last two decades of the 20th century also revealed nothing very useful when taken in isolation. These returns must surely have exceeded investors' prior expectations, and thus provided too rosy a picture of the future. The 1980s and 1990s were a golden age. Inflation fell from its highs in the 1970s and early 1980s, which lowered interest rates and bond yields. Profit growth accelerated and world trade and economic growth expanded. This led to strong performance from both equities and bonds.

Long periods of history are also needed to understand bond returns. Over the last 40 years, our World bond index has provided an annualized real return of 6.2%, only marginally below the 6.8% from world equities. Yet today, long sovereign bonds in most developed countries are selling on prospective real yields that are close to zero or negative. In some countries, even the nominal yields on long bonds are negative. Extrapolating bond returns from the last 40 years into the future would be foolish. That was a golden age for bonds, just as the 1980s and 1990s were a golden age for equities.

However, golden ages, by definition, are exceptions. To understand risk and return in capital markets – a key objective of the Yearbook – we must examine periods much longer than 20 or even 40 years. This is because stocks and bonds are volatile, with major variation in year-to-year returns. We need very long time series to support inferences about investment returns.

Our 121-year returns, which we document below, include several golden ages, as well as many bear markets; periods of great prosperity as well as recessions, financial crises, and the Great Depression; periods of peace, and episodes of war. Very long histories are required in order to hopefully balance out the good luck with the bad luck, so that we obtain a realistic understanding of what long-run returns can tell us about the future.

We document the long-run history of stocks, bonds, bills and inflation since 1900 based on the 21 countries and five composite indexes for which we have continuous 121-year histories. The two other countries with 1900 start dates but which have broken histories, Russia and China, are included in the relevant composite indexes. The returns histories for the nine new countries added in 2021 that have later start dates are documented in the full printed Yearbook.

Equity returns since 1900

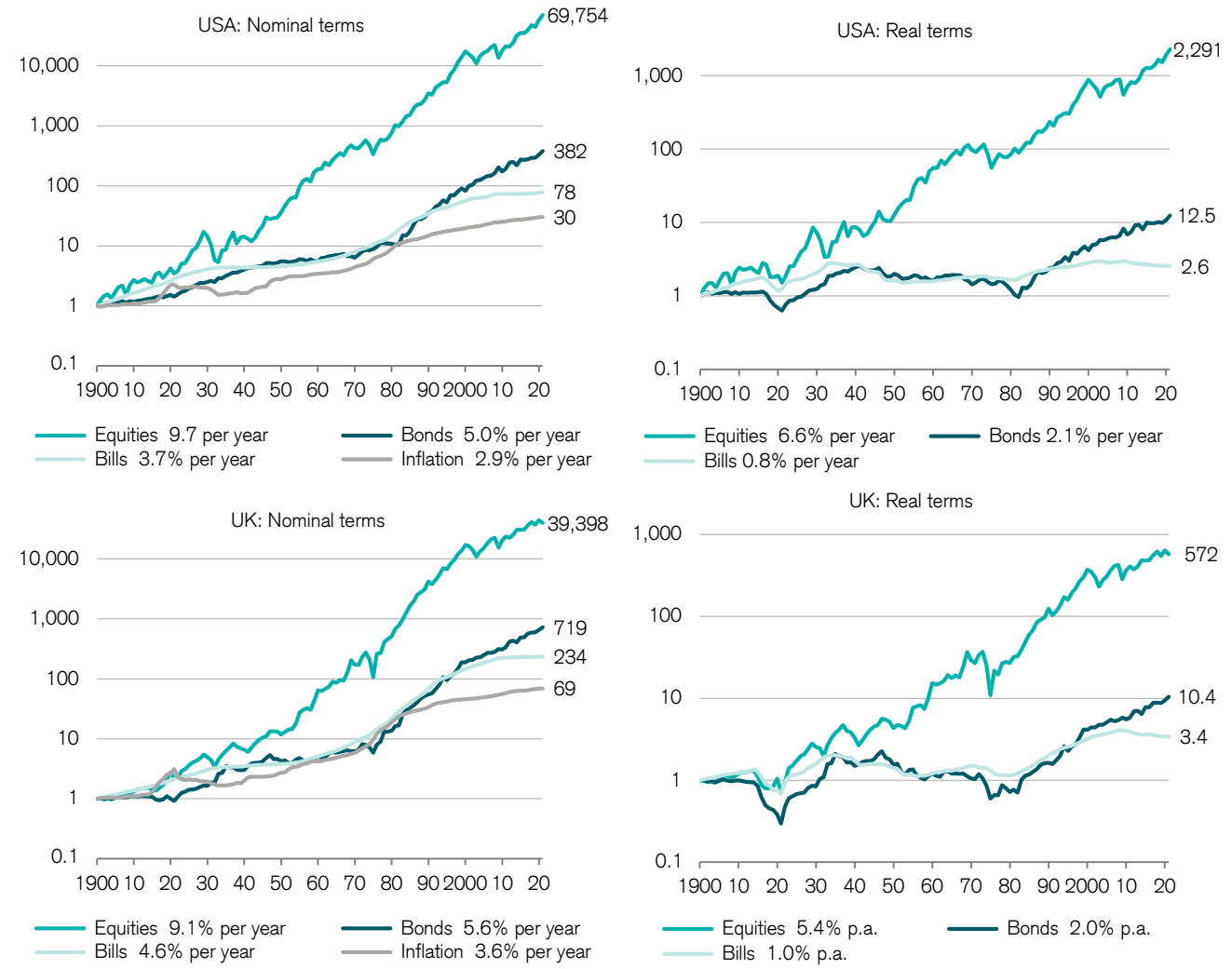
The top left panel of **Figure 3** overleaf shows the cumulative total return from stocks, bonds, bills, and inflation from 1900 to 2020 in the world's leading capital market, the United States. Equities performed best. An initial investment of USD 1 grew to USD 69,754 in nominal terms by end-2020. Long bonds and Treasury bills gave lower returns, although they beat inflation. Their respective index levels at the end of 2020 are USD 382 and USD 78, with the inflation index ending at USD 30. The chart legend shows the annualized returns. Equities returned 9.7% per year versus 5.0% on bonds, 3.7% on bills, and inflation of 2.9% per year.

Since US prices rose 30-fold over this period, it is more helpful to compare returns in real terms. The top right panel of **Figure 3** shows the real returns on US equities, bonds, and bills. Over the 121 years, an initial investment of USD 1, with dividends reinvested, would have grown in purchasing power by 2,291 times. The corresponding multiples for bonds and bills are 12.5 and 2.6 times the initial investment, respectively. As the legend to the chart shows, these terminal wealth figures correspond to annualized real returns of 6.6% on equities, 2.0% on bonds, and 0.8% on bills.

The chart shows that US equities totally dominated bonds and bills. There were severe setbacks of course, most notably during World War I; the Wall Street Crash and its aftermath, including the Great Depression; the OPEC oil shock of the 1970s after the 1973 October War in the Middle East; and the two bear markets in the first decade of the 21st century. Each shock was severe at the time. At the depths of the Wall Street Crash, US equities had fallen by 80% in real terms. Many investors were ruined, especially those who bought stocks with borrowed money. The crash lived on in the memories of investors for at least a generation, and many subsequently chose to shun equities.

The top two panels of **Figure 3** set the Wall Street Crash in its long-run context by showing that equities eventually recovered and gained new highs. Other dramatic episodes, such as the October 1987 crash hardly register; the COVID-19 crisis does not register at all since the plot is of annual data, and the market recovered and hit new highs by year-end; the bursting of the technology bubble in 2000 and the global financial crisis of 2007–09 do show on the chart, but are barely perceptible. Besides revealing impressive

Figure 3: Cumulative returns on US and UK asset classes in nominal terms (left) and real terms (right), 1900–2020



Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

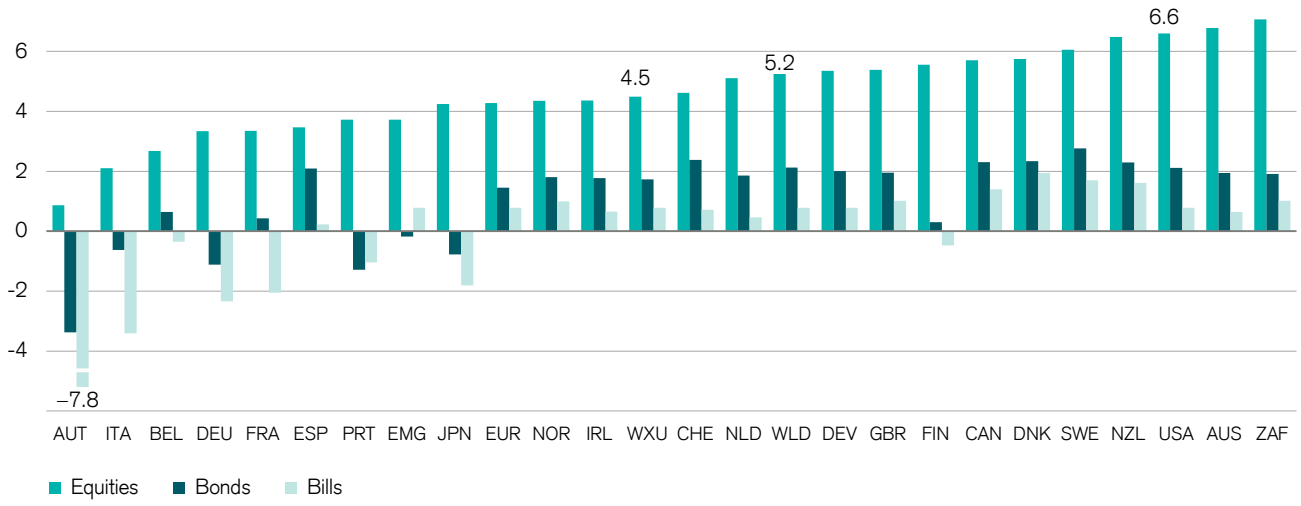
long-run equity returns, the chart sets the bear markets of the past in perspective. Events that were traumatic at the time now just appear as setbacks within a longer-term secular rise.

As noted above, we should be cautious about generalizing from the USA, which, over the 20th century, rapidly emerged as the world's foremost political, military, and economic power. By focusing on the world's most successful economy, investors could gain a misleading impression of equity returns elsewhere, or of future equity returns for the USA itself.

The bottom two panels of **Figure 3** show the corresponding charts for the UK, with nominal returns on the left and real returns on the right. The right-hand chart shows that although the real return on UK equities was negative over the first 20 years of the 20th century, the story thereafter was one of steady growth, broken by periodic setbacks. Unlike the USA, the worst setback was not during the Wall Street Crash period, but instead in 1973-74, the period of the first OPEC oil squeeze following the 1973 October War in the Middle East. UK bonds suffered too in the mid-1970s thanks to inflation rising to a peak of 25% in 1975.

The chart shows that investors who kept faith with UK equities and bonds were eventually vindicated. Over the full 121 years, the annualized real return on UK equities was 5.4%, versus 2.0% on bonds. As in the USA, equities greatly outperformed bonds which in turn gave higher returns than bills. These returns are high, although below those for the USA. However, for a more complete view, we need to look at investment returns across all countries.

Figure 4: Real annualized returns (%) on equities versus bonds and bills internationally, 1900–2020



Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Long-run returns around the world

The Yearbook allows us to make global comparisons. **Figure 4** shows annualized real equity, bond, and bill returns over the last 121 years for the 21 Yearbook countries with continuous investment histories plus the five composite indexes, namely, the World index (WLD), the World ex-USA index (WXU), the Europe index (EUR), the Developed markets index (DEV) and the Emerging markets index (EMG) ranked in ascending order of equity market performance. The real equity return was positive in every location, typically at a level of 3% to 6% per year.

Equities were the best-performing asset class everywhere. Furthermore, bonds outperformed bills in every country except Portugal. This overall pattern, of equities outperforming bonds and bonds beating bills, is what we would expect over the long haul, since equities are riskier than bonds, while bonds are riskier than cash.

Figure 4 shows that, while most countries experienced positive real bond returns, five countries had negative returns. Mostly, countries with poor bond returns were also among the worst equity performers. Their poor performance dates back to the first half of the 20th century, and these were the countries that suffered most from the ravages of war, and from periods of high or hyperinflation, typically associated with wars and their aftermath.

Figure 4 shows that the USA performed well, ranking third for equity performance (6.6% per year) and sixth for bonds (2.1% per year). This confirms our earlier conjecture that US returns would be high since the US economy has been such an obvious success story, and that it was unwise for investors around the world to base their future projections solely on historical US evidence. However, while US stocks did well, the USA was not the top performer, nor were its returns especially high relative to the world averages. The real return on US equities of 6.6% contrasts with the real USD return of 4.5% on the World-ex USA index.

In **Figure 5** overleaf, we compare equity and bond returns with inflation in the same year for the full range of 21 countries for which we have a complete 121-year history. We exclude the hyperinflationary years of 1922–23 for Germany and 1921–22 for Austria.

Out of 2,537 country-year observations, we identify those with the lowest 5% of inflation rates (i.e. with very marked deflation), the next lowest 15% (which experienced limited deflation or stable prices), the next 15% (which had inflation of up to 1.6%), and the following 15%; these four groups represent half of our observations, all of which experienced inflation of 2.6% or less.

At the other extreme, we identify the country-year observations with the top 5% of inflation rates, the next highest 15% (which still experienced inflation above 7.5%), the next 15% (which had rates of inflation of 4.1%–7.5%), and the remaining 15%; these four groups represent the other half of our observations, all of which experienced inflation above 2.6%. In **Figure 5** we plot the lowest inflation rate of each group as a dark turquoise rectangle.

The bars in **Figure 5** are the average real returns on bonds and on equities in each of these groups. As one would expect, and as documented in the previous section, the average real return from bonds varies inversely with contemporaneous inflation. Needless to say, in periods of high inflation, real bond returns were particularly poor, while in deflationary periods, they were excellent. As an asset class, bonds suffer in periods of inflation, but provide a hedge against deflation.

During marked deflation periods, equities gave a real return of 13.2%, greatly underperforming the bond return of 19.1% (see the left of the chart). Over all other intervals, equities outperformed bonds, with an average premium relative to bonds of almost 7%. During marked inflation periods, equities gave a real return of –10.5%, greatly outperforming the bond return of –24.9% (see the right of the chart). Although harmed by high inflation, equities were resilient compared to bonds.

Overall, it is clear that equities performed especially well in real terms when inflation ran at a low level. High inflation impaired real equity performance, and deflation was associated with deep disappointment compared to government bonds. Historically, when inflation has been low, the average realized real equity returns have been high, greater than on government bonds, and very similar across the different low inflation groupings shown in **Figure 5**.

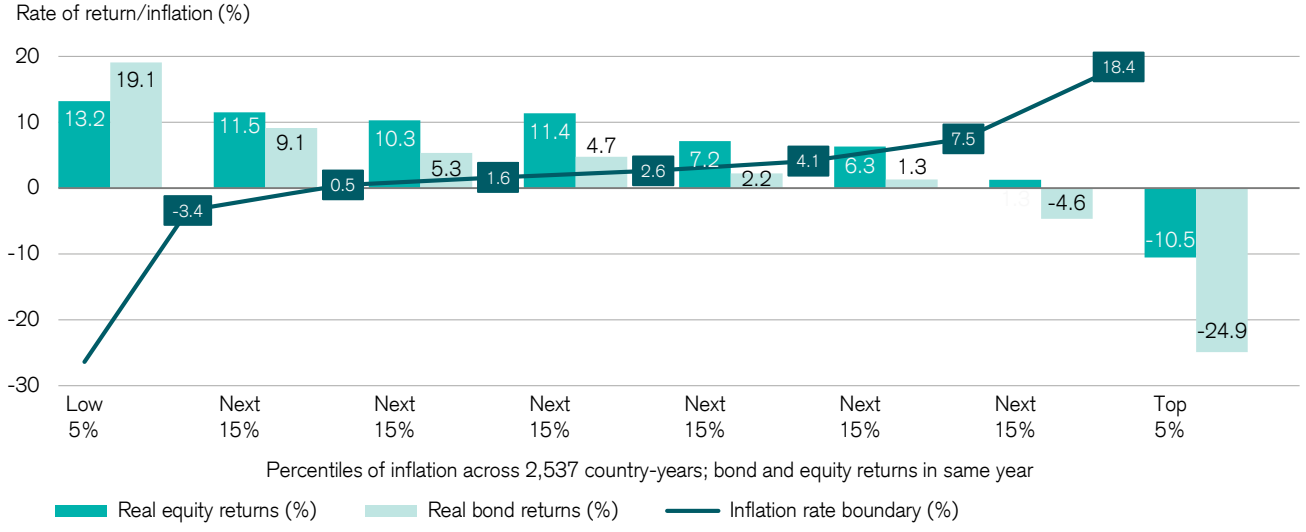
These results suggest that the correlation between real equity returns and inflation is negative, i.e. equities have been a poor hedge against inflation. There is extensive literature which backs this up. Fama and Schwert (1977), Fama (1981), and Boudoukh and Richardson (1993) are the three classic papers. The negative correlation between inflation and stock prices is cited by Tatom as one of the most commonly accepted empirical facts in finance.

Yet it is widely believed that common stocks must be a good hedge against inflation to the extent that they have had long-run returns that were ahead of inflation. But their high ex-post return is better explained as a large equity risk premium. The magnitude of the equity risk premium tells us nothing about the correlation between equity returns and inflation. It is important to distinguish between beating inflation and hedging against inflation.

Concluding remarks

Over the long run, equity returns have dominated bond and bill returns. Over the 121 years since 1900, equities have outperformed bonds and bills in all 21 countries. For the world as a whole, equities outperformed bills by 4.4% per year and bonds by 3.1% per year.

Figure 5: Real bond and equity returns versus inflation rates, 1900–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, DMS dataset. Not to be reproduced without express written permission from the authors.

Photo: Seoul, South Korea; Credit Suisse

Currencies

Global investors are exposed to both foreign assets and foreign currencies. We look at the long-run behavior of currencies since 1900. While they have been volatile, parity changes were largely responding to relative inflation rates. This has important implications for long-run investors, as it means they are already protected to some extent from currency risk.

Exchange rates and long-run asset returns

For some 50 years now, investors have been exhorted to diversify internationally so that they can benefit from risk reduction through diversification. Even 50 years ago, this idea was not new. Long before the birth of portfolio theory, international diversification was familiar to investors.

Over a century ago, when capital flowed freely, London, New York, Amsterdam and Paris facilitated the development of transport systems, utilities, and natural resources around the world. In those days, many currencies were tied directly or indirectly to the gold price, and currencies did not seem an important element of the risk of investing overseas.

Today, however, exchange rates are volatile, and a switch from domestic toward foreign equities introduces exchange rate risk to a portfolio. For investors whose emphasis is on consumption in their home country – individuals, charities, insurance companies, pension funds, and the like – it is important to identify the potential risks from currency exposure.

Although the 121-year returns depend on the reference currency, in real terms, the ranking of markets by long-term return does not vary greatly with the location of the investor.

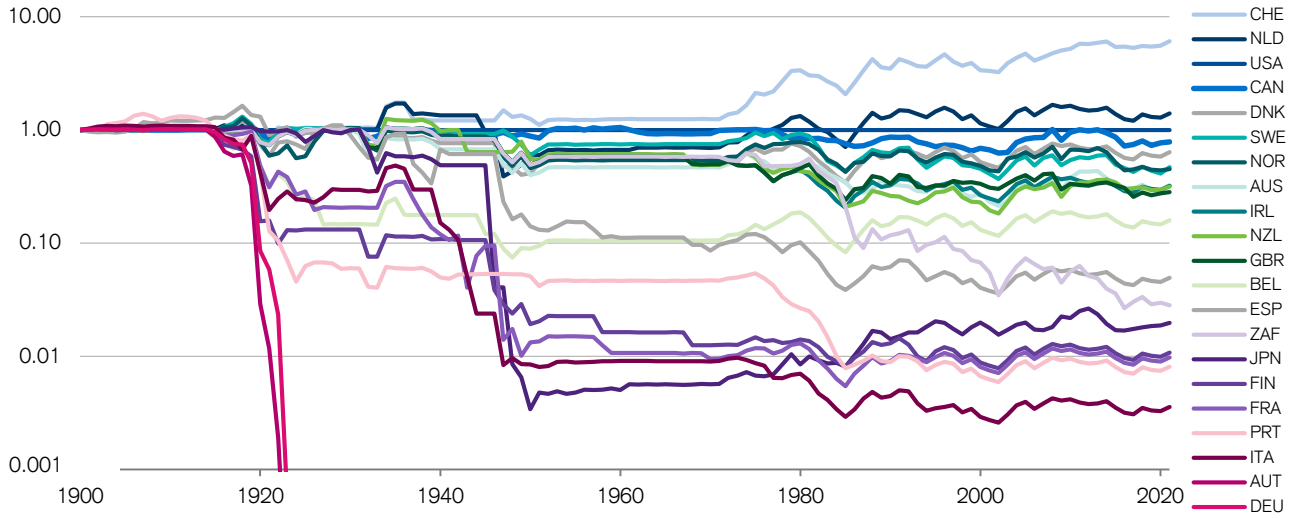
Long-run exchange rate behavior

Figure 6 presents exchange rates against the US dollar. On the left of the graph, we record the dollar value of 5.38 Swiss francs, 0.21 British pounds, and the sums in other currencies that equated, at start-1900, to one dollar. That is, we rebase the exchange rates at start-1900 to a value of 1.0. The vertical axis displays the number of dollars required to purchase one local currency unit (after rebasing). A depreciating currency trends downward.

Figure 6 shows that, in Germany's 1922–23 hyperinflation and Austria's long period of high inflation and hyperinflation that peaked in 1922, the currencies of these two countries were debased to a value of essentially zero. Other currencies took longer to move less. By start-2021, the currencies in the diagram had depreciated to the point where the number of Italian currency units (lira, followed by euros) that could be bought for one dollar was 280 times as large as in 1900, the number of yen was 51 times larger, and the number of British pounds was 3.5 times larger.

The strongest currency was the Swiss franc, which had appreciated until (by today) one dollar could buy only 16 rappen (Swiss centimes), which is one-sixth of the number of francs that the dollar could have bought in 1900.

Figure 6: Nominal exchange rates, 1900–2020, in USD per local currency (1900=1)



Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Common-currency returns across markets

When considering cross-border investment, we need to account for exchange rate movements. To illustrate, consider an American buying Swiss equities and a Swiss investor buying US equities. Each investor now has two exposures, one to foreign equities and the other to foreign currency. We need to convert each investor's return into his or her reference currency.

To convert nominal returns, we use changes in the nominal exchange rate. Investors, however, focus on real returns in their local currency. To convert real returns in one currency into real returns in another, we simply adjust by the change in the real exchange rate. Over the period 1900–2020, the real (inflation-adjusted) Swiss franc was stronger than the US dollar by 0.74% per year.

Thus, the American who invested in Switzerland had a real return of 4.61% (from Swiss equities) plus 0.74% (from the Swiss franc), giving an overall return of (1+4.61%) × (1+0.74%) – 1 = 5.39% (all numbers rounded). In contrast, the Swiss investor who invested in America had a real return of 6.60% (from US equities) minus 0.74% (from the US dollar), namely (1+6.60%) × (1–0.74%) – 1 = 5.81% (again, rounded).

Instead of comparing domestic returns, an alternative way of making cross-country comparisons is thus to translate all countries' returns into real returns in a common currency using the real exchange rate. We make these comparisons in the printed Yearbook.

Conclusion

Currency values have fluctuated considerably both recently and over the 121 years from 1900 to 2020. Over the long run, most currencies weakened against the US dollar, and only a couple (most notably, the Swiss franc) proved perceptibly stronger than the US dollar. Yet, over the long haul, parity changes were largely responding to relative inflation rates.

Over more than a century, real exchange rates against the US dollar changed by an annualized amount that was smaller than 1% per year. Common currency returns have thus been quite close to, and have a very similar ranking to, real returns expressed in local currency terms.

Photo: Jaipur, India; Getty Images, Geraint Rowland Photography

Investment risk

Investment in equities has proved rewarding over the long run, but has been accompanied by correspondingly greater risks. Bonds similarly beat cash, but were again more volatile. Our main focus here is on equity risk and the equity risk premium, although we also provide evidence in the full Yearbook on long-term bonds. We begin by examining the historical variation of stock market returns, giving particular attention to downside risks – the bad times for investors.

Dispersion and the investment horizon

We now examine the range of real returns from investing over various time horizons in the stock and bond markets. On the following pages, **Figures 7 and 8** display the dispersion of real equity returns in the USA and Japan. **Figure 9** presents a similar analysis of real returns for US bonds, which we will discuss shortly. In each chart, the vertical axis measures the real return, annualized over intervals of all possible length from ten to 121 years. We depict the range of real returns that could be computed if data were used as at any year-end between 1909 and 2020.

The horizontal axis shows the number of years used to compute the real return. For instance, at the left-hand side of the chart, located against a holding period of ten years, is the range of 10-year real returns. This part of the chart is based on 112 estimates of the historical real return. The estimates comprise performance statistics over the following overlapping intervals, each with a duration of one decade: 1900–09, 1901–10, and so on to 2011–20. Similarly, with a holding period of 20 years, the chart is based on 102 estimates of the real return over the following overlapping intervals, each with a duration of two decades: 1900–19, 1901–20, and so on to 2001–20.

The shaded areas run from the maximum (100th percentile) all the way down to the minimum (the 0th percentile) of the distribution of estimated real returns. The depth of the shading denotes five components of the distribution of returns. The top decile (the darker-shaded area) represents favorable returns that occur one-tenth of the time. The top quartile (the lighter- and darker-shaded areas, taken together) represents favorable returns that occur one-fourth of the time. The interquartile range (the unshaded area in the middle of the chart) represents the middle half of the distribution.

The bottom quartile (the lighter- and darker-shaded areas, taken together) represents unfavorable returns that occur a quarter of the time. The bottom decile (the darker-shaded area) represents unfavorable returns that occur one-tenth of the time. The thicker line in dark turquoise at the center of the interquartile range shows the median, which is out- or underperformed one-half of the time. More details are in Dimson, Marsh, and Staunton (2004a).

Equities and the investment horizon

Charts like this enable us to answer questions such as: what is the longest drawdown of cumulative real returns? Restricting ourselves just to the USA, the longest such period lasted for 16 years. To verify this, look in **Figure 7** at the horizontal axis, and note the point where the holding period is 16 years. You will see that for holding periods above 16 years, the dark area is consistently above the line labelled 0%.

There were no sub-zero real returns over investment periods of 17 or more years, as can be seen in the chart. Even that 16-year drawdown period in which real returns were negative was long ago (it was 1905–1920). This finding for the USA supports the widely cited claim that stock market investors have historically enjoyed a positive real return as long as they held a diversified portfolio of US shares for at least 20 years. The observation that stocks have been "safe" over the long run was first made by Wharton School professor Jeremy Siegel.

However, the USA was fortunate. Many other markets were less so. **Figure 8** shows the equivalent chart for the Japanese equity market, which underperformed US stocks, while at the same time being more volatile. Putting these two factors together, it is no surprise that there were lengthy periods when Japanese stocks were underwater in real terms. Indeed, over the course of the 20th and 21st centuries, the minimum investment horizon to be sure of a non-negative real return from Japanese equities would have been over 51 years.

Bonds and the investment horizon

If equities can impose such a large downside on investors, default-free bonds might seem a safer alternative. Unfortunately, this is not the case as the likelihood of a substantial and protracted negative real return has been greater in the bond market. Bond markets have had long periods during which investors who bought at the "wrong" time failed to achieve a real return.

Figure 9 focuses on US government bonds. The long-run investment returns from government bonds were substantially lower than equities (see the right of the trumpet-shaped chart, which intersects the vertical axis at a lower level than the prior two exhibits. This repositions the area lower on the graph, which amplifies the likelihood of a negative real return. A positive real return from US government bonds was assured only if the investor had a horizon of 57 years. Anything less, and the investor may have suffered a sub-zero real return. So there is a price to be paid for the safety of government bonds. In terms of inflation-adjusted returns, there is a high chance of disappointment.

Figure 7: US real US equity returns; periods of 10–121 years

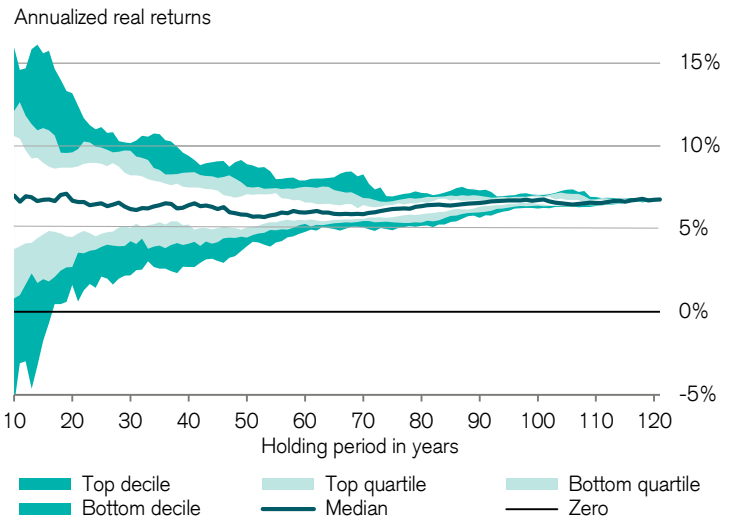
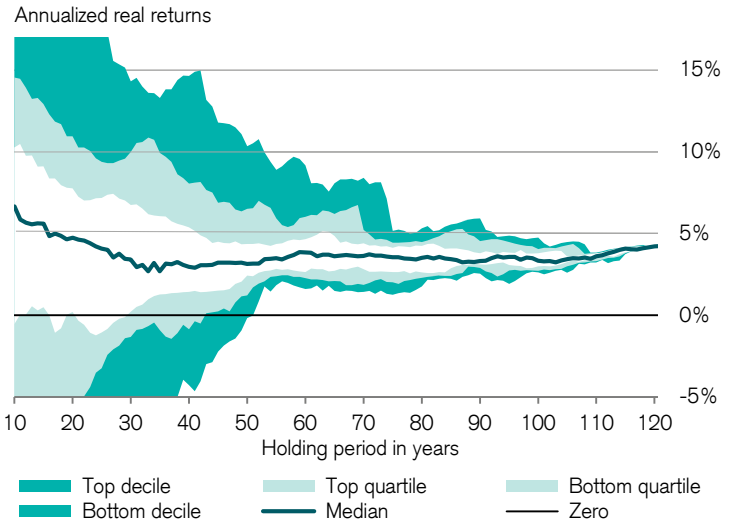
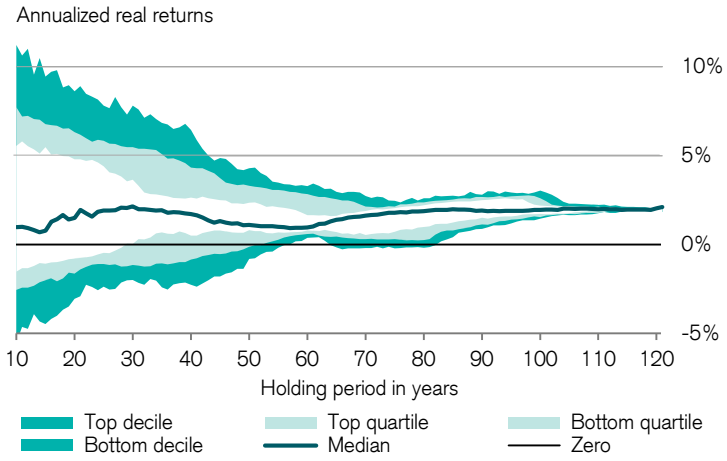


Figure 8: Japan real equity returns; periods of 10–121 years



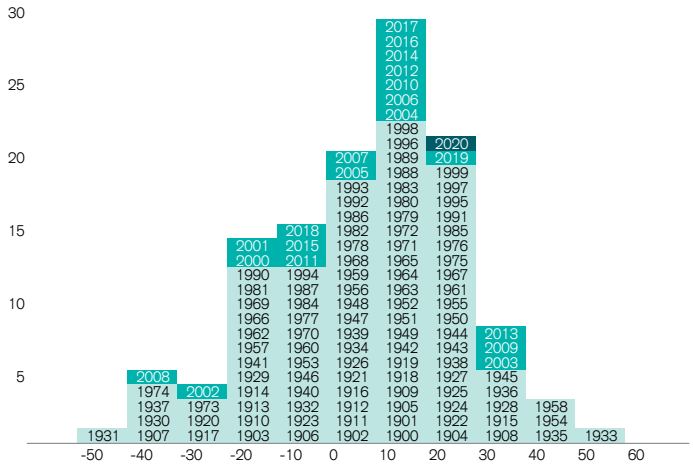
Source Figures 7–8: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook 2021, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Figure 9: US real bond returns; periods of 10–121 years



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook 2021, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Figure 10: US equity risk premium versus bills, 1900–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

The historical reward for risk

Investors expect a reward for exposure to risk. This is the risk premium, which we measure relative to the returns on Treasury bills and, if appropriate, government bonds. To do this, we estimate the geometric difference between the realized return on an asset and the risk-free rate of return that was available over the same period.

Figure 10 shows the year-by-year US historical risk premium relative to bills. The distribution of outcomes was wide, with the lowest and highest premiums being realized, as might be expected, in the worst and best years for stocks. The lowest premium was –45% in 1931, when equities returned –44.3% and Treasury bills 1.1%; the highest was 57% in 1933, when equities gave 57.0% and bills 0.3%. The chart shows that the distribution of annual premiums was roughly symmetric, resembling a normal distribution. The arithmetic mean is 7.7% and the standard deviation is 19.4%. On average, therefore, US investors received a reward for exposure to equity market risk that was positive and quite large.

Because the range of year-to-year premiums is broad, it can be misleading to label them as "risk premiums." Investors clearly cannot have expected, let alone required, a negative risk premium from equities, as otherwise they would simply have avoided them. All the negative and many of the very low premiums shown in the chart must therefore reflect unpleasant surprises.

Equally, investors could not have "required" huge premiums, such as 57% in 1933. Such numbers are implausibly high as a required reward for risk, and the high realizations must therefore reflect pleasant surprises. To avoid confusion, we should probably refer to "excess returns" – namely returns in excess of (or under) the risk-free interest rate.

To make sensible inferences about the risk premium, we need to examine intervals much longer than a year. Over extended horizons, we might expect good and bad luck to cancel one another out. However, long needs to be long indeed, as even over intervals of a decade or more, there can be big performance surprises.

For example, there have been several lengthy periods, including the opening decade of the 21st century, as well as intervals in the 1970s and early 1980s when the realized US risk premium was negative. We require very many decades to infer investors' expectations about the reward for risk. Over the full 121 years, the annualized US equity risk premium relative to bills was 5.8%.

The worldwide equity premium

Before our series of studies, most of the long-term evidence on the historical equity premium had been for the US market, which today is the world's largest stock market. Estimates for that country are therefore susceptible to success bias. We therefore now look at worldwide evidence

The annualized equity premiums for the 21 countries and five composite indexes with continuous investment histories since 1900 are shown in **Figure 11**. Countries are ranked by the equity premium measured relative to bills, displayed as bars. The line-plot shows each country's risk premium measured relative to bonds. Over the entire 121 years, the annualized equity risk premium, relative to bills, was 5.8% for the USA and 4.3% for the UK. Averaged across the 21 countries, the risk premium relative to bills was 4.8%, while the risk premium on the world equity index was 4.4%.

Relative to long government bonds, the premiums are similar, but tend to be smaller. The annualized US equity risk premium relative to bonds was 4.4% and the corresponding figure for the UK was 3.4%. Across the 21 markets the risk premium relative to bonds averaged 3.5%, while for the world index, it was 3.1%.

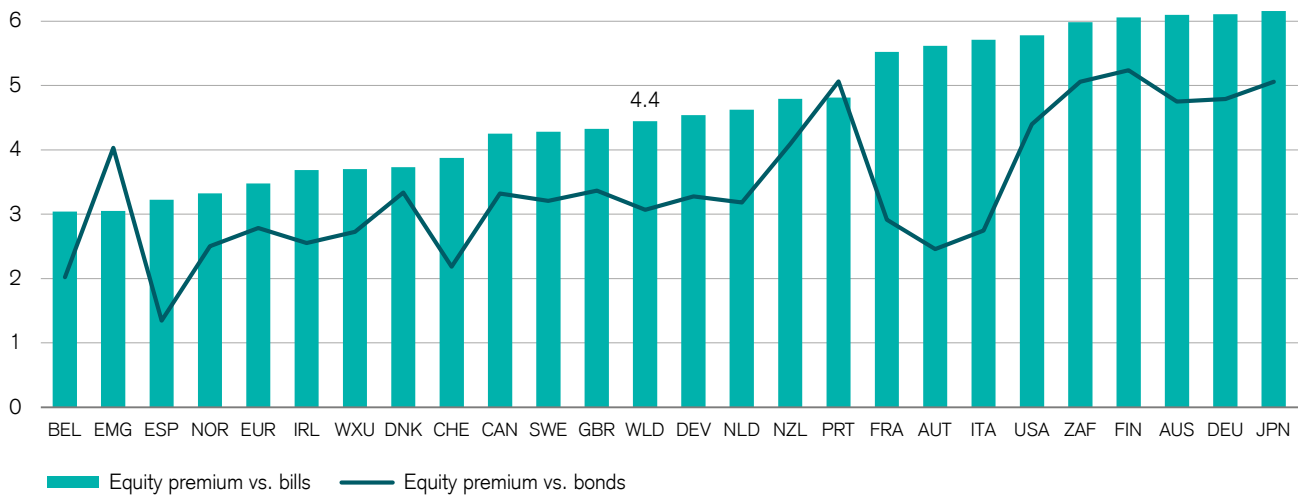
These estimates are lower than frequently quoted historical averages. The differences arise from omission in many studies of returns during the earlier part of the 20th century and omission of non-US markets. Our global focus gives rise to lower estimated risk premiums than were previously assumed.

Summary

We have discussed the risks from investing in equities and bonds and have described the variability of returns and presented evidence on the extremes of performance experienced globally since 1900. We have included here the good times, as well as the bad, but since our focus here is on risk, we have dwelt mostly on the potential downside.

Investors expect a reward for exposure to such risks. For equities, this is the equity risk premium. We have presented evidence on the historical equity premium for 21 countries and for our composite indexes, including our World index, estimated over 121 years. Our estimates, including those for the USA and UK, are lower than frequently quoted historical averages.

Figure 11: Worldwide annualized equity risk premium (%) relative to bills and bonds, 1900–2020



Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Photo: Hong Kong SAR; Credit Suisse

The low-return world

We examine the low-return world in which we now live, estimating the returns we can project into the future. The real interest rate on Treasury bills represents the inflation-adjusted return on an asset that is essentially risk-free. The expected return on equities needs to be higher than this as investors require some compensation for their higher risk exposure. If real equity returns are equal to the real risk-free rate plus a risk premium, it follows that when the real interest rate is low, subsequent real equity returns will also be low. This applies not only to equities but also to bonds.

The race to zero and beyond

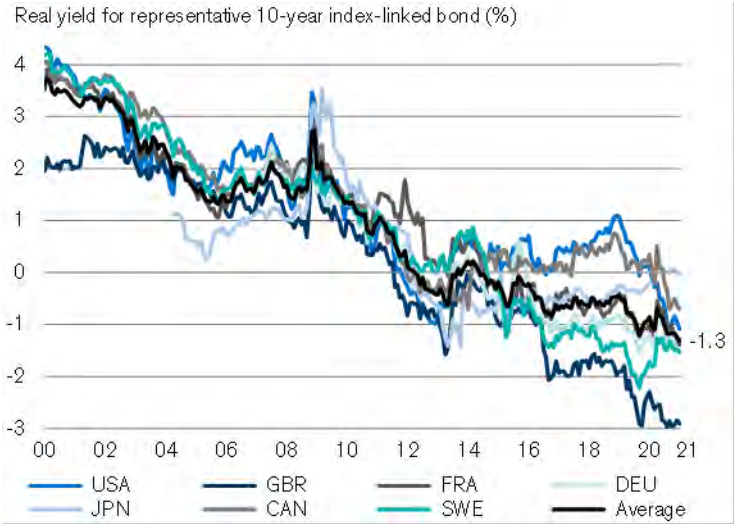
Figure 12 plots the real yields on 10-year inflation-linked bonds (ILBs). These securities are equivalent to the US Treasury Inflation-Protected Security (TIPS). The black line is the average of the ILB yields for seven individual markets. In 2000, the average real yield was nearly 4%; by end-2020 it had collapsed by some five percentage points to –1.3%. When we add an equity premium to the real risk-free rate, we get an estimate of the expected real return on equities. The 21st century fall in real rates has had a big impact on capital market projections.

Interest rates and financial returns

What is the relationship between real interest rates and real equity returns? **Figure 13** looks at the markets with a 121-year history. We compare the real interest rate in a particular year with the real return from an investment in equities and bonds over the immediately following five years. After excluding the German and Austrian hyperinflations, we have a total of 2,445 observations of (overlapping) 5-year periods. We rank country-years by their real interest rate and allocate the sample to bands containing the 5% lowest and highest rates, with 15% bands in between. The line plot shows the boundaries between each band.

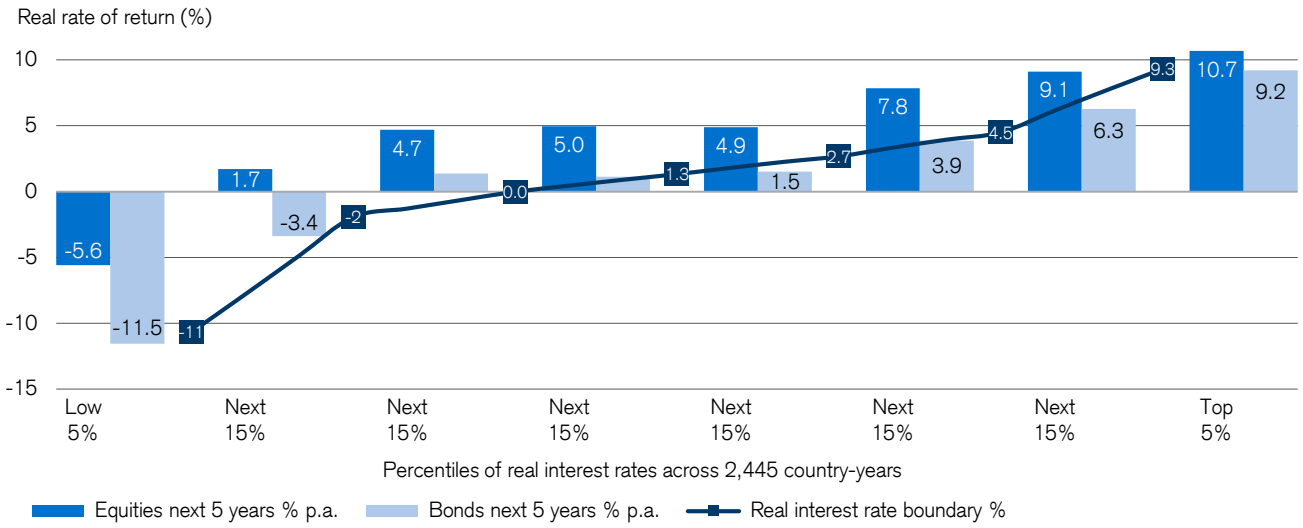
The bars are the average real returns on bonds and equities over the next five years. The first bar shows that, during years with a real interest rate below –11%, the average annualized real equity return over the next five years was –5.6%.

Figure 12: Real yields on inflation-linked bonds, 2000–2021



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook 2021, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Figure 13: Real asset returns versus real interest rates, 1900–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

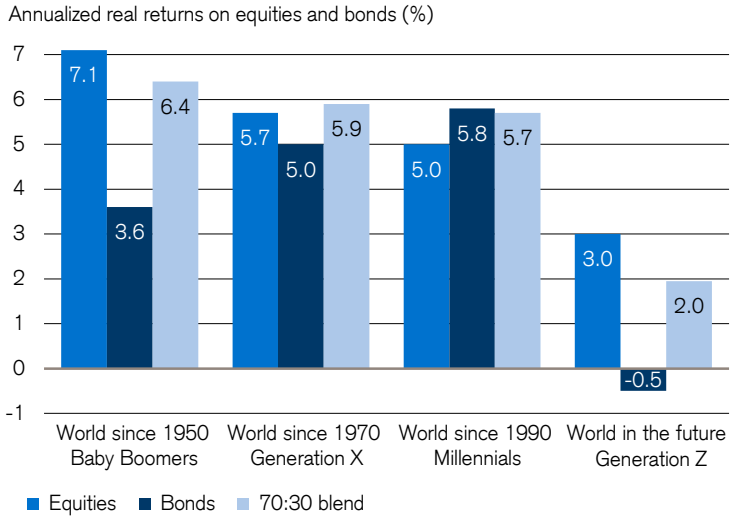
The first three bands comprise 35% of all observations and relate to real interest rates below zero. Negative real interest rates were experienced in around one-third of all country-years. Thus, although today's nominal short-term interest rates are at record lows, real rates are not. Note, however, that, unlike today, low real rates typically arose in inflationary times.

There is a clear relationship between the current real interest rate and subsequent real returns for both equities and bonds. Regression analysis of real interest rates on real equity and bond returns confirms this, yielding highly significant coefficients.

Note also that in every band depicted in **Figure 13**, equities provided a higher return than bonds.

When real interest rates are low, expected future risky-asset returns are also lower. However, during periods when real interest rates fall unexpectedly, this will tend to provide an immediate boost to asset prices and hence returns, even though prospective returns will have been lowered. These patterns prevailed during the 21st century.

Figure 14: Return experiences across generations



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, Global Investment Returns Yearbook 2021, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Return projections

Investors' views of the future are conditioned by past experiences that differ across generations. Baby boomers (born 1946–64) were the post-war babies; and Generation X (born 1965–80) and Millennials (born 1981–96) followed. Social scientists report major differences between the tastes, habits and expectations of each cohort. However, their capital market experiences have been similar. In the first three blocks of **Figure 14,** we report investment performance for each cohort. Generation Z (born 1997–2012) faces a different future.

The block on the right uses current bond yields to indicate future bond returns. It then adds our estimated equity risk premium (relative to bills) of around 3½% on a geometric mean basis to provide a projection of equity returns. The balanced portfolio now offers a far lower expected return of around 2% in real terms – about a third of the real return enjoyed by the previous three generations. Many savers, investors, pension plans, endowments and institutions are challenged by the low-return world.

Photo: Mexico City, Mexico; Getty Images, Jia Liu

Factor premiums

In Aesop's fable "The Hen and the Golden Eggs," a farmer had a hen that laid a golden egg every day. Thinking the hen must contain a lump of gold, he killed it, only to find it was no different from the other hens. He deprived himself of the gain he could have had day after day. For a long time, factor premiums have been the "golden egg" of investing. Seeking to harvest extra rewards, investors have searched for ever more factors. However, most were just an artefact of data mining. We focus on the premiums that have been persistent over time and across markets. As "factor effects," they matter and will continue to exist. But will they generate premiums in the future?

The attraction of factor investing

Many factor-investing strategies have a record of desirable long-term returns. Perhaps reflecting this, the rates of adoption of factor investing have been impressive. What is the allure of factor-based asset management, often known as "smart beta"? There are at least three attractions. First, at a time when active management has lost credibility in the eyes of many, smart beta offers an alternative to the underperformance of the average active manager. Factor investing is often regarded as a compromise between active and passive investing.

Second, competition between asset managers is fierce and they face profound cost pressures. Factor investing is attractive because it can be less costly than traditional active asset management. The lower-cost solution can be used to reduce an asset manager's cost base or to reduce fees and charges for clients.

Third, real interest rates have declined precipitously since the global financial crisis (see **Figure 12**). Many investors see factor investing as an innovative means of enhancing returns with more certainty than traditional approaches.

Popular factors

Smart-beta investing seeks to harvest the long-run factor premiums highlighted by academic researchers. Factors are security-related characteristics that give rise to common patterns of return among subsets of listed securities. While industry and sector membership have long been a part of how we categorize investments, the focus here goes beyond industry membership.

To identify factors, researchers typically construct long-short portfolios. They are long the preferred exposure and short the unwanted exposure. For example, an income factor portfolio could contain high-dividend yield stocks accompanied by a short position in lower-yielding stocks. It is far easier to buy stocks you do not own than to sell stocks you do not own. So the long side of a factor portfolio is usually easy to acquire, whereas the short side can be challenging. Long-short strategies are therefore relatively expensive – on occasion impossible – to construct. They can certainly be difficult to scale up.

What are the smart-beta strategies that researchers have highlighted? As we show in the full Yearbook, size, value, income, momentum, volatility and other factors can have an important

impact on portfolio returns. Researchers such as Harvey and Liu [2019] have identified over 400 factors, and most are doomed to be unsuccessful in terms of portfolio performance.

The problem of apparently significant in-sample results being non-robust in out-of-sample tests is not new. It was discussed more than 30 years ago; see, for example, Dimson and Marsh (1990) and Markowitz and Xu (1994). There is no substitute for genuine out-of-sample testing. Yet it is impractical to wait for additional data in order to test a model's reliability – not to mention the understandable impatience of practitioners.

Factor premiums: Short- and long-term

We start by looking at factor premiums since the onset of the Global Financial Crisis (GFC). **Figure 15** reports premiums since the beginning of the GFC for both the USA upper panel) and the UK (lower panel). For each year, we estimate factor performance by geometric subtraction. For example, the income premium is equal to *1 + return on higher yielding stocks*, divided by *1 + return on lower yielding stocks*, minus *1*.

Within each market, the premiums for an individual year are ranked from high to low. Factors are color-coded. Several features stand out. First, although these are labelled premiums, they are frequently negative. Indeed, only 48% of the annual figures shown in **Figure 15** were positive. At best, factor investing is a long-term strategy. Second, over time, the ranking of the factors varies a great deal. Third, and relatedly, although the rankings within a year for the two countries are often similar, that is not always the case. For example, in 2017, low volatility did best in the USA but worst in the UK.

Fourth, it is not obvious which factors are destined to do well. There can be a successful run of years, but it is hard to know if it will persist. Fifth, over the 13 post-GFC years, a pattern has emerged in which value investing has performed poorly. In ten out of 26 country-years, value was the worst-performing factor. Finally, we report the cumulative annualized performance of each factor in the right-hand column of the table.

Note that the 2008–20 ranking is highly sensitive to the period over which that summary statistic is estimated. For example, we see in the right-most column that the highest factor performance in the USA comes from low-volatility investing, and that low volatility is ranked second for the UK. Yet the striking performance of low-volatility investing in both countries over the course of 2008–20 owes a great deal to just one year (2008). An interval of 13 years is simply too brief to underpin judgements about the longer-term premiums from a particular factor.

A frustrating feature of factor premiums is that they may simply be transient anomalies rather than market regularities. If so, as soon as they are identified, they may cease to work.

To sum up, **Figure 15** shows that, since the GFC, the ranking of investment performance has not been stable. Earlier years (not shown here) also behave unpredictably. Because of this, perceptive investors diversify their risk exposures.

Figure 15: Post-crisis equity factor premiums (%) in the USA and UK, by year 2008–2020

USA	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2008–20
Highest	Low vol 90.4	Size 28.6	Size 13.5	Low vol 38.2	Value 10.8	Size 5.4	Low vol 11.3	Momentum 42.1	Value 16.9	Low vol 6.5	Low vol 14.1	Momentum 8.9	Momentum 3.7	Low vol 6.3
	Income 20.3	Value -8.0	Momentum 8.6	Income 29.3	Size 7.7	Value 5.2	Income 1.3	Low vol 12.9	Income 14.5	Momentum 6.2	Momentum 13.5	Low vol 4.8	Size 0.1	Size 1.3
	Momentum –2.3	Income –17.1	Income 7.1	Momentum 1.2	Momentum –0.8	Momentum 4.5	Value –2.3	Income 0.7	Size 9.7	Size –3.0	Income 3.8	Size –5.1	Income –24.0	Income 0.8
	Size –4.0	Low vol –32.9	Value –5.0	Size –3.5	Low vol –2.0	Income –8.2	Momentum –5.4	Size –9.4	Low vol –1.8	Value –9.5	Size –11.0	Value –5.9	Low vol –27.2	Momentum –2.3
Lowest	Value –5.3	Momentum –50.6	Low vol –16.2	Value –13.4	Income –7.9	Low vol –9.2	Size –6.9	Value –11.6	Momentum –22.0	Income –14.0	Value –14.2	Income –9.5	Value –28.5	Value –4.0
GBR														
Highest	Low vol 127.0	Size 26.9	Size 13.8	Low vol 35.0	Size 18.3	Momentum 32.4	Momentum 7.8	Low vol 23.7	Value 20.2	Momentum 11.0	Low vol 18.2	Size 6.6	Momentum 18.7	Momentum 8.1
	Momentum 78.9	Income 1.1	Value 3.2	Income 28.3	Value 14.8	Size 17.2	Income –1.3	Momentum 20.1	Income 15.3	Size 6.2	Momentum 6.6	Low vol 6.3	Size 7.3	Low vol 5.2
	Income 15.7	Value –6.9	Momentum 0.7	Momentum 20.6	Momentum –1.6	Low vol 11.5	Size –2.6	Size 12.4	Size –5.4	Value 3.3	Income –2.4	Momentum –3.6	Low vol –1.7	Size 4.3
	Value –11.8	Low vol –20.1	Income –13.7	Size –5.6	Income –8.1	Income 0.0	Low vol –6.2	Income –11.2	Momentum –18.3	Income –0.6	Value –7.0	Value –7.7	Income –16.9	Income 0.6
Lowest	Size –18.9	Momentum –25.4	Low vol –22.9	Value –10.7	Low vol –15.7	Value 0.0	Value –10.0	Value –20.9	Low vol –21.2	Low vol –9.6	Size –7.4	Income –7.9	Value –21.4	Value –3.4

Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Photo: Bangkok, Thailand; Getty Images, Navinpeep

Emerging markets

Emerging markets (EMs) are receiving increased attention, driven especially by North Asian markets, which account for two-thirds of EM value. We are expanding this year's coverage to include 90 markets, most of them EMs, and we spotlight nine of these new markets with a long history. We present our 121-year EM equity and bond indexes, documenting their long-run performance. We analyze risk, factor and country-rotation strategies. Within EMs, the value factor appears stronger, while size, momentum and profitability seem weaker than for developed markets. The volatility of EMs as a group is lower than it was, but the diversification benefits remain attractive.

Promise and disappointment

Advocates of emerging markets (EMs) stress two attractions. First, the potential for risk reduction through diversification. Second, the prospect of superior economic growth, with the vision of markets following the same path. While EMs do indeed offer rich diversification opportunities, the growth story has proved less robust.

The conventional view had been that, over the long run, dividends ought to grow at a similar rate to the overall economy. This suggests that fast-growing economies should experience superior growth in real dividends, and hence higher stock returns. However, as we have documented in our book, Triumph of the Optimists, and in previous Yearbooks, real dividend growth has lagged behind real Gross Domestic Product (GDP) per capita growth in almost every economy, whether developed or emerging. The relation between long-run real per capita growth in GDP and real equity returns is, in fact, negative.

While EM stock market performance has not benefitted – as many might have hoped – from the growth story, this is not to imply that EMs have disappointed. As we will show, the comparative performance of EM and developed market (DM) equities has varied over time. Over the last decade, EMs underperformed; since 2000, they outperformed; since 1900, the picture is mixed.

Though many recovered, markets were hit hard by the pandemic in early 2020. A second wave emerged later in the year, continuing into 2021. While all countries were exposed to COVID-19, a number of EMs were fast to get the virus under control, including China, South Korea and Taiwan (Chinese Taipei), which together represent about two-thirds of the overall value of EMs. Some observers argue that countries that responded successfully may be at an advantage for several years. Others disagree. Only time will tell.

This is an extract from the Credit Suisse Global Investment Returns Yearbook 2021 (it is Chapter 8 of the published book). We spotlight the investment performance and risk of EMs, and their role in a global equity portfolio. As always, we take a long-run view. A short-term focus on current perceptions and market beliefs can

seriously detract from investment performance. Those who follow the herd are destined to sell after markets have fallen and to buy after a rise. By examining very long periods, modern events can be placed in context. We therefore augment the Yearbook, with its 121 years of stock-market history for 23 countries, by broadening our database to include 90 DMs and EMs, albeit mostly over shorter periods than 121 years.

Now that the pandemic has challenged the role of the USA and other DMs as safe havens, we dig into what EMs offer to portfolio investors.

What is an emerging market?

There is no watertight definition of emerging markets. The term was introduced in the early 1980s by the International Finance Corporation to refer to middle-to-higher-income developing countries in transition to developed status, which were often undergoing rapid growth and industrialization, and which had stock markets that were increasing in size, activity and quality.

To classify markets as developed or emerging, investors rely on the major index providers which consider multiple criteria: MSCI uses 23 variables, FTSE uses 13, and S&P uses ten, plus a further ten if a change is indicated. Index compilers subdivide markets below developed status into several categories, such as emerging, frontier, "stand-alone" and unclassified markets.

An emerging market is not the same as an emerging economy. When the International Monetary Fund (IMF) classifies countries into advanced and developing economies, it focuses mostly on economic criteria such as GDP per capita, export diversification, and the degree of integration into the global financial system.

In contrast, index compilers use a combination of economic and capital market criteria, such as market size, liquidity and accessibility to global investors. This involves considering openness to foreign ownership, ease of capital inflows and outflows, investor rights, regulatory frameworks, and issues such as the ability to sell short. Investor and market opinion also matter.

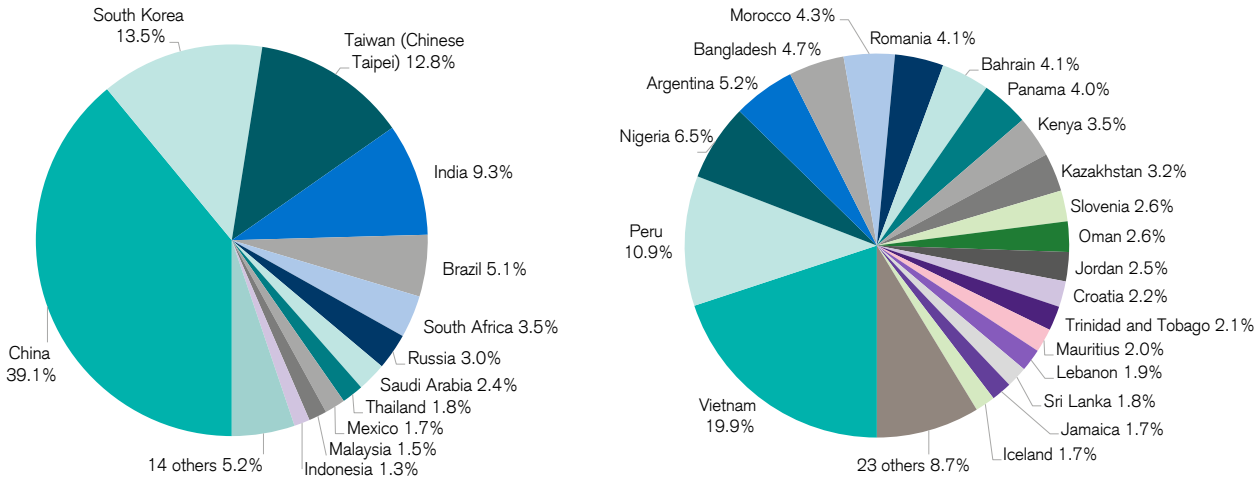
Emerging and frontier markets

Figure 16 shows the countries that currently constitute the MSCI Emerging Markets Index, together with their weightings. China is by far the largest EM. Its weight in the EM indexes has grown rapidly from just 3% in the early 2000s to 39% today. With the gradual inclusion of A-shares, the country's weighting is expected to grow further. Currently, MSCI includes only large- and mid-cap A-shares at 20% of their free-float value. Were this to increase to 100%, China would account for some 60% of the EM index. At that point, China's dominance of EMs would more than match that of the USA in DMs (see **Figure 1**).

After China, and based on MSCI's categorizations, the largest EMs are South Korea, Taiwan (Chinese Taipei), India, Brazil, South Africa, Russia and Saudi Arabia. All the EMs listed are long-standing constituents of the MSCI Emerging Markets Index, except for Saudi Arabia, which entered the index in 2019.

Despite the multiplicity of criteria used by the three major index compilers, there is substantial agreement between them on the boundary between DMs and EMs. The biggest difference between the MSCI classification, which we use here, and other index providers is that MSCI continues to regard South Korea as emerging, whereas FTSE Russell and S&P categorize it as developed. One reason that MSCI considers

Figure 16: Emerging markets (left) and frontier markets (right), end-2020



Sources: Elroy Dimson, Paul Marsh, and Mike Staunton, MSCI, FTSE Russell, S&P. Not to be reproduced without express written permission from the authors.

South Korea – and why all index compilers deem Taiwan (Chinese Taipei) – to be emerging is because their foreign-exchange markets are not fully liberated. The only other difference in terms of the DM-EM boundary is that FTSE Russell now regards Poland as a DM, while both MSCI and S&P deem it to be an EM.

The relative consensus on the DM-EM boundary contrasts with a lack of agreement on the boundary between EM and frontier markets. The chart on the right below identifies the countries that are currently deemed to be frontier by at least one of the main three index providers. Using this broad definition, there are 45 frontier markets around the world, of which the largest are Vietnam, Peru, Nigeria, Argentina, Bangladesh, Morocco and Romania.

Disagreements between the index compilers are rife. FTSE Russell regards Peru as a frontier market, while MSCI and S&P classify it as an EM. MSCI classifies Argentina as an EM, while FTSE has recently admitted Romania to its EM index, albeit with a single constituent. Of the 27 countries included in the MSCI Frontier Markets Index, only 19 feature in the S&P Frontier BMI Index, and just 17 in the FTSE Frontier Index. Yet the S&P Frontier BMI Index features 13 countries not covered by MSCI.

The classification of a national market is taken seriously by governments and regulators around the world. However, we focus primarily on the split between markets that are deemed developed and those with developing status. Unless stated to the contrary, our research groups together all of the latter markets as a single cohort and refers to them generically as "emerging."

Distinguishing between DMs and EMs

To analyze historical returns, we need a way of identifying whether a market was a DM or EM for each year in the past. Most of the 23 countries in our long-term 121-year dataset are today classified as developed. However, back in 1900, several would then have been classified as emerging. Indeed, if we go back far enough in time, even the USA was once an EM.

From the start of MSCI's EM index in 1987, we adopt MSCI's annual classification of developed versus not-yet-developed markets. We do not use MSCI index values. Prior to 1987, we use our own algorithm to determine which markets were developed and which were EMs.

In 2010, the Yearbook noted that, despite the complexity of index compilers' procedures, there was a simple rule that replicated market classification decisions accurately. This was to categorize countries as developed if they had per capita GDP above USD 25,000.

Given the success of this rule, we apply it to historical data, adjusting for US inflation to obtain the equivalent cut-off for earlier years. For the 23 countries in our database with start dates of 1900, seven would have been deemed EMs at the start of the 20th century: China, Finland, Japan, Portugal, Russia, South Africa and Spain. Three are still emerging today: China, Russia and South Africa. Using the GDP per capita rule, we estimate that Finland would have moved to developed in 1932, Japan in 1967 and Spain in 1974, while Portugal would still be emerging today (despite being promoted to developed by the index providers in 1997–98).

Our long-term dataset

Figure 17 shows the consolidated dataset of 90 developed and emerging markets analyzed by us. The vertical axis lists the markets, ranked by the number of years for which we have data. We include markets only if we have at least a decade of returns. The horizontal axis runs from 1900 to 2020 inclusive. Prior to 1950, the units of time are demi-decades; from 1950 onward, time is measured in years.

The shading in the chart denotes three levels of coverage. The top panel shows the 23 Yearbook countries for which we have data for all asset classes starting in 1900. All have continuous histories except China and Russia. Both had extended market closures following total losses to investors after the communist revolutions. They resume when their markets reopened in the early 1990s. The 23 countries listed in the top panel form the dataset used last year for the 2020 Yearbook. We refer to them as the DMS 23 (Dimson-Marsh-Staunton dataset 23).

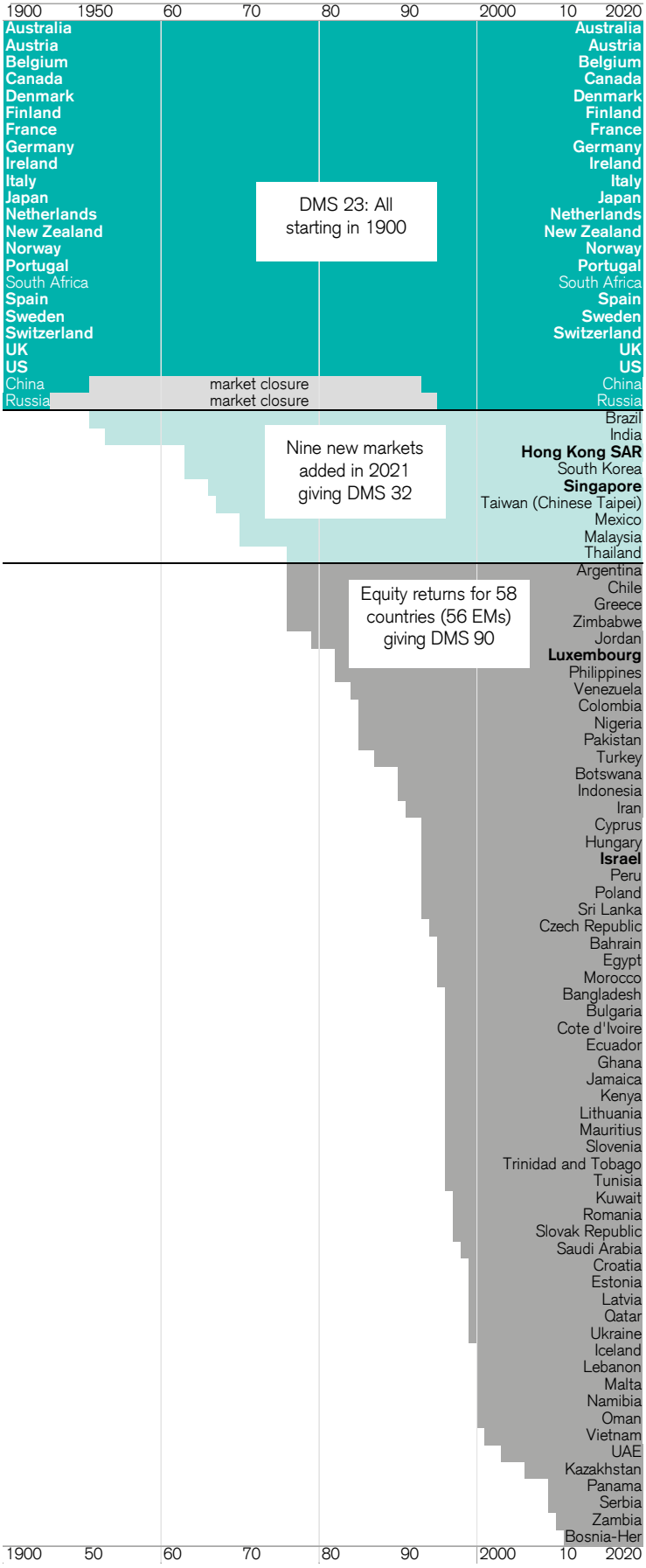
In **Figure 17**, we show countries deemed to be developed markets at start-2021 in bold typeface. All of the DMS 23 are currently developed markets, except China, Russia and South Africa.

New countries added in 2021

The middle panel of **Figure 17** shows the nine new markets that we added in 2021, seven from Asia and two from Latin America. Together with the DMS 23, they form the DMS 32, i.e. the 32 individual markets that we analyze in detail in the printed Yearbook, where we present exhaustive information and historical performance statistics, and list our data sources for each market. Selected extracts of the latter feature at the end of this Summary Edition

Unlike the DMS 23, these markets start later in the second half of the 20th century, although we typically have over 50 years of data. All were EMs at their start dates. However, both Hong Kong

Figure 17: Markets in the DMS long-term dataset, 1900–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton. Not to be reproduced without express written permission from the authors.

SAR and Singapore have now long been regarded as developed markets. Using the rule outlined above, Hong Kong SAR achieved developed status in 1977, followed by Singapore in 1980.

Five of the new markets have long-established stock exchanges dating back well over a century; Brazil (1890), Hong Kong SAR (1890), India (1875), Mexico (1894) and Singapore (1911). Unfortunately, we have been unable to obtain total returns data back to the origins of these exchanges. However, we have assembled 70 years of data since 1951 for Brazil, 58 years for Hong Kong SAR since 1963, 68 years for India since 1953, 52 years for Mexico since 1969 and 55 years for Singapore since 1966.

The other four markets have stock exchanges that were established after World War II, and we have total return series that span virtually all of the period since they opened. Thus we have 51 years of data for Malaysia since 1970, 58 years of data for South Korea since 1963, 54 years for Taiwan (Chinese Taipei) from 1967, and 45 years for Thailand from 1976.

Our 90-country database

The bottom panel of **Figure 17** shows 58 additional markets for which we have equity returns data for periods ranging from 11 to 45 years (for sources, see the full Yearbook). We also have inflation, currency and market capitalization data, but not yet bond or bill returns. These 58 countries, taken together with the DMS 32, provide a total of 90 developed and emerging markets (the DMS 90), which we use in our research and for constructing our long-run equity indexes.

Just two of these 58 markets are today deemed developed, i.e. Luxembourg, where its exchange opened in 1928, but where our data starts more recently, and Israel, which was promoted to developed status by MSCI in 2010. The remaining 56 markets are all today classified as EMs. However, this was not always the case. Some countries failed to progress. Chile and Argentina were developed in 1900, but Chile had slipped to emerging status by the 1950s. Argentina followed in 1975 and was subsequently relegated to an even lower classification by the index compilers, although MSCI restored it to emerging status in 2019. Greece was promoted to developed status in 2001, but was later demoted back to emerging.

While these moves reflect the shifting fortunes of countries, it is striking that, over more than a century, so few markets were promoted from emerging to developed status. The success stories are obvious, but it is easy to forget the disappointments from once-promising countries like Argentina, Nigeria, Pakistan, Venezuela and Zimbabwe.

The evolution of emerging markets

Markets experience periods of success and setback. We described in the Introduction to this report how the world equity market (mostly DMs by weighting) has evolved over the last 121 years. In **Figure 18** we examine the proportions of the worldwide emerging equity market represented in each year by individual countries.

This chart is based on the DMS 90 population of countries, where only countries classified as EMs are included each year. It covers all the countries shown in the legend back to 1900 or to the start date of the country's stock exchange if this was after 1900. For many countries, we have country capitalization data long before we have equity returns data.

Figure 18 shows a volatile pattern highlighting four aspects of emerging market history. First, there are major events such as revolutions, wars and crises. The communist revolutions led to the complete disappearance of Russia and China; they reappear when markets re-opened in the early 1990s. Similarly, the Japanese market was decimated by World War II, while the Spanish market was severely attenuated by the Spanish Civil War. Moving to more recent times, the chart shows the impact of the Asian Financial Crisis in the late 1990s.

Second, there are sharp falls to zero weighting (and the country disappearing from the chart) when the market is promoted from EM to DM. The chart shows this happening at the end of 1965 for Japan, 1973 for Spain, 1976 for Hong Kong SAR and 1979 for Singapore.

Third, the chart shows those markets that emerged, in most cases during the latter part of the 20th century, most notably India, South Korea, Taiwan (Chinese Taipei) and especially China. Each major EM's end-2020 weighting is shown on the right-hand side of the chart.

Finally, there are occasional booms or declines, e.g. Japan boomed post World War II and China has achieved astonishing growth since the early 1990s. Meanwhile, the chart shows a turbulent history for Brazil and Mexico, including several slumps.

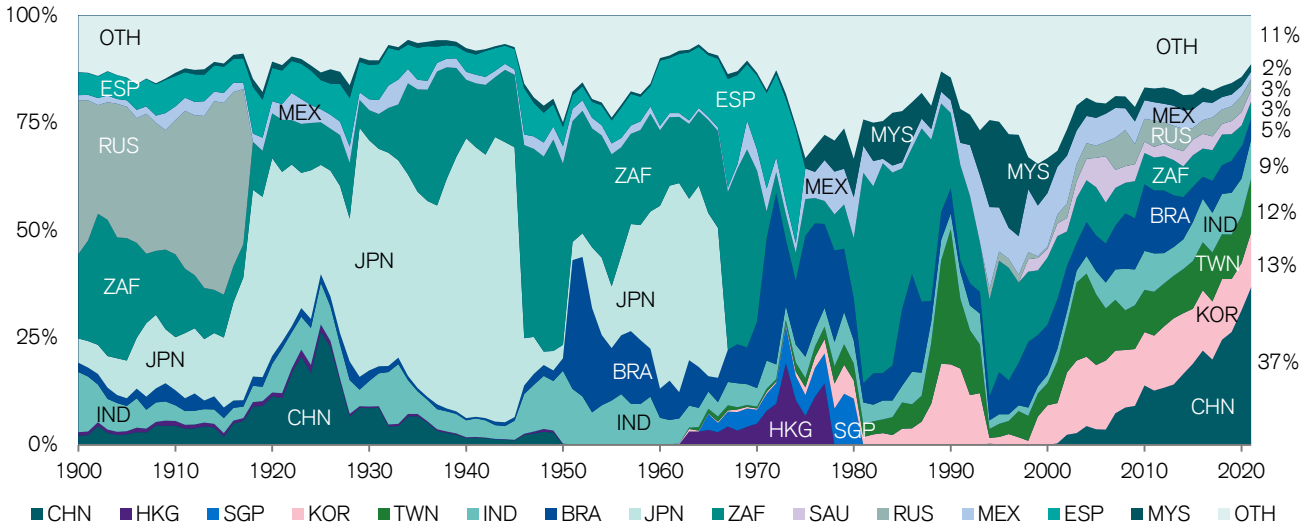
EM and DM weightings

In the 2019 Yearbook, EMs accounted for some 70% of the world's population (over five times that of DMs), 46% of its land mass (double that of DMs) and 39% of its GDP at market exchange rates (almost 70% that of DMs). In building long-term EM indexes, how should these be weighted?

One possibility would be to weight each country by its contribution to world GDP. The upper panel of **Figure 19** illustrates this approach. Each year, the DMS 90 countries are aggregated into four blocs. Three relate to DMs in Asia-Pacific, Europe and North America. The remaining bloc consists of all EMs. The EM group accounted for 43% of world GDP at market exchange rates by December 2020. From this viewpoint, EMs are significant compared to DMs.

The lower panel of **Figure 19** presents the same decomposition, but this time in terms of the weightings assigned to EMs in global

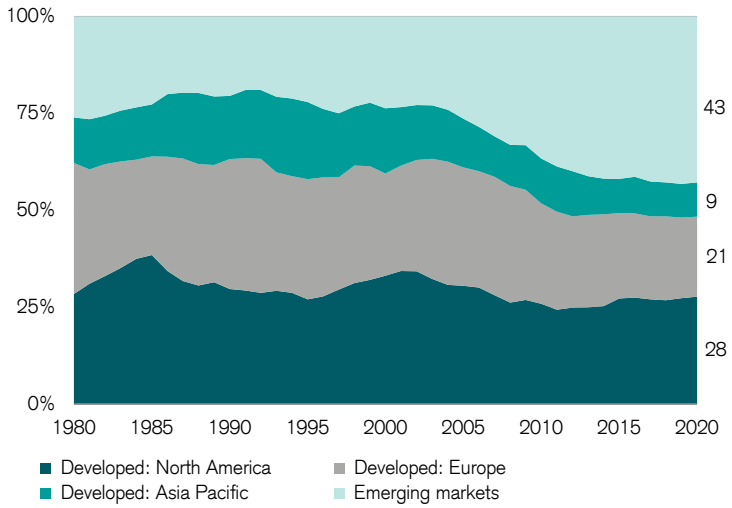
Figure 18: The evolution of emerging markets 1900–2020



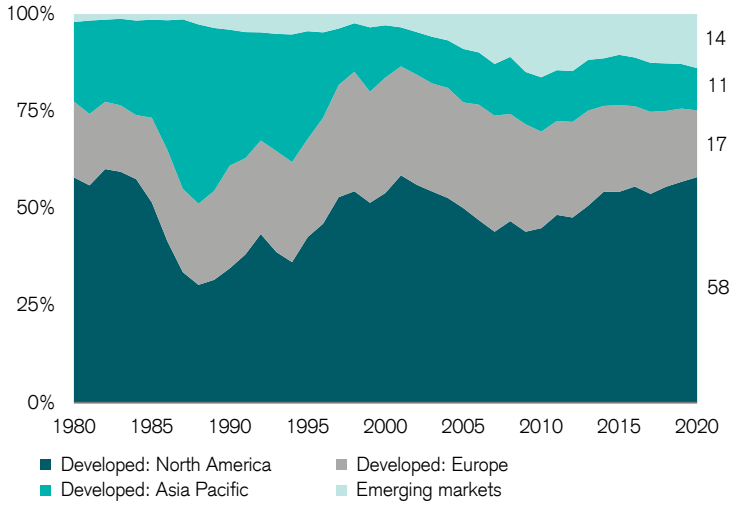
Sources: Elroy Dimson, Paul Marsh, and Mike Staunton; IMF, MSCI, S&P, FTSE Russell, GFD. Not to be reproduced without express written permission from the authors.

Figure 19: EM versus DM weightings, 1980–2020

(a) GDP weights (at market exchange rates)



(b) Weightings in global equity indexes



Sources: Elroy Dimson, Paul Marsh, and Mike Staunton, IMF, MSCI, FTSE Russell. Not to be reproduced without express written permission from the authors.

indexes. At just under 14%, the end-2020 index weightings are about a third of the corresponding GDP weights. Furthermore, while the GDP weightings have continued to grow over time, the weighting of EMs in the global index is now lower than it was a decade ago when it hit just over 16%.

The low weighting of EMs in the World index is largely explained by the focus of the major index compilers, such as MSCI, FTSE Russell and S&P, on the investable universe from the perspective of a global investor. Thus, while their weightings are based on market capitalization, they understate the full market capitalizations of constituent countries for three reasons.

First, they exclude or underweight markets or segments that are difficult to access. These access problems may arise from constraints imposed on foreign ownership or through other regulatory restrictions, e.g. until 2018 the large Chinese A-share market was excluded from the MSCI Emerging Markets Index. Even now, the index has a partial weighting in A-shares of only 20% of free-float market capitalization.

Second, index compilers screen out individual stocks deemed hard to deal in, typically because of their low free-float and/or poor liquidity. This has a proportionately greater impact on EM versus DM weightings as a greater proportion of EM stocks fail the free-float and liquidity hurdles.

Finally, and very importantly, since around the start of the 21st century, the index compilers have moved to free-float weighting. Free-float weighting involves excluding those shares that are not at present freely available for trading from market capitalization calculations. Examples include state-owned enterprises (SOEs), which are listed companies with large state holdings, firms with significant cross-holdings by other corporations, and companies with large holdings by founders of the business or private equity.

Free-float weightings are much lower for EMs than DMs, partly because of the far-higher proportion of SOEs, but also because of greater cross-holdings and larger founder stakes. In the 2019 Yearbook, we reported that the weighted-average free-float in the USA was around 96%, while in both the UK and Switzerland, it exceeded 90%. In contrast, China and India both had free-floats below 50%, while Russia's free-float was below 40%. When markets were weighted by size, the average float for EMs (42%) was less than half that for DMs (89%). These figures are confirmed by recent MSCI data.

In summary, if there were no exclusions, restrictions or the application of free-float weighting, we estimate that the overall weighting of EMs would be far higher than the 14% shown in the lower panel of **Figure 19**, and close to the GDP weighting shown in the upper panel.

The remaining puzzle from **Figure 19** is why EMs have a lower weighting in world indexes today than they had a decade ago. This is not because of promotions from EM to DM as the only MSCI promotion over this period was Israel, with a tiny weighting. Instead, the explanation is simply that EMs have underperformed DMs (especially the USA) over this period, while EM equity issues were insufficient to overcome this underperformance.

Long-term equity investment performance

To provide a long-run perspective, we use our extensive DMS 90 index returns database to construct an EM index from 1900 onward, using the GDP per capita rule to classify countries until 1987 and MSCI categorizations thereafter. At the start of the 20th century, our EM index begins with seven constituent countries.

We then add in further markets once returns data becomes available (see **Figure 17**). Thus we add Brazil in 1951, India in 1953, South Korea and the former Crown Colony of Hong Kong (now Hong Kong SAR) in 1963 (until the latter moved to developed status in 1977), Singapore in 1966 (until it moved to developed status in 1980), Malaysia in 1970, Argentina, Chile, Greece, Mexico, Thailand and Zimbabwe in 1976, and so on. We continue bringing other countries into the EM index until we reach 2020. Countries leave if they are promoted to DM status.

As a comparator, we create a DM index using the same rule. This had 16 constituents in 1900 and was joined by Finland in 1932, Japan in 1966, Spain in 1974, Hong Kong SAR in 1977, Singapore in 1980, Luxembourg in 1982, Portugal in 1998, Greece from 2002–13 and Israel in 2011. The DM index is computed annually based on all markets deemed to be developed at the start of the year in question.

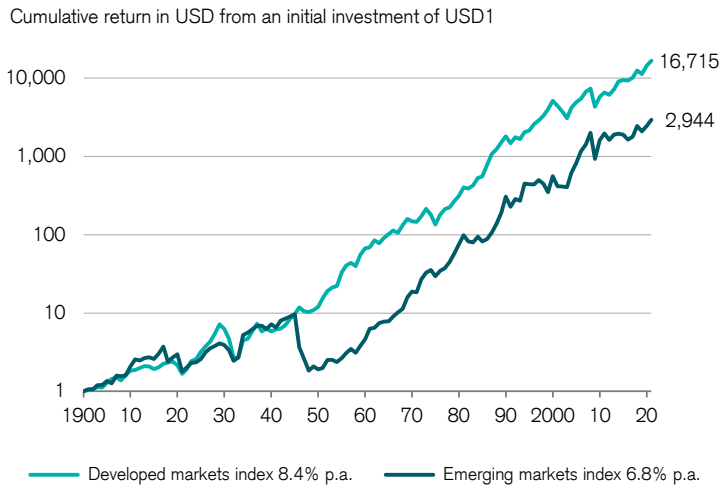
The indexes incorporate reinvested income and are estimated in common currency, namely US dollars. They can be converted to other currencies using the real exchange rates described in the main Yearbook and available in Dimson, Marsh and Staunton (2021). We use DMS returns data and start-year weightings throughout, and no longer switch to MSCI index series. This provides consistency and enables us to create indexes that span the full 121 years.

The long-run performance of EM versus DM equities is plotted in **Figure 20**. EMs outperformed in the early part of the 20th century, but were hit badly by the October 1917 Revolution in Russia, when investors in Russian stocks lost everything. EMs underperformed during the global bull market of the 1920s, but were less severely affected than DMs by the Wall Street Crash. From the mid-1930s until the mid-1940s, EM equities moved in line with DMs.

From 1945 to 1949, EMs collapsed. The largest contributor was Japan, where equities lost 97% of their value in US dollar terms. Another contributor was China, where markets were closed in 1949 following the communist victory, and where investors effectively lost everything. Other markets such as Spain and South Africa also performed poorly in the immediate aftermath of World War II. Nor were the 1950s kind to EM investors, where poor returns from Brazil contributed to underperformance.

In 1960, EMs staged a long fight back, albeit with periodic setbacks. From 1960 to 2020, their annualized return was 11.2% versus 9.5% from DMs. This was insufficient, however, to make up for their precipitous decline in the 1940s. The full 121-year graph shows that the terminal wealth from an initial investment of one dollar in EMs was USD 2,944. This is appreciably below DMs, which had a terminal value of USD 16,715. The annualized return from investing in EMs was 6.8% compared with 8.4% from DMs. Our World index, which includes every stock market in the DMS 90 population in every year for which data is available, had an annualized

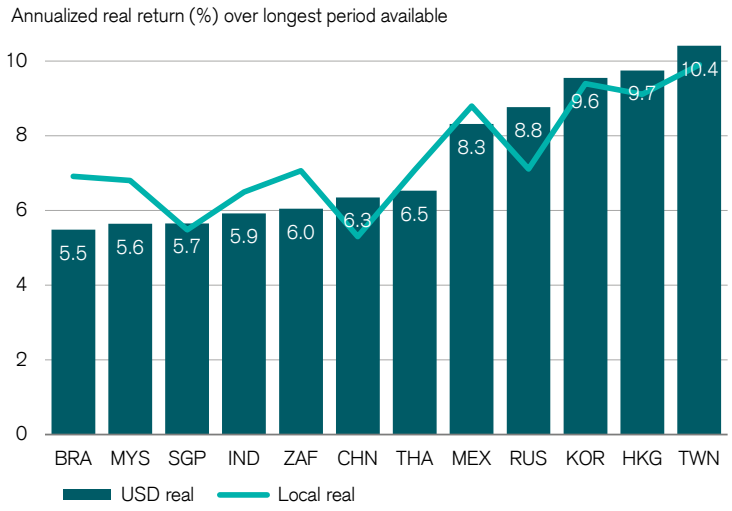
Figure 20: Long-run EM and DM equity returns, 1900–2020



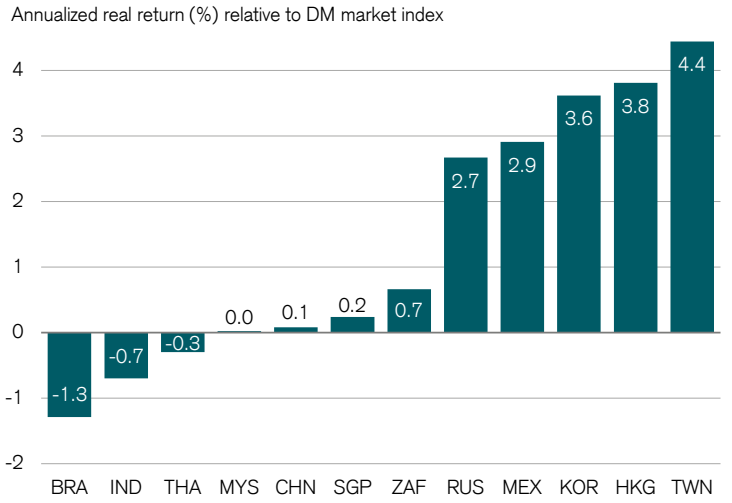
Source: Elroy Dimson, Paul Marsh, and Mike Staunton, DMS database. Not to be reproduced without express written permission from the authors.

Figure 21: Individual equity markets: start date to 2020

(a) Real returns in local currency and USD



(b) Real USD returns relative to DM index over the same period



Sources: Elroy Dimson, Paul Marsh, and Mike Staunton, MSCI, national exchanges, DMS database. Not to be reproduced without express written permission from the authors.

return of 8.3%. For a global investor, the impact from including or excluding particular EMs has been small. The rules for market classification and the dangers of survivorship bias also have a negligible impact on estimated equity returns or premiums.

Individual equity markets

In addition to examining the long-run equity returns from our 121-year EM index, we also examine long-term returns in key individual markets. We focus on the nine new countries we added to the Yearbook in 2021 (see the middle panel of **Figure 17**), plus the three EMs that were already in the Yearbook as part of the DMS 23.

For the nine new countries, we track their returns from the earliest date available. The countries and their start dates are: Brazil (1951), Hong Kong SAR (1963), India (1953), Malaysia (1970), Mexico (1969), Singapore (1966), South Korea (1963), Taiwan (Chinese Taipei) (1967) and Thailand (1976). The three pre-existing countries, China, Russia and South Africa, have start dates of 1900. South Africa has an uninterrupted history, but, as noted above, Russia and China experienced long market closures after the communist victories of 1917 and 1949. In the early 1990s, these markets reopened, and we report returns from China since 1993 and Russia since 1995.

Two of these 12 markets, Hong Kong SAR and Singapore, are today classified as DMs, but they were EMs when their return series started in 1963 and 1966, respectively, and they are important Asia-Pacific markets. It therefore seems appropriate to include them. The other ten markets are all EMs. Indeed, they currently comprise the seven largest EMs, plus those ranked ninth through to eleventh in terms of size. The eighth-largest EM, Saudi Arabia, is omitted here as it is not a Yearbook/DMS 32 country and has only a short returns history.

For each market, we compute real returns in both local currency and US dollar terms. The dollar returns are from the perspective of a US investor buying EMs. As explained earlier, to convert local currency real returns to USD real returns, we multiply the local currency real return by the change in the real exchange rate.

In the upper panel of **Figure 21,** we show annualized real returns in both US dollars (the bars) and local currency (the line plot). Comparisons between countries are difficult because of their different start dates. In the bottom panel, we therefore show each country's real USD return relative to the equivalent return on the DM index over the same period.

In the top panel of the chart, the magnitudes of the real local currency return and real US dollar return are similar. This is because changes in each country's exchange rate relative to the US dollar have been approximately equal to the inflation differential between that country and the USA over the same period. Expressed another way, relative purchasing power parity has held to a reasonably close approximation. This is very much in line with findings reported earlier and, in more detail, in the full Yearbook.

We report only real inflation-adjusted returns in **Figure 21**, and not nominal returns. This is because investors care about the purchasing power resulting from their investments and, in many cases, nominal returns have been greatly devalued by inflation. Three of the countries examined here experienced extraordinarily high annualized rates of inflation, namely 65.3% in Brazil, 19.2% in Mexico and 16.6% in Russia.

Brazil suffered the worst and, over a 22-year period from 1974 to 1995, annual inflation never fell below 20%. In six of these years, it was close to or above 1000%. In 1951, the start of the period covered for Brazil, the currency was the cruzeiro. After seven name changes and five redenominations, the modern day Brazilian real emerged in 1994. One real was equivalent to 2.75 quadrillion (10^{15}) 1951 cruzeiros. It is impressive that such a vast devaluation came close to matching the inflation-rate differential, supporting our strong emphasis on inflation-adjusted returns.

To summarize **Figure 21**, from inception to date, the annualized real returns range from Brazil's 5.5% in US dollars (6.9% in local currency) to Taiwan's (Chinese Taipei) 10.4% (9.9% in local currency). The bottom panel shows that Taiwan (Chinese Taipei) was also the best performer relative to DMs. Since its start date of 1967, it has outperformed the DM index by 4.4% per annum. The worst relative performance was from Brazil, which, since its start date of 1951, has underperformed the DM index by 1.3% per year.

There were four other strong outperformers, namely Hong Kong SAR, South Korea, Mexico and Russia. The remaining countries performed broadly in line with developed markets. Perhaps the most noteworthy of these is China, which outperformed the DM index by just 0.1%. This is despite unprecedented growth in real GDP over the last 30 years of 9.2% per annum versus 2.3% for the USA. This is a reminder of the lack of a relationship between long-term GDP growth and stock price performance.

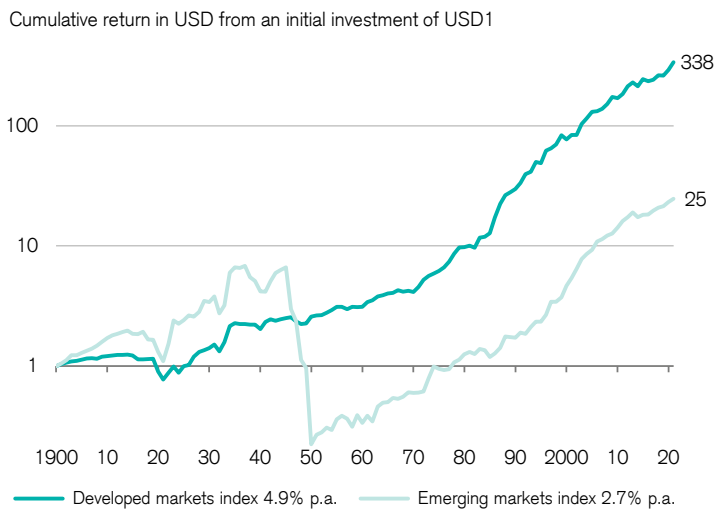
The good performance of the ten (current) EMs shown in **Figure 21** is not surprising. Today, they represent ten of the 11 largest EMs. They are likely to have grown partly due to solid stock-market performance. Focusing on the largest EMs is thus likely to introduce a success bias, i.e. selecting successful markets ex post. This is confirmed by their performance. Since 1976, they have achieved an annualized return of 10.6% versus 10.4% for the EM index. This is a small difference, but these countries have a dominant weighting in the EM index. A more telling comparison is their performance versus all other EMs, where the annualized return was 10.0%. This confirms the suspicion of a small amount of ex post success bias.

Bond returns

The long-run performance of EM versus DM bonds is plotted in **Figure 22**. These long-run bond indexes are constructed using the same principles as the DM and EM equity indexes, but are based on the 32-country DMS 32 dataset, as we do not yet have bond data for the supplementary 58 (almost entirely EM) countries (see **Figure 17**). The EM bond index thus has fewer constituents, starting with seven countries in 1900 and ending with ten in 2020.

Figure 22 shows that EM bonds were ahead until the 1940s, when they plummeted. As was the case with the EM equity index, the largest contributor to this investment debacle was Japan, where bonds lost 99% of their value in US dollar terms. Another contributor was China, where investors effectively lost everything in 1949. Spanish bonds also performed poorly in the wake of the Spanish Civil War.

Figure 22: Long-run EM and DM bond returns, 1900–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, DMS database. Not to be reproduced without express written permission from the authors.

Unlike the EM equity index, however, there was no fight back in the second half of the 20th century. EM bonds underperformed DM bonds from 1950 to 2020, with the same finding being true for start dates 1960, 1970 and 1980. While, over the last 30 and 20 years, EM bonds have outperformed DM bonds, this was sadly not true for the most recent decade.

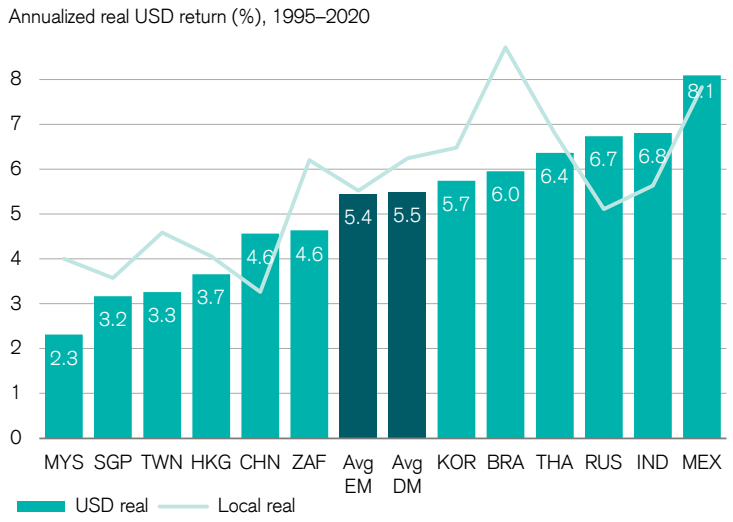
Over the full 121 years, EM bonds gave an annualized USD return of just 2.7% compared with 4.9% for DM bonds. These are nominal USD returns and, after adjusting for US inflation, a US investor in EM bonds would have lost money in real terms, with an annualized real return of –0.2% versus +2.0% for DM bonds. These results are unsurprising, given the crises of the 1940s and also the high inflation rates since then in many EM countries.

Individual bond markets

Our focus here is on the same 12 markets for which we presented equity returns. In line with the rest of the Yearbook database, our bond series for these countries are for local currency government/sovereign bonds with long maturities, typically of ten years or more.

Only South Africa has an unbroken 121-year history of sovereign bond returns. Although our Russian and Chinese bond series also start in 1900, we assume a total loss on Russian and Chinese bonds in 1917 and 1949. These bond series then resume in the early 1990s. The remaining nine countries have start dates in the second half of the 20th century. Three of them, namely India, Malaysia and South Korea, have bond series starting at the same date as their equity series. For the remaining countries, the bond series start later than the equity series.

Figure 23: Individual bond markets, 1995–2020



Source: Elroy Dimson, Paul Marsh, and Mike Staunton, DMS database. Not to be reproduced without express written permission from the authors.

The later start is most often because the country in question did not have an organized bond market and/or it issued no bonds, or only bonds of very short duration. This applied to Hong Kong SAR (start date for bond data 1994), Taiwan (Chinese Taipei) (1995), Thailand (1980) and Singapore (1988). In contrast, Brazil and Mexico have issued sovereign bonds for well over a century. However, we have been unable to find reliable bond returns data extending through the prolonged periods of high inflation, and periodic economic crises, such as the Mexican peso crisis. Our bond returns for these two countries start in 1995. We fully recognize that starting these series after periods of crisis and hyperinflation will flatter their long-run returns.

The bars in **Figure 23** show real bond returns in USD for the 12 markets since 1995, the common start date that enables us to compare 26 years of bond returns. It shows a wide range of returns, with Malaysia in bottom position and Mexico in first place, with annualized real returns of 2.3% and 8.1%. The dark shaded bars show the average real USD bond returns from DM and EM countries over this period. DMs were very marginally ahead at 5.5% versus 5.4% for the average DM. Over this period, there was no premium for the additional credit risk from EMs.

The line plot in **Figure 23** shows the equivalent annualized local currency real returns. On average, real local and real USD annualized returns were similar across the 12 markets. However, there were some large differences for individual markets, most notably Brazil and Malaysia, where real USD returns were palpably lower due to falls in these countries' real exchange rates.

The returns in **Figure 23** are for local currency sovereign debt. Historically, global investors have had an alternative way of investing in EM debt by purchasing hard currency (typically USD) bonds. Such bonds carry no currency risk and the yield offered is the US Treasury yield for the maturity in question plus a spread for credit risk.

It would be interesting to show comparative returns from hard currency EM bonds. However, we have been unable to find appropriate bond indexes with long enough histories and that match our local currency bond data in terms of maturity and credit risk. The best-known commercial indexes of foreign-currency EM debt include corporate bonds as well as sovereigns, and typically have shorter maturities.

Note, however, that local currency EM sovereign debt is the larger asset class, with around eight times the value of foreign currency sovereign debt.

There has been growing interest recently in EM sovereign bonds, motivated partly by their higher real interest rates and yields. The average real rate of interest for the ten EMs shown in **Figure 23** is currently 0.5%, while, for the largest ten

DMs, it is –0.4%. This is an average, and the real rate of interest for China, one of the countries generating interest, is 2.3%. At the time of writing, the average maturity premium, measured as the difference between the yield on 20-year sovereign bonds and 3-month treasury bills is 2.5% for EMs versus just 1.0% for DMs.

These are not sufficient reasons in themselves to divert funds into EM bonds. As always, the asset allocation decision involves trade-offs. EM sovereign bonds on average offer higher real interest rates, and appreciably higher long bond yields. However, average inflation rates are higher at 1.5% for the ten EMs versus just 0.1% across the largest ten DMs. EM bonds are also exposed to greater inflation risk, currency risk and credit risk. As always, insightful fundamental analysis is needed to determine the appropriate allocation to EM sovereign bonds.

Equity risk and reward

Especially as we travel back in time, we have seen that emerging markets have fluctuated wildly. To dig deeper into this, we examine the variability (standard deviation) of the annual local currency real equity returns from the 12 markets for which we presented returns in **Figure 21**. These are markets that became big. Consequently, compared to other markets that failed to grow to the same size, they were more likely to become more stable EMs with lower volatilities.

We compute the volatilities of the 12 markets, measured over their full available history. We contrast this with the average volatility of individual DMs over the last 57 years, which is the average period over which we have data for the 12 markets.

The left-hand chart in **Figure 24** shows that only South Africa was less volatile than the average DM. Ten countries had volatilities above 30%, while Brazil (54%) and Russia (67%) had exceptionally high volatilities reflecting their historical hyperinflationary periods.

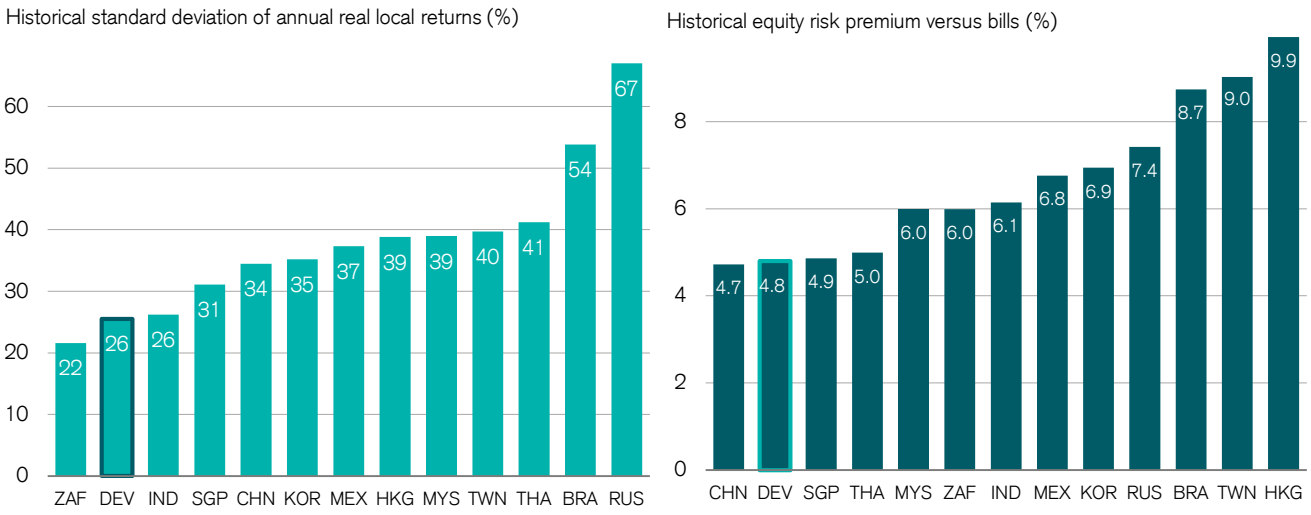
Looking to the future, volatilities are likely to be lower than the historical experience, not least because economic policy lessons should have been learned and, hopefully, mistakes will not recur. However, EMs (and especially frontier markets) are likely to continue to have higher volatilities than DMs. We return to the time path of stock-market risk below when we report the trends in risk estimates over recent decades.

The panel on the right of **Figure 24** presents each market's reward for bearing risk – this is the annualized historical equity risk premium relative to Treasury bills (or cash) in each of the 12 markets. Our Treasury bill data is taken from a variety of central bank and government sources, and, for countries or periods where Treasury bills were not issued or the data was unavailable, we use the closest equivalent instrument.

The historical equity risk premiums are obtained by deducting (geometrically) the real return on bills from the local real returns on equities. In two countries – Hong Kong SAR and Russia – the real bill return was negative, so the equity risk premium was actually higher than the real local equity return.

Our equity premium estimates are historical. We do not advocate using them as indicators of a country's prospective equity risk premium. Some markets enjoyed good luck, while others were less

Figure 24: Long-run historical volatility (left) and equity risk premiums (right) from individual markets



Sources: S&P, national exchanges, central banks and statistical agencies, GFD, Refinitiv Datastream, DMS database, MSCI, Elroy Dimson, Paul Marsh, and Mike Staunton.
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fortunate. Similarly, these historical premiums were impacted by real bill returns that are not representative of expected future bill returns. We have also noted that these markets, as a group, are subject to a modest degree of success bias. For some countries, the start date comes after a troubled period, while the periods covered in **Figure 24** span several decades of relatively strong EM performance.

Nor is the long-run historical equity risk premium from EMs as a group an especially helpful guide to their likely future premium. Based on the EM index presented in **Figure 25** overleaf, the annualized historical equity premium since 1900 for a US investor in EMs was 3.0%, compared with 4.5% for DMs.

However, EM returns were badly impacted by events in the 1940s that are unlikely to be repeated. It also seems implausible that the prospective risk premium on EMs would be below that of DMs. If we were instead to adopt a base date for the indexes of 1960, the 61-year annualized historical equity risk premium from the perspective of a US investor in EMs was 6.4% versus 4.8% for DMs.

What equity risk premium should we expect in the future from EM equities? We argue that a realistic estimate of the future equity premium on world equities was around 3.5% per annum. With interest rates so low, the expected returns from stocks are largely attributable to the stocks' beta and to overall market fluctuations. The higher the beta, the higher the equity premium. Since 2000, EMs as a group have had a somewhat above-average risk (beta) measured relative to the World index. This implies a rather higher equity premium for EMs of perhaps 4% and hence a higher long-term return commensurate with their risk.

Declining risk

We now ask whether the risk of investing in EM equities has trended downward as countries have developed. To do this, we examine monthly returns data from MSCI over the 45 years from 1976–2020. Our analysis covers 21 DMs and 31 EMs (which, in terms of MSCI classifications, are a mixture of EMs and frontier markets, but which we refer to generically as EMs). Not all countries start at end-1975, so the sample expands as data accumulates for more countries. By end-1987, we have returns for 21 DMs and 18 EMs; by mid-2002, this coverage extends to 21 DMs and 29 EMs.

For every individual market, we calculate the volatility of that market as the standard deviation of the 60 monthly USD returns over 1976–80,1981–85, and so on to 2016–20.

We then calculate the equally weighted mean of the single-country volatilities for all EMs and for all DMs. For each of the nine 5-year periods, we then compare the volatilities of the average DM, average EM, a DM index and an EM index. The DM index is the MSCI World Index and the EM index is the MSCI Emerging Markets Index from its inception in December 1987 (and our own monthly index of EMs before that).

The upper panel of **Figure 25** shows that the gap between the risks of the average EM and DM has narrowed greatly. In the earliest period examined, the average EM had a volatility that was 18 percentage points higher than the average DM. In the final period examined, ending in December 2020, the gap had shrunk to just five percentage points. Over the last 20 years, the chart shows that the average EM volatility has declined sharply.

The top panel of **Figure 25** also shows, as we would expect, that both the EM and DM indexes have appreciably lower volatilities than the average volatility of their constituent countries. The indexes are diversified holdings of EMs and DMs and the much lower volatility of the indexes shows the risk reducing power of diversification. Finally, note that over the most recent 5-year period, the annualized volatility of a diversified portfolio of EMs – as represented by the MSCI Emerging Markets Index – is just 17.6%. This is only slightly above that of a diversified portfolio of DMs (15.1%) as represented by the MSCI World Index. However, the case for EMs is stronger than that.

Diversification benefits

A rationale for investing in emerging markets is the opportunity for enhanced diversification. Have these benefits shrunk as EMs have converged to being more like DMs? To investigate this, we examine how correlations between markets have changed over time, using the same data and countries as above. We measure correlations over the same periods as before, namely 1976–80, 1981–85, and so on to 2016–20. We compute the average correlation between USD equity returns for every pairing of emerging and developed markets. We also estimate the correlation between the EM and DM indexes.

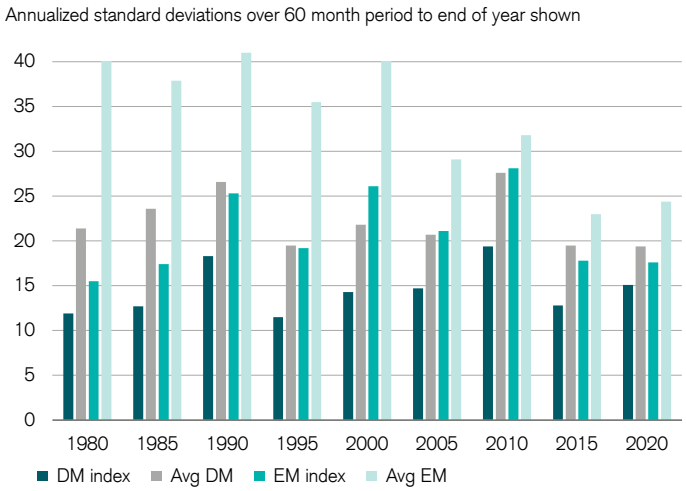
The darker colored bars in the lower panel of **Figure 25** display the average correlations between pairs of EMs and DMs. There has been a rise in correlations, which indicates that the scope for diversification has declined. However, investors do not in fact invest in single pairs of developed and emerging markets, but instead view markets as broad asset classes.

The lighter-colored bars show the correlation between the EM and DM indexes. These are the correlations that would apply to a US investor who already held a portfolio like the MSCI World Index and was considering diversifying into EMs. These bars tell the same story of rising correlations. However, even for the most recent period, the average correlation between the EM and DM index remains well below one, showing there is still a benefit from risk reduction. For a DM investor, EMs continue to offer better diversification prospects than other DMs.

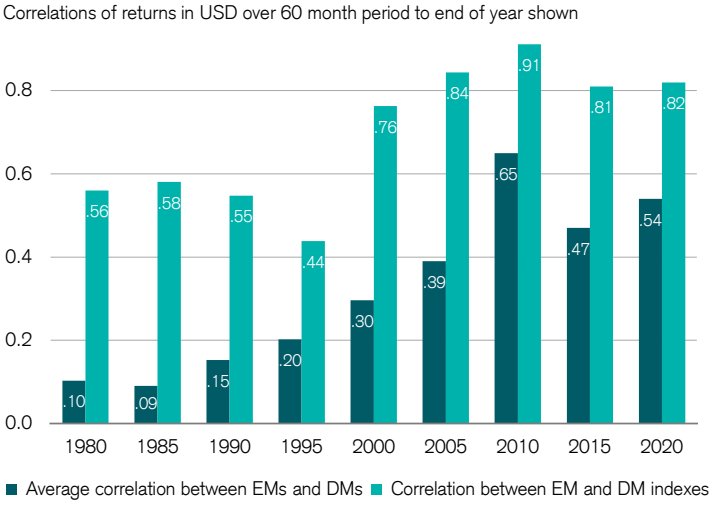
The correlation between EM and DM indexes was low in the 1980s. Since then, correlations have risen as countries matured and businesses globalized. EMs are now mainstream investments with a key role in global portfolios. Their importance will continue to rise.

Figure 25: Volatility and correlation of EMs versus DMs

(a) Annualized standard deviation (%) of monthly USD returns



(b) Correlation between monthly USD returns



Source: Data from MSCI and DMS database; analysis by Elroy Dimson, Paul Marsh, and Mike Staunton. Not to be reproduced without express written permission from the authors.

Factors in emerging markets

We noted earlier in this report, and describe in detail in the hardcopy Yearbook, the extent to which many global investors have adopted factor-based strategies. They aim to benefit from long-run factor premiums highlighted by academic research. While almost all of this research originated in the USA, there is now a large amount of literature from other DMs. There is less evidence from EMs, partly because the data is limited and recent.

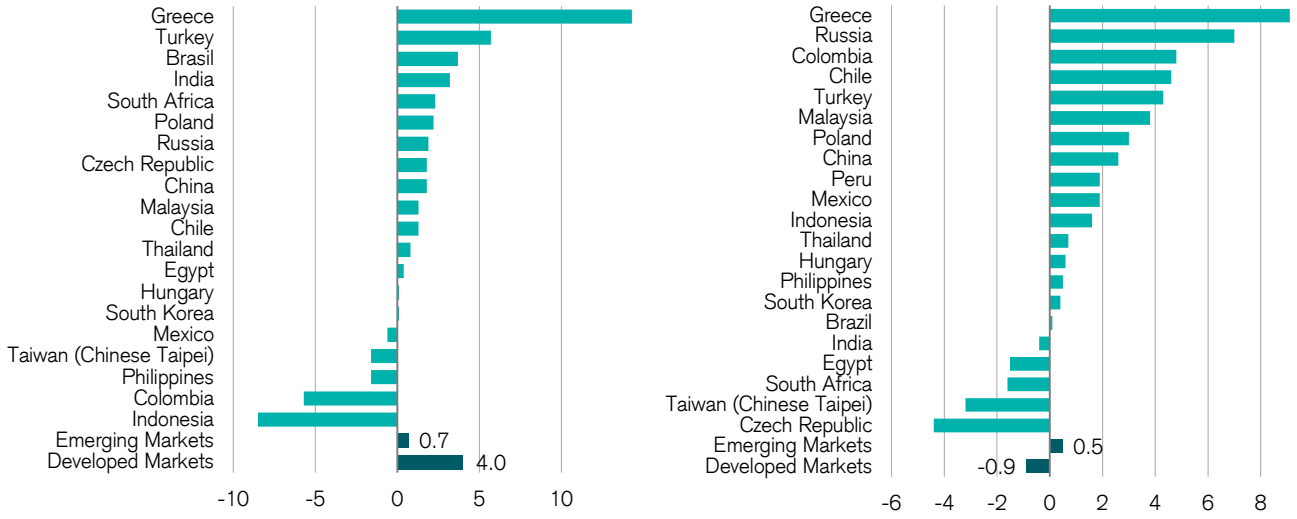
This section summarizes the evidence on emerging market factor returns, making comparisons with developed markets. We look at size, value, size combined with value, momentum, and finally at quality.

Size premium

The size premium, or the tendency for small caps to outperform large caps, was one of the earliest factors identified by US research. To measure the size premium, we use MSCI's size-based indexes and define the premium as the geometric difference in returns between the MSCI small- and large-cap indexes for each country. The MSCI size-based indexes for EMs mostly start in the mid-1990s. The developed market size-based indexes start later, at the end of 1999. To compare the EM and DM size premiums, we focus on the period from 2000 to 2020.

The left side of **Figure 26** shows the annualized size premiums for 20 emerging markets and for two composite indexes, the MSCI World Index (DMs) and the MSCI Emerging Markets Index. The premiums were negative for five of the EMs, positive but small for four, and over 1% per year for the remaining 11. As noted above, the MSCI EM size-based indexes begin a little earlier than 2000, with 15 countries starting in May 1994.

Figure 26: Premiums in EMs – size premium 2000–20 (left) and value premium 1994–2020 (right)



Source: MSCI, Elroy Dimson, Paul Marsh, and Mike Staunton. Not to be reproduced without express written permission from the authors.

Adding the earlier period lessens the size premium in most EMs. Indeed, from May 1994 to end-1999, the annualized size premium on the MSCI Emerging Markets Index itself was –3.7%. Within DMs, the 1990s was the era of large caps: the same was true for EMs.

The evidence for an EM size premium since the mid-1990s is therefore weak. From 2000 onward, the annualized size premium on the MSCI Emerging Markets index was just 0.7%. This contrasts with a size premium of 4.0% for developed markets. Of the 23 DMs, only two (Hong Kong SAR and Norway) experienced negative size premiums over this period (see the 2021 Yearbook).

Value premium

We measure the extent to which value stocks outperformed growth stocks using a similar approach. The value premium is estimated as the geometric difference in returns between the MSCI Emerging Market Investable Value and Growth Indexes for each country.

These series began in May 1994 for the MSCI Emerging Market Investable Index and for a majority of EM countries, with the remaining countries having start dates shortly afterwards. The MSCI Value and Growth Indexes for DMs start earlier, typically in December 1974. We therefore focus on the period from May 1994 onward, so that we can compare emerging and developed market premiums over the longest possible period.

On the right of **Figure 26** we show the annualized value premiums for 21 EMs, the MSCI World Index (DMs) and the MSCI Emerging Markets Investable Indexes. The premiums were negative for five countries, positive but small for five more, and over 1% per year for the remaining 11. As with size, the evidence for an EM value premium since the mid-1990s is therefore weak. Over more than a quarter century from May 1994 to date, the annualized value premium on the MSCI Emerging Market Investable Index was just 0.5%. However, this was larger than the equivalent figure for DMs of –0.9% per annum.

The second half of the 1990s was, of course, the era of the growth stock, and also that the value style has performed poorly since the Global Financial Crisis. A researcher who focused only on the past quarter century would not conclude that there was a value premium in either DMs or EMs. However, at least within the EM world, the value premium has been positive, and somewhat larger than for DMs.

Value and size

Within DMs, the value premium is more substantial among small than among large companies. Fama and French (1993) were the first to investigate this. Their methodology involves creating four portfolios based on book-to-market – to distinguish between value and growth – and on market capitalization – to distinguish between big stocks and small stocks.

Figure 27 overleaf shows the corresponding findings for these four value/size portfolios for EMs. This is taken from Professor Ken French's data website. The chart shows the

cumulative returns on the four portfolios from June 1989 to the end of 2020. Just as for the USA and for DMs as a whole, the chart shows that small value stocks performed best, followed by large value stocks. The two growth portfolios underperformed the two value portfolios. The annualized returns on the four portfolios are shown in the legend.

While the pattern of returns for EMs was the same as for DMs, the magnitudes differed, with EMs giving more extreme returns over the same time period. The best-performing portfolio was small value stocks, which gave an annualized return of 16.2% within EMs, compared with 10.3% for DMs. The worst-performing portfolio was small growth stocks, which gave an annualized return of just 3.9% within EMs compared with a slightly higher return of 4.8% within DMs.

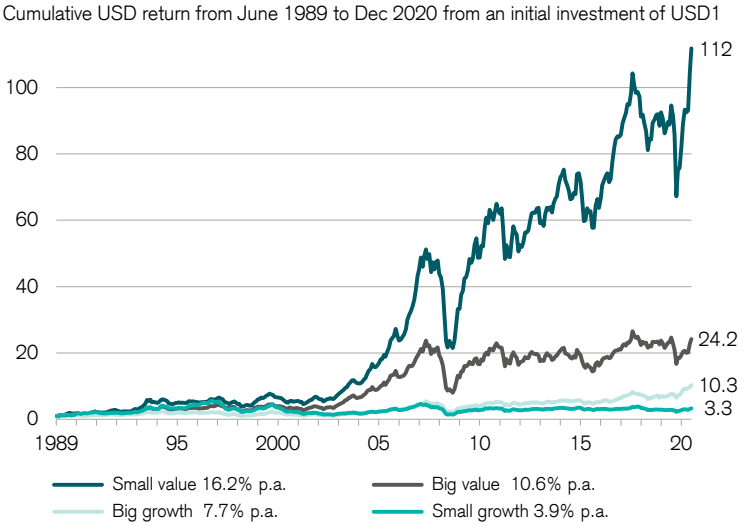
Fama and French compute two long-short factor premiums from the value and size portfolios, namely SMB (Small Minus Big) and HML (High book-to-market Minus Low book-to-market, which is equivalent to value minus growth). These premiums are expressed as the average percentage return per month. For the EM portfolios, SMB was 0.07% while HML was 0.58%. For the DM portfolios, SMB was 0.00% while HML was 0.15%. The size factor was thus small in magnitude for both EMs and DMs, while the value factor was substantial for EMs, but quite modest for DMs. The magnitude of the HML factor for EMs was heavily influenced by the very strong performance of the small value stocks.

Momentum

We have also examined momentum in EMs. We update and extend the analysis by Griffin, Ji, and Martin (2003). In addition to covering 22 DMs, their study also embraced 17 EMs. Their analysis was based on a 6-1-6 momentum strategy, which involves ranking stocks by their returns over the past six months, waiting one month, and then investing for a 6-month period, before rebalancing by repeating the procedure. Stock returns are equally weighted, with a monthly rolling window, using 20%/80% break-points to define winners and losers. Their analysis spans a period to end-2000, with the start date varying, based on data availability for each country. On average, their data covered a 10-year period.

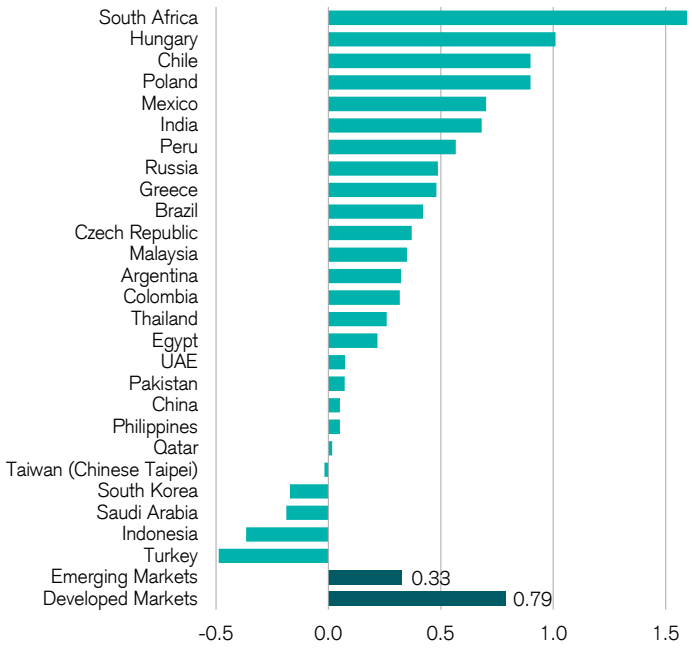
We extend the Griffin, Ji, and Martin analysis to end-2020, adding an extra 20 years and using exactly the same methodology. We also extend their sample to include nine EMs not covered in their work, namely Colombia, four eastern European EMs: the Czech Republic, Hungary, Poland and Russia, and four Middle East EMs: Egypt, Qatar, Saudi Arabia and the United Arab

Figure 27: Performance of EM value and size portfolios



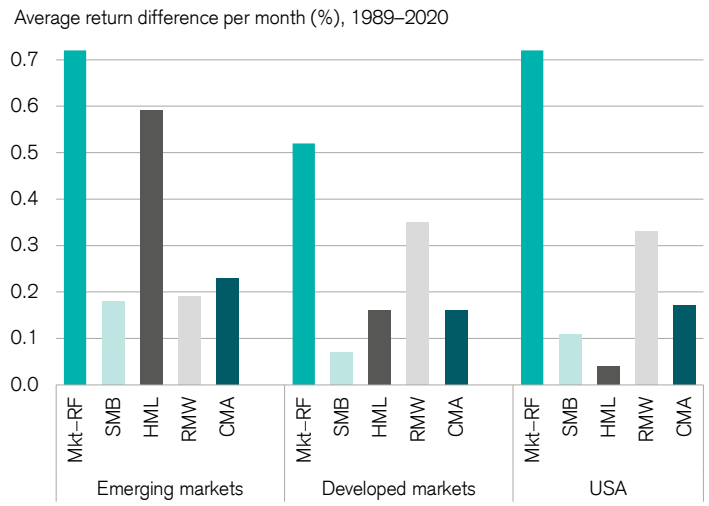
Source: Data from Professor Ken French's data website. Not to be reproduced without express written permission from the authors.

Figure 28: Momentum premium (WML) in EMs



Source: Griffin, Ji, and Martin (2003) and computations and analysis by the authors using Refinitiv data. Not to be reproduced without express written permission from the authors.

Figure 29: Fama French 5-factor model for EMs, DMs and USA



Source: Data from Professor Ken French's data website. Not to be reproduced without express written permission from the authors.

Emirates (UAE). The period covered for these additional markets was 2001–20, except for Qatar and the UAE where the data start in 2005.

The bars in **Figure 28** show the Winner Minus Loser (WML) premiums expressed as percent per month over the full period to end-2020. Adding 20 years to the 17 EMs covered by Griffin, Ji and Martin resulted in increased WMLs for eight countries, and lowered WMLs for the remaining nine. The chart shows that five EMs had negative WML premiums, five had premiums close to zero, while, in the remaining countries, the WML premium was above 0.2% per month. The average WML across all 26 EMs, weighted by the number of annual observations for each country, was 0.33% per month.

The pattern of momentum/WML premiums in EMs differs from developed markets. In the full Yearbook, which reports the WML premiums for 20 DMs, only one is negative. All of the rest have WMLs of 0.35% per month or more – which is above the average WML for the emerging markets in **Figure 28**. The average WML for the 20 DMs is 0.79% per month, which is well above the corresponding figure of 0.33% for EMs. Relative to DMs, momentum in EMs has been weak. These findings are consistent with research by Hanauer and Linhart (2013) who find a strong and highly significant value effect in EMs and a less significant momentum effect.

Quality: The Fama-French 5-factor model

Quality investing has a long history, but its popularity as an investment factor is due to the research of Novy-Marx (2013). This showed that quality, as measured by gross profitability, did as good a job at predicting future returns as conventional factors like value/book-to-market. Influenced by this, Fama and French (2015) developed a 5-factor model for asset pricing. This added two quality factors, profitability and investment, to their original 3-factor model that was based on a market factor, SMB and HML.

Fama and French refer to their profitability variable as RMW, the difference between the returns on diversified portfolios of the most profitable (R = Robust) firms minus (M) the least profitable (W = Weak). They refer to their investment factor as CMA, which is the difference between the returns from firms whose investment is most conservative (C) minus (M) those whose investment is most aggressive (A). The sense in which these are quality variables is that investing in the RMW factor involves going long in profitable firms and shorting weak firms, while the CMA factor involves going long in firms that invest conservatively and shorting those that tend to over-invest.

Fama and French find that their 5-factor model performs better than their 3-factor model. They provide some 30 years of factor returns for both EMs and DMs in aggregate, as well as 57 years of data for the USA. The average factor values are plotted in **Figure 29**, with the first panel relating to EMs, the second to DMs, and the last to the USA. The period covered for EMs and the USA is July 1989 (the start date for the EM data) to end-2020. The DM data starts a year later in July 1990.

Figure 29 shows that the market factor (Mkt–RF) is large across all markets. With the 5-factor model, the size factor (SMB) remains quite modest, but because of the interactions between the factors, now appears larger within EMs than in DMs or the USA. As a result of adding the profitability and investment factors, the value factor (HML) becomes tiny for the USA and is redundant for that country within the 5-factor model. Over this period, the value factor within EMs is large and far greater than for DMs.

The two quality factors show positive premiums across all markets. However, the profitability factor is much lower within EMs, averaging just 0.19% per month versus 0.35% for DMs and 0.33% for the USA. In contrast, the investment factor is slightly higher for EMs at 0.23% per month, versus 0.16% for DMs and 0.17 in the USA. In summary, factors that have been found to matter in the USA and in DMs also exhibit positive premiums in EMs. However, within EMs, the value factor appears stronger, while momentum and profitability seem weaker than within DMs.

Rotation strategies in the emerging world

Emerging markets are heterogeneous. They embrace large and small countries, geographic diversity, developed and underdeveloped economies, rich and poor, a mix of industrialized, agrarian, and oil- or commodity-based countries, democratic versus authoritarian regimes, and sound versus more precarious economies. This explains the wide variation in EM investment returns.

Inevitably, this leads investors to stress the importance of selectivity. However, their actual success rate in selecting countries is questionable. Cagnazzo (2020) examined all open-ended dollar-denominated mutual funds that invested in EMs from 2000 to 2019. He found that a buy and hold policy would, on average, have beaten the funds' selectivity/market timing strategies by 0.05% per month (0.6% per year). Frequently, "selectivity" involved allocating funds to countries based on past returns.

We examine below several mechanical strategies for selecting and rotating between EMs. We initially looked at rotation strategies in the 2005 Yearbook and revisited this idea using additional variables in the 2011, 2012 and 2014 Yearbooks. We now update and extend our earlier work, utilizing our 90-country database.

Prior to 1976, there were insufficient EMs available for this type of analysis, so our study spans the period from 1976–2020. In each year, we include all markets for which we have data, but excluding those deemed to be DMs. We account for transitions over time from emerging to developed status. The countries we analyze include emerging and frontier markets; for simplicity, we refer to them all as emerging.

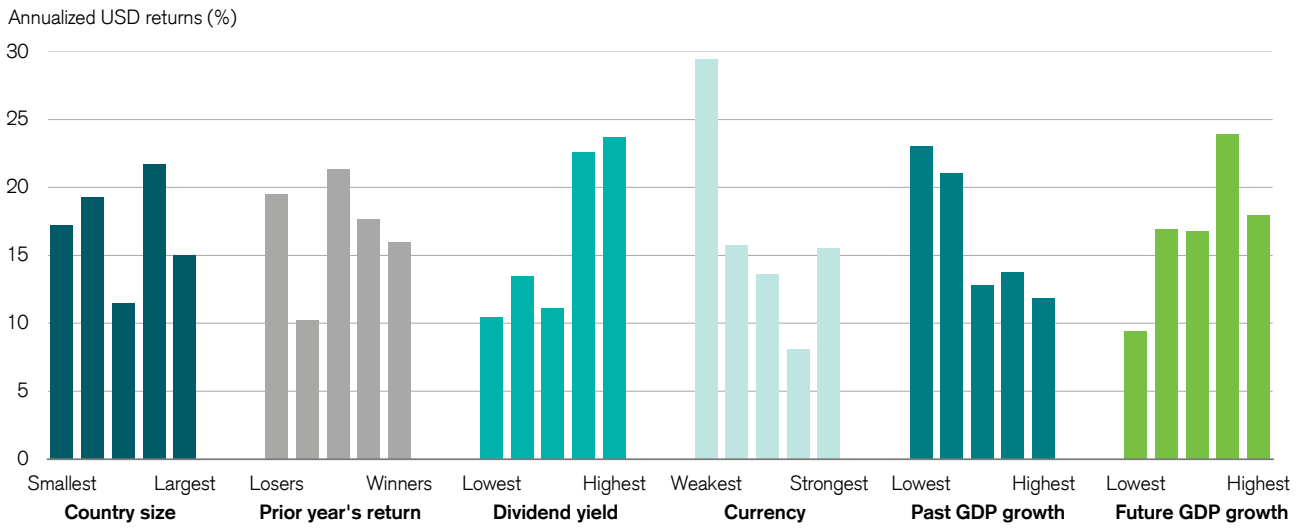
Our rotation strategy involves cycling through each of the 45 years. At each start-year, we rank all markets by the variable of interest and assign them to quintiles. We then compute the USD returns from investing in each quintile over the year, giving equal weight to each country. We repeat this process for all years, re-ranking annually, and bringing in new countries when data becomes available. We compute the cumulative returns for each quintile and the annualized returns over the entire period.

First, we look at factor strategies applied across markets – in contrast to the previous section where we focused on stocks within markets. We then look at a rotation strategy based on currency and finally at strategies predicated on economic growth.

Factor rotation strategies between EMs

We examine rotation strategies based on size, momentum and value. For size, we investigate whether there is a small-country effect, defining size as the magnitude of the country's economy measured by GDP expressed in US dollars at market rates. The rotation strategy involves investing each year in the quintile of the smallest countries through to the quintile of the largest. On the left of **Figure 30** we show the 45-year annualized return from this strategy for the five quintiles of country size. There is no obvious pattern. The average of the annualized returns on the two smallest country quintiles is virtually the same as that on the two largest. There is no hint of a "small country effect."

Figure 30: Rotation strategies within developing markets, 1976–2020



Source: Elroy Dimson, Paul Marsh and Mike Staunton, DMS database, the IMF and Refinitiv. Not to be reproduced without express written permission from the authors.

Next we look at momentum to see whether there is a tendency for winning countries to continue to outperform and losers to underperform. Winners are defined as the 20% of countries (quintile) with the highest prior-year USD total return, while the losers are the 20% with the worst returns. The second panel of **Figure 30** shows the long-run annualized returns from investing in the biggest winners through to the biggest losers. There is no obvious relationship. The average of the annualized returns on the two winner quintiles is only slightly above the average of the two loser portfolios. Investors favoring countries that have performed well over the past year perform similarly to contrarian investors who favor the opposite approach.

Finally, we examine the returns from a value rotation strategy. We proxy value by a country's start-year dividend yield, with higher yields associated with value and lower yields with growth. The middle panel of **Figure 30** shows a strong value effect. The average of the annualized returns of the two lowest-yield quintiles was just under 12%, while the average for the two highest-yield quintiles was just over 23%.

The annualized returns shown in **Figure 30** are not risk-adjusted, and the differences we observe could be explained by risk. However, the standard deviation of returns on the highest yield quintile is actually lower than that on the lowest yield quintile. If we look at Sharpe ratios, the highest yield quintile has a ratio of 0.84 compared with just 0.44 for the lowest yield quintile. Our findings on factor rotation across EMs are thus similar to our conclusion from the previous section on longer-run factor effects within EMs: value has been the dominant influence.

Currency and economic growth

Emerging markets typically have more volatile currencies than DMs. We therefore examine the benefit of investing in countries with strong currencies, or whether greater returns are available from countries that have experienced currency weakness. We form quintiles based on each country's exchange rate change against the US dollar over the prior year.

The fourth panel of **Figure 35** shows the annualized USD returns from investing in countries with weak, rather than strong, currencies. Clearly, the highest returns are obtained from investing in the weak currency countries. The average of the annualized returns from investing in the two weakest-currency quintiles was 22.6% compared with an average of 11.8% from the two strongest-currency quintiles. The average Sharpe ratio of the two weakest-currency quintiles was 0.60, as compared to 0.45 for the two strongest-currency quintiles.

Lastly, we examine investing on the basis of economic growth. An oft-cited reason for investing in EMs is the prospect of benefitting from their higher economic growth. We form quintiles on the basis of real GDP growth over the past five years. We use IMF data for real GDP using their "constant prices in local currency" series for all countries. The fifth panel of **Figure 30** shows that, contrary to many people's intuition, it is the EM countries with the lowest historical GDP growth that achieved the highest returns, while the highest growth quintile of countries generated the lowest returns. The difference persists, but is somewhat attenuated, when we focus on Sharpe ratios rather than annualized returns.

There is much evidence that GDP growth impacts stock prices and indeed that stock prices are a leading indicator of economic growth (see "The growth puzzle" in the 2014 Yearbook). This is borne out by the final panel on the right of **Figure 30** which shows annualized returns when quintiles are formed not on the basis of historical GDP growth, but instead using perfect foresight about the next five years' growth. Here, the highest returns (and Sharpe ratios) are for the countries that grew fastest over this subsequent period, while the lowest returns accrue to the low-growth countries. Unfortunately, this strategy cannot be executed successfully except by a clairvoyant fund manager with perfect foresight about future GDP growth.

The perverse results based on past GDP growth are thus a puzzle. Neutral results could readily be explained. They would arise if markets had fully impounded all information about past GDP growth. In this case, we would expect investing in countries where past GDP growth was low to give the same risk-adjusted return as investing in countries where past GDP growth was high. However, **Figure 30** shows underperformance by countries that experienced high growth.

Our interpretation is that low growth and currency weakness indicate economic distress and higher risk, for which investors should demand a higher equity risk premium. The puzzle, however, is why the outperformance persists even after standard risk adjustments. If the risk argument is correct, then our risk adjustments are failing to fully capture the risks involved. An alternative, behavioral explanation is that investors avoid distressed countries or demand too high a premium for investing in them, while at the same time enthusiastically overpaying for stable-currency countries or growth markets. Even if sophisticated investors spot this overvaluation, it may be hard to exploit as shorting fast-growing markets can be costly and risky.

Caution is needed in interpreting the return differences in **Figure 30**. Not all markets were open to global investors throughout this period.

Our use of equal weights within quintiles involves investing the same amounts in tiny countries as large ones. We have ignored transaction costs and taxes, including withholding taxes. It may be hard to trade in some countries' markets at the best of times, but our rotation strategies may target markets just when trading is hardest and most costly. These strategies would best be implemented using country index exchange traded funds (ETFs), but such instruments are not available for many of the smaller markets.

However, these relationships have stood the test of time. We first reported the GDP growth effect in the 2005 Yearbook. In the 16 years since then, the average annualized return on the two lower GDP growth quintiles has been 8.9% versus 4.2% for the higher growth quintiles. We first reported the dividend yield rotation effect in the 2011 Yearbook. In the decade since, the average annualized return on the two higher-yield quintiles has been 5.2% versus 0.6% for the lower yield quintiles. Similarly, we first reported the currency rotation effect in the 2012 Yearbook. In the nine years since, the average annualized return on the two weaker currency quintiles has been 6.3% versus 1.4% for the stronger currency quintiles.

Thus, despite the caveats, we believe that our rotation analysis reveals important relationships and key pointers to successful investment strategies in emerging markets.

Concluding remarks

As recently as 20 years ago, EMs made up less than 3% of world equity market capitalization and 24% of GDP. Today, they comprise 14% of the free-float investable universe of world equities and 43% of GDP. The weightings of today's EMs are likely to rise steadily as the developing world continues to grow faster than the developed world, as domestic markets open up further to global investors and as free-float weightings increase. EMs are now mainstream investments with a key role and an essential position in global portfolios. They are already too important to ignore.

At the same time, the case for EMs is sometimes oversold. Almost certainly, the implications of their faster growth are already impounded in market valuations. Despite China's unprecedented economic growth, the annualized return from its stock market has been almost the same as from DMs.

Indeed, our long-run research shows that the relationship between long-run real per capita growth in GDP and real equity returns is, perversely, negative. However, we do show that perfect foresight – clairvoyance – about future GDP growth would lead to higher returns within the emerging world. This suggests that insightful economic analysis could pay dividends. This is a competitive arena, however, where insights rapidly become impounded in prices.

Similarly, the long-term returns from EMs have been less stellar than many imagine. Over the very long run, EM equities have underperformed DM equities by 1.5% per year, while EM bonds have underperformed by 2.4%. This underperformance can be traced back mostly to the somewhat distant 1940s. Since 1960, EM equities have outperformed DM equities by around 1.5% per annum. In contrast, EM bonds have continued to underperform, although they have slightly outperformed DM bonds over the last 20 and 30 years, but not the most recent decade.

In terms of equity returns, the emerging world does offer the prospect of potentially outstanding performance from individual markets. This was the case for Japan in the post-World War II period – it subsequently became a DM. Similarly, we have seen outstanding returns from Hong Kong SAR (also now long regarded as a DM), South Korea and Taiwan (Chinese Taipei). However, while not detracting from these undoubted success stories, we should not forget the disappointing performance of once-promising countries like Argentina, Nigeria, Pakistan, Venezuela and Zimbabwe.

Investors should not be deterred from investing in EMs because of risk. We have shown that the risk of individual EMs has fallen dramatically over the last 20 years, while the gap between the average risk of EMs versus DMs has fallen dramatically. Indeed, over the most recent 5-year period, the annualized volatility of a diversified portfolio of EMs has been only a little above that of a diversified portfolio of DMs. Furthermore, EMs still offer important diversification benefits for DM investors. For EM-based investors, the benefits from spreading investments across their home markets, as well as other EMs and DMs are even greater.

We have seen that factor returns that are well documented in DMs, such as size, value, momentum and quality are also present in EMs. The size and momentum effects appear weaker than in DMs, In contrast, the value effect has been strong, although not immune from the worldwide malaise in the value effect over the last 12 or so years. Finally, we have seen that the value effect has not only been apparent within EMs, but also as a basis for successful rotation strategies between markets.

Photo: Shanghai, China; Credit Suisse

Individual markets

The Credit Suisse Global Investment Returns Yearbook covers 32 markets and five composite indexes, namely the world, the world ex-USA, Europe, developed markets and emerging markets. 23 of the countries and all five composite indexes start in 1900. The other nine markets, which are new to the Yearbook in 2021, start later than 1900, but have long histories ranging from 45 to 70 years. We provide an overview of some important national markets and composite indexes, with charts summarizing their investment performance and risk premiums.

The coverage of the Dimson-Marsh-Staunton (DMS) database was stable from 2015–20, comprising 23 countries and representing over 95% of world equity market capitalization at start-1900. From start-2021, we have added nine new markets with shorter investment histories of 45–70 years. The new markets are Brazil, Hong Kong SAR, India, Malaysia, Mexico, Singapore, South Korea, Taiwan (Chinese Taipei) and Thailand.

Our 32 markets represent over 98% of the investable equity universe in 2021. They comprise two North American countries, two from Latin America, 16 European countries, one African country and 11 markets from Asia-Pacific. More details on their global coverage and the sizes of each market are provided in **Figure 17** and the accompanying discussion.

We also introduce five capitalization-weighted composite equity indexes. These are a world market, a world ex-USA, a Europe-only, a DM and an EM index. These indexes are all expressed in common currency (USD). They have some special attributes that are described in the text on the first page of each composite index.

In addition to the 32 national and five composite series, we maintain annual data on equity returns, inflation and currencies for a further 58 markets. These markets have returns histories ranging from 10 to 45 years (see **Figure 17**). We include selected index data in the pages that follow, with a description and overview of investment performance and risk premiums. The full Yearbook covers all 37 markets and provides extensive charts, tables, returns and premiums over multiple intervals.

Data sources

We list data sources for every index in the full Yearbook. Selected sources are cited in this document, and additional references are listed at the end of Dimson, Marsh and Staunton (2002, 2007, 2021).

We follow a policy with our data sources of continuous improvement, introducing new countries where this becomes feasible, and switching to superior indexes as they become available or as we become aware of them.

The underlying annual returns and risk premiums for our database are distributed as the DMS data module by Morningstar Inc.

Australia

Australia is often described as "The Lucky Country" with reference to its natural resources, weather, and distance from problems elsewhere in the world. But maybe Australians make their own luck.

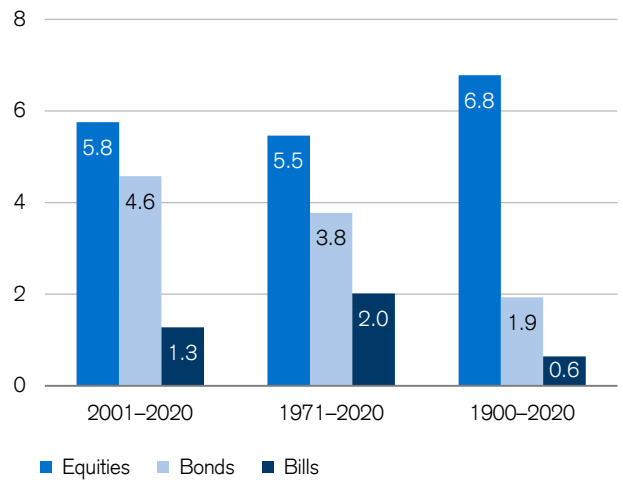
Services make up a large part of the Australian economy, representing three-quarters of GDP. With a strong banking system, the country was relatively untouched by the global financial crisis and was supported by strong demand for resources from China and other Asian nations. Australia is the world's largest exporter of coal, iron ore, lead, rutile, and zinc; the second largest of gold and uranium, and the third largest of aluminum.

Whether it is down to economic management, a resource advantage or a generous spirit, Australia has in real common currency (USD) terms been the world's best-performing equity market over the past 121 years, while in real local-currency terms, it has been second-ranked. Since 1900, the Australian stock market has achieved an annualized real local-currency return of 6.8% per year and a real USD return of 6.6% per year.

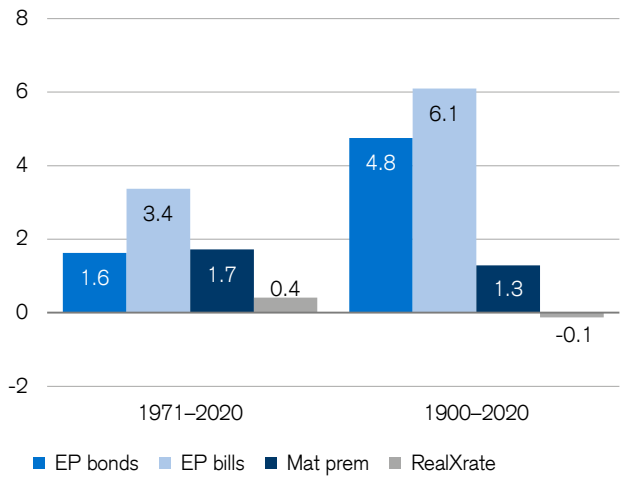
Australia is the world's ninth-largest equity market. Some 41% of the FTSE Australia index is represented by banks (22%) and basic materials (19%, predominantly mining). The largest stocks at the start of 2021 were Commonwealth Bank of Australia (9% of the index), CSL (8%) and BHP Billiton (7%). They are followed by National Australia Bank, Westpac Banking Corporation, and Australia & New Zealand Banking Group.

Australia also has a significant government and corporate bond market and is home to the largest financial futures and options exchange in the Asia-Pacific region.

Figure 31: Annualized real returns and risk premiums (%) for Australia, 1900–2020



Note: The three asset classes are equities, long-term government bonds, and Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.



Note: EP bonds and EP bills denote the equity premium relative to bonds and to bills; Mat prem denotes the maturity premium for bonds relative to bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

China

Despite the occasional wobble, China's economic expansion has had a huge cumulative impact. According to the International Monetary Fund, China now has the world's largest GDP measured using PPP exchange rates, although at market exchange rates, the USA is still the world's largest economy. The world's most populous country, China has over 1.3 billion inhabitants, and more millionaires and billionaires than any country other than the USA.

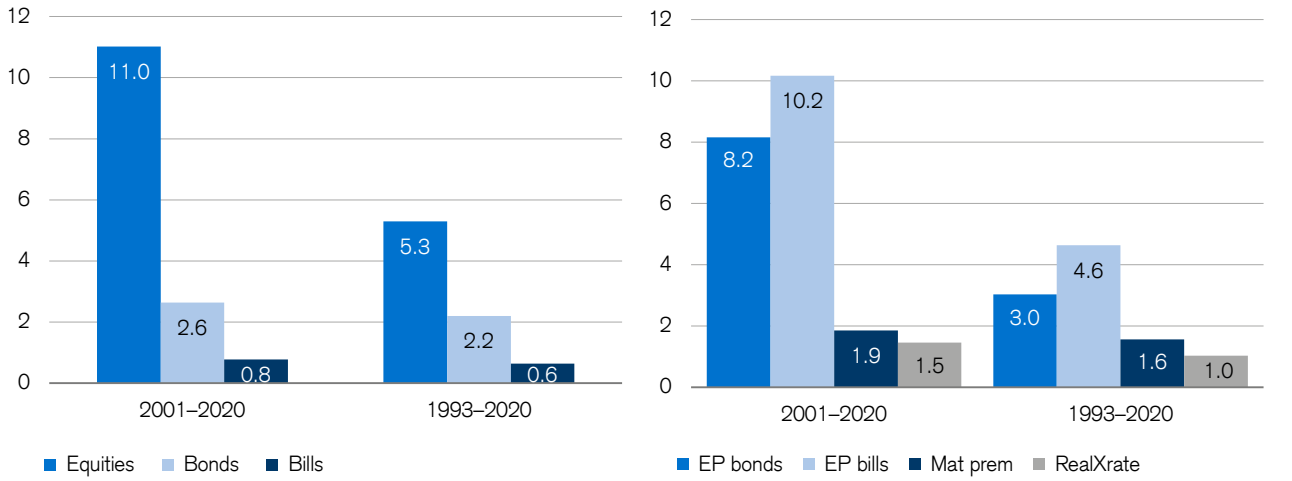
After the Qing Dynasty, it became the Republic of China (ROC) in 1911. The ROC nationalists lost control of the Mainland at the end of the 1946–49 civil war, after which their jurisdiction was limited to Taiwan (Chinese Taipei) and a few islands. Following the communist victory in 1949, privately owned assets were expropriated and government debt was repudiated.

The People's Republic of China (PRC) has been a single-party state since then. We therefore distinguish between (1) the Qing period and the ROC, (2) the PRC until economic reforms were introduced, and (3) the modern period following the second stage of China's economic reforms of the late 1980s and early 1990s.

The communist takeover led to total losses for local investors. Chinese returns from 1900 are incorporated into the world and world ex-US indexes, including these total losses. However, a minuscule proportion of foreign assets retained some value (some UK bondholders received a tiny settlement in 1987).

As discussed in the 2019 Yearbook, China's astonishing GDP growth was not accompanied by superior investment returns. Today, consumer services make up 28% of the FTSE World China index, followed by technology (22%) and financials (19%). Tencent Holdings is the biggest holding in the index, followed by Alibaba Group, Meituan-Dianping, Ping An Insurance, and China Construction Bank.

Figure 32: Annualized real returns and risk premiums (%) for China, 1993–2020



Note: The three asset classes are equities, long-term government bonds, and Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.

Note: EP bonds and EP bills denote the equity premium relative to bonds and to bills; Mat prem denotes the maturity premium for bonds relative to bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

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Switzerland

For a small country with just 0.1% of the world's population and less than 0.01% of its land mass, Switzerland punches well above its weight financially and wins several gold medals in the global financial stakes.

The Swiss stock market traces its origins to exchanges in Geneva (1850), Zurich (1873), and Basel (1876). It is now the world's sixth-largest equity market, accounting for 2.7% of total world value. Since 1900, Swiss equities have achieved a real return of 4.6% (equal to the median across our countries).

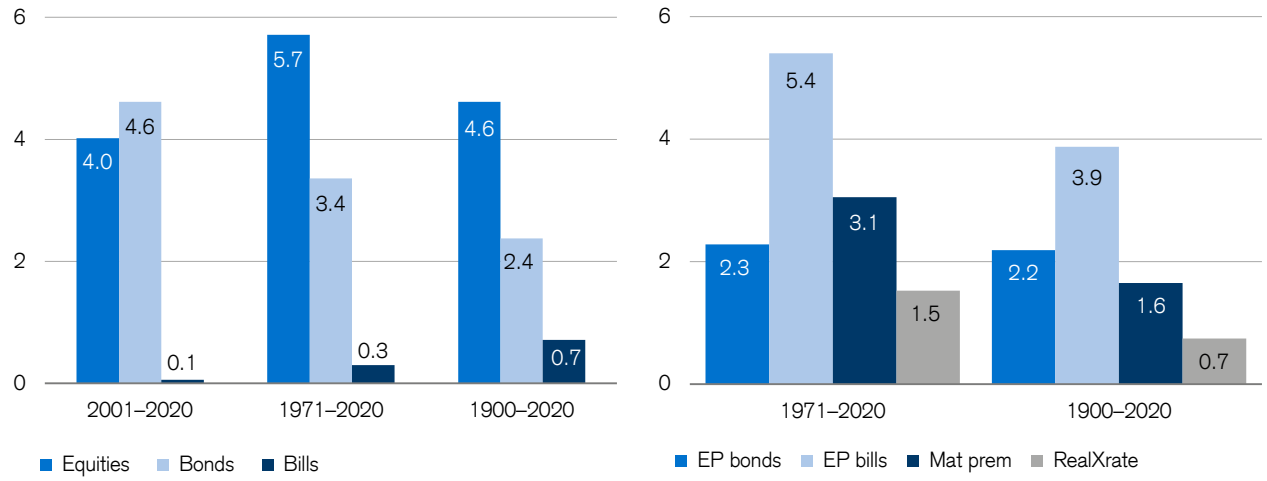
Meanwhile, Switzerland has been the world's best-performing government bond market, with an annualized real USD return of 3.1% (it ranks first in real local currency return terms, with an annualized return since 1900 of 2.4%). Switzerland has also had the world's lowest 121-year inflation rate of just 2.1%.

Switzerland is one of the world's most important banking centers, and private banking has been a major Swiss competence for over 300 years. Swiss neutrality, sound economic policy, low inflation and a strong currency have bolstered the country's reputation as a safe haven.

A large proportion of all cross-border private assets invested worldwide is still managed in Switzerland.

Switzerland's pharmaceutical sector accounts for a third (33%) of the value of the FTSE World Switzerland Index. Nestle (21%), Roche (16%), and Novartis (13%) together account for half of the index's value.

Figure 33: Annualized real returns and risk premiums (%) for Switzerland, 1900–2020



Note: The three asset classes are equities, long-term government bonds, and Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.

Note: EP bonds and EP bills denote the equity premium relative to bonds and to bills; Mat prem denotes the maturity premium for bonds relative to bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

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United Kingdom

Organized stock trading in the United Kingdom dates from 1698, and the London Stock Exchange was formally established in 1801. By 1900, the UK equity market was the largest in the world, and London was the world's leading financial center, specializing in global and cross-border finance. Early in the 20th century, the US equity market overtook the UK and, nowadays, New York is a larger financial center than London. What continues to set London apart, and justifies its claim to be the world's leading international financial center, is the global, cross-border nature of much of its business.

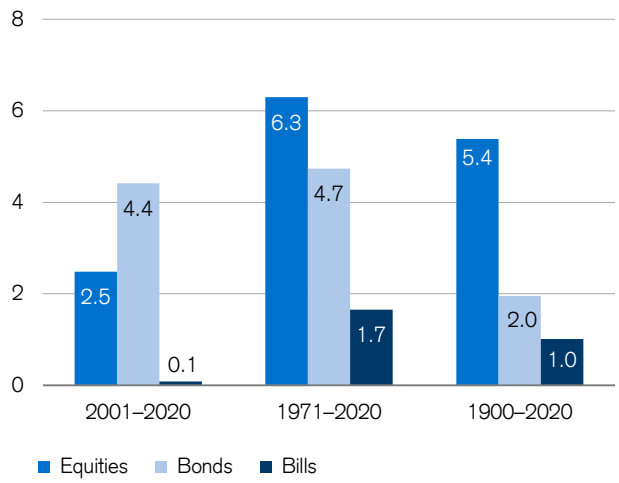
Today, London is ranked as the second most important financial center (after New York) in the Global Financial Centers Index. It is the world's banking center, with 550 international banks and 170 global securities firms having offices in London.

The UK's foreign exchange market is the biggest in the world, and Britain has the world's number-three stock market, number-three insurance market, and the fourth-largest bond market.

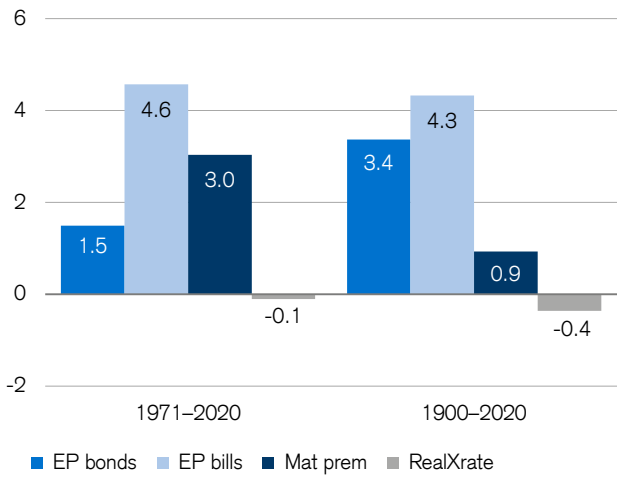
London is the world's largest fund management center, managing almost half of Europe's institutional equity capital and three-quarters of Europe's hedge fund assets. More than three-quarters of Eurobond deals are originated and executed there. More than a third of the world's swap transactions and more than a quarter of global foreign exchange transactions take place in London, which is also a major center for commodities trading, shipping and many other services.

Unilever is the largest UK stock by market capitalization. Other major companies include Royal Dutch Shell, Astra Zeneca, HSBC Holdings, Glaxo SmithKline, and Diageo.

Figure 34: Annualized real returns and risk premiums (%) for the UK, 1900–2020



Note: The three asset classes are equities, long-term government bonds, and Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.



Note: EP bonds and EP bills denote the equity premium relative to bonds and to bills; Mat prem denotes the maturity premium for bonds relative to bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

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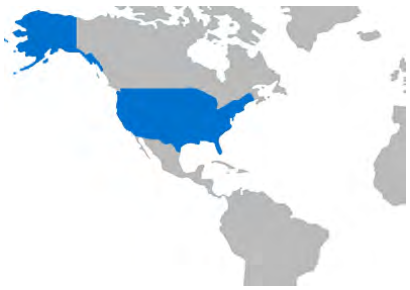
United States



In the 20th century, the United States rapidly became the world's foremost political, military, and economic power. After the fall of communism, it became the world's sole superpower. It is also the world's number one oil producer.

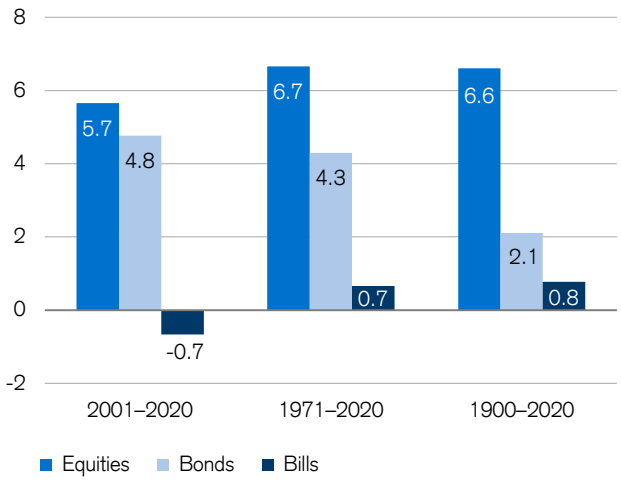
The USA is also a financial superpower. It has the world's largest economy, and the dollar is the world's reserve currency. Its stock market accounts for 54% of total world value (on a free-float, investible basis), which is seven times as large as Japan, its closest rival. The USA also has the world's largest bond market.

US financial markets are by far the best-documented in the world and, until recently, most of the long-run evidence cited on historical investment performance drew almost exclusively on the US experience. Since 1900, equities and government bonds in the USA have given annualized real returns of 6.6% and 2.1%, respectively.

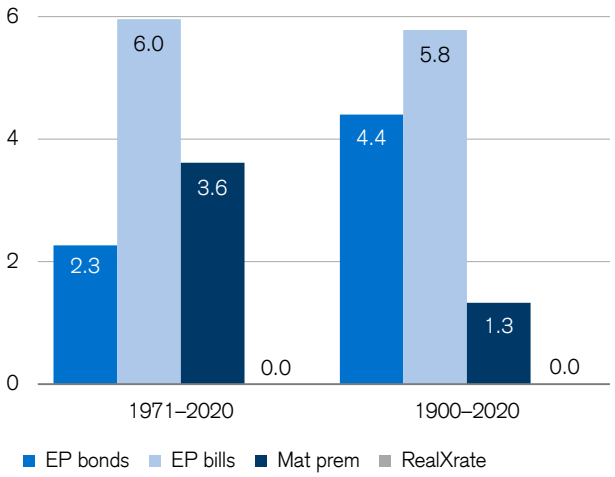
There is an obvious danger of placing too much reliance on the impressive long-run past performance of US stocks. The New York Stock Exchange traces its origins back to 1792. At that time, the Dutch and UK stock markets were already nearly 200 and 100 years old, respectively. Thus, in just a little over 200 years, the USA has gone from zero to more than a majority share of the world's equity markets.

Extrapolating from such a successful market can lead to "success" bias. Investors can gain a misleading view of equity returns elsewhere, or of future equity returns for the USA itself. That is why this Yearbook focuses on global investment returns, rather than just US returns.

Figure 35: Annualized real returns and risk premiums (%) for the USA, 1900–2020



Note: The three asset classes are equities, long-term government bonds, and Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.



Note: EP bonds and EP bills denote the equity premium relative to bonds and to bills; Mat prem denotes the maturity premium for bonds relative to bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

Sources: Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists, Princeton University Press, 2002, and Global Investment Returns Yearbook, Credit Suisse, 2021. Not to be reproduced without express written permission from the authors.

Developed markets

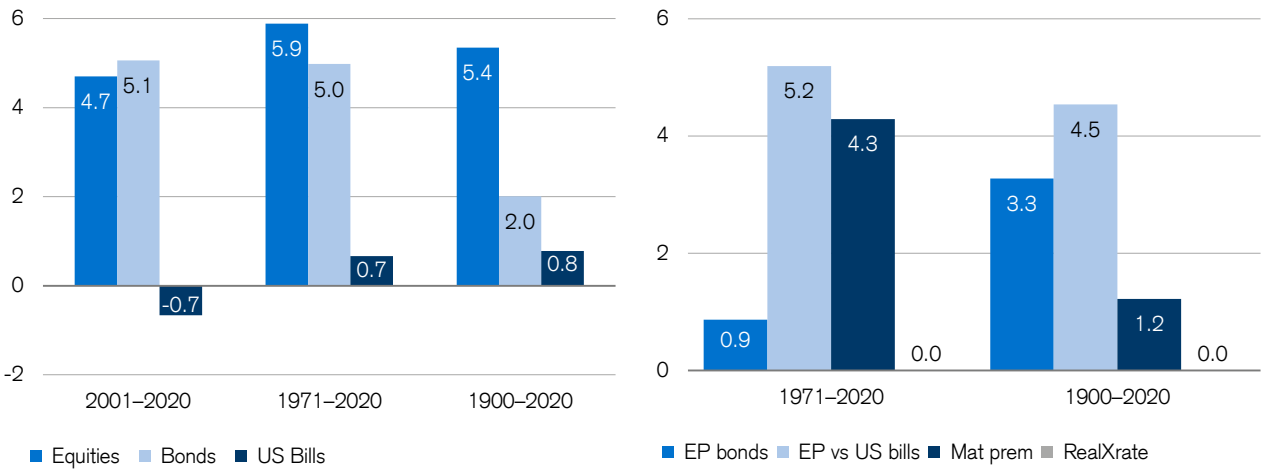
We also produce long-run indexes from 1900 for both developed and emerging markets. To do this, we need a way of identifying whether a market was developed or emerging at each year in the past. Most of the countries for which we have data in 1900 are today classified as developed. However, back in 1900, several would then have been deemed emerging.

From the start of MSCI's EM index in 1987, we adopt MSCI's annual classification to determine which markets were developed. We do not use MSCI index values. Prior to 1987, we use our own algorithm to determine which markets were developed. This is based on GDP per capita, and is explained in an earlier chapter of this report.

Using these classifications, we create our developed markets index using the same methodology as for our other composite indexes. We estimate the index returns annually for all those markets which were deemed developed at the start of the year in question. The index had 16 constituents in 1900. These were joined by Finland in 1932, Japan in 1966, Spain in 1974, Hong Kong SAR in 1977, Singapore in 1980, Luxembourg in 1982, Portugal in 1998, Greece from 2002–13 and Israel in 2011. By 2020, the developed markets index thus spanned 24 countries. As with our other composite indexes, the developed markets index is designated in US dollars from the perspective of a US international investor.

Over the last 121 years, the left-hand chart below shows that the annualized real return on the developed markets equity index was 5.4%. This is a little higher than the 5.3% for the World index, indicating that developed markets have outperformed emerging markets over the long run. For a fuller discussion, see the previous section of this document.

Figure 36: Annualized real USD returns & risk premiums (%) for developed markets, 1900–2020 (in USD)



Note: The three asset classes are equities, long-term government bonds, and US Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.

Note: EP bonds and EP bills denote the equity premium relative to bonds and to US bills; Mat prem denotes the maturity premium for bonds relative to US bills; RealXRate
denotes the inflation-adjusted change in the exchange rate against the US dollar.

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Emerging markets

Our emerging markets index follows the same methodology used for the other composite indexes, and the same classification rule as the developed markets index (see above). At the start of each year, we deem a market to be emerging unless the rule indicates that it is a developed market at that point in time.

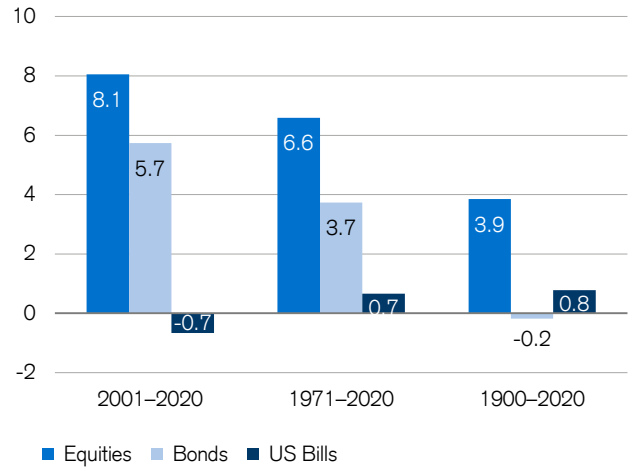
Unlike the major index providers, we do not distinguish between emerging, frontier, other or unclassified markets. Our focus is simply on the split between markets that are deemed developed and those with developing status. We group together all of the latter markets as a single cohort and refer to them generically as "emerging."

In 1900, our emerging markets equity and bond indexes had seven country constituents. By 2020, the number of constituents in the emerging markets equity index had grown to 66 countries. The constituents, with their start dates, are shown in **Figure 17**. The emerging markets

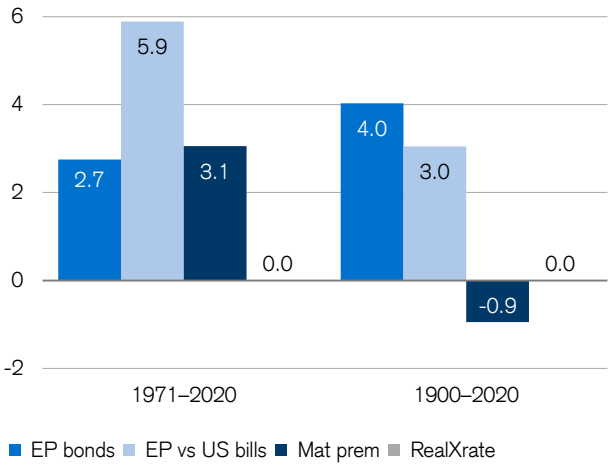
our supplementary database of 58 countries does not yet have bond data..

Over the last 121 years, the left-hand chart below shows that the annualized real return was 3.9% for the emerging markets equity index, and –0.2% for the bond index. These are much lower than for developed markets. The main reason for the underperformance was the dismal returns from emerging markets in the 1940s. Since 1960, emerging market equities have outperformed, although bonds continued to disappoint. For a fuller discussion, see the discussion of EMs earlier in this Summary Edition.

Figure 37: Annualized real USD returns and risk premiums (%) for emerging markets, 1900–2020 (in USD)



Note: The three asset classes are equities, long-term government bonds, and US Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.



Note: EP bonds and EP bills denote the equity premium relative to bonds and to US bills; Mat prem denotes the maturity premium for bonds relative to US bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

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bond index had ten constituents. This is because

World

To see how equities and bonds have performed in aggregate, we compute a World index embracing all countries. The equity index starts in 1900 with the DMS 23 countries. Additional countries enter the index as data becomes available. This includes the nine new Yearbook markets, as well as 58 further countries for which we have equity data (see **Figure 17**). Thus in recent years, the DMS World index includes 90 countries.

The World bond index is computed in the same way, initially comprising the DMS 23 countries, and adding in the nine new markets as data becomes available. No bond data is available for the other 58 countries, so the World bond index is based on the 32 Yearbook countries.

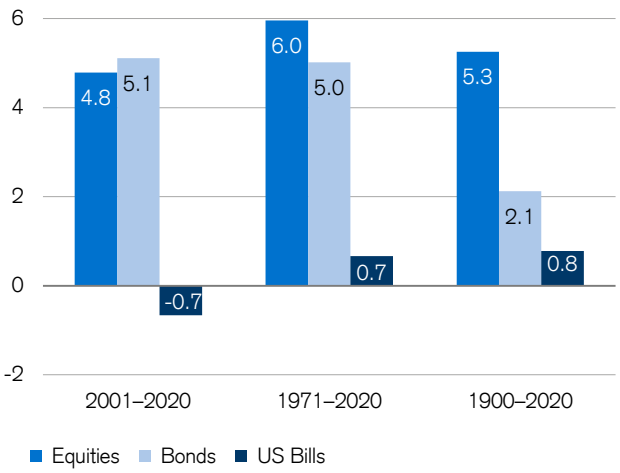
In the World equity index, countries are weighted by their start-year market capitalizations, free-float adjusted from 2001. The World bond index is weighted by GDP. The weighting schemes are discussed at the beginning of this book.

To avoid survivorship bias, all countries are fully included in the world indexes once data becomes available. Two markets register a total loss – Russia in 1917 and China in 1949. They then re-enter the world indexes after their markets reopened in the 1990s. We also record a total loss on German bonds during the hyper-inflationary period of 1922–23.

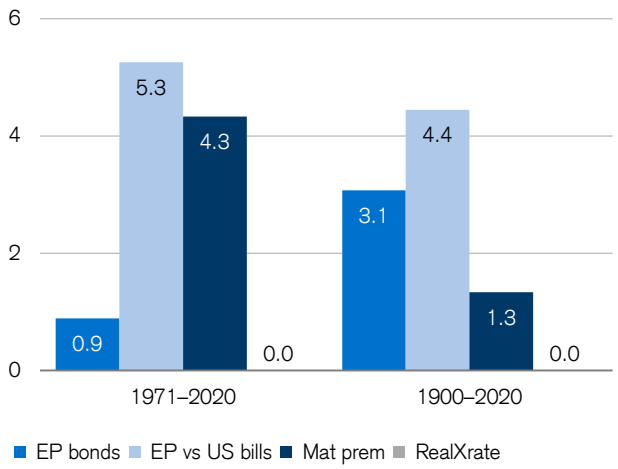
The DMS World indexes represent the long-run returns on a globally diversified portfolio from the perspective of an investor in a given country. The charts and tables below show the returns for a US global investor. The indexes are expressed in US dollars, real returns are measured relative to US inflation, and the equity premium versus bills is relative to US Treasury bills.

Over the last 121 years, the left-hand chart below shows that the annualized real return on the world index was 5.3% for equities and 2.1% for bonds. The right-hand chart shows that the World equity index had an annualized equity risk premium, relative to Treasury bills, of 4.4% over the last 121 years.

Figure 38: Annualized real USD returns and risk premiums (%) for the World index, 1900–2020



Note: The three asset classes are equities, long-term government bonds, and US Treasury bills. All returns include reinvested income, are adjusted for inflation, and are expressed as geometric mean returns.



Note: EP bonds and EP bills denote the equity premium relative to bonds and to US bills; Mat prem denotes the maturity premium for bonds relative to US bills; RealXRate denotes the inflation-adjusted change in the exchange rate against the US dollar.

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