ROBECO
The Investment Engineers

EXPECTED RETURNS

2021
2025

BRAVE REAL WORLD

5-year outlook

Sustainable Investing Expertise by
ROBECOSAM

BRAVE REAL WORLD

2021-2025 outlook

This document has been compiled by Laurens Swinkels and Peter van der Welle.
It represents the views of Robeco's Multi-Asset team, which are not necessarily shared by other teams at Robeco.
Please visit www.robeco.com/expectedreturns for more information.
Special thanks to our colleagues from other Robeco departments, including Steef Bergakker, David Blitz, Jeroen Blokland, Sam Brasser, Joop Huij, Dries Laurs, Rikkert Scholten, Bob Stoutjesdijk and Martin van Vliet for their contribution.

This publication is intended for professional investors only

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Foreword

As we celebrate the tenth edition of our annual five-year outlook, it's safe to say that never in its history has this publication been drafted in an environment as uncertain as right now. And though it's hard to make any accurate predictions about the financial markets in the short term, we do believe that looking ahead to the next five years is still a worthy challenge.

Financial markets panicked in March when the coronavirus spread to the Western world, with reality hitting home as hospitals reached maximum capacity in Italy's Lombardy region. Lockdowns in various shapes and forms around the world followed suit, bringing down equity markets, while quick and decisive action by governments and central banks restored a large part of these initial losses.

Expected returns are a vital element of any investor's strategic decision making. The approach we take in this report is based on a five-year outlook, extending to 2025, and the forecasts we present can be used as input for the investment plans of both institutional and professional investors. We pair our return forecasts for all major asset classes with related content, to provide readers with a deeper understanding of the markets in which they are investing. A notable shift in this year's report is our upward revision of expected returns on global equity markets, because we have faith in the coordinated response of governments and central banks to resolve the economic downturn in the coming five years.

This outlook's theme, 'Brave real world', is inspired by the negative real interest rates dominating most of the developed world, and the belief that recovery will not just be restricted to the virtual aspect of the global economy. Central banks' policies have resulted in nominal interest rates close to zero, which will lead to declines in real wealth for bond investors if inflationary pressures rise. Two of our special topics discuss this theme in more detail, concentrating on these issues in relation to the massive fiscal stimulus packages that were implemented to deal with the Covid-19 crisis. Our other special topics examine factor investing in equity markets, the pricing of climate risks, and how skewness of equity returns is a blessing for trends investing. We at Robeco have been research driven for over 90 years, and have therefore included many references to academic and non-academic publications for readers wishing to delve deeper into the topics discussed.

We hope that you enjoy reading this publication and find it helpful in navigating the investment landscape in the period ahead.

Victor Verberk
Chief Investment Officer

For an assessment of the long-term expected returns, please visit www.robeco.com/expectedreturns.

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Executive summary

Brave real world

It's as if nothing happened. At the time of writing, the MSCI AC World index in EUR is up 8% since a year ago, which is very close to our long-term equilibrium equity return estimate of 7%. Yet, in the interim period, when the global economy was first confronted with Covid-19, we experienced the most significant US GDP contraction since the third quarter of 1932 and the deepest global recession since the 1930s. To overcome the crisis, we believe investors need to understand, now more than ever, that ultra-low interest rates are a key feature of the current investment landscape. We foresee a protracted period of negative real interest rates, meaning their impact on the relationship between economic fundamentals and asset price performance, and the consequences for multi-asset allocation, will be critical. We are living in a time of radical transition, and volatility in markets will remain elevated.

Yet, there are signals to be found amid the static. Financial markets have been confronted by pandemics and prolonged episodes of negative real interest rates before. We believe risk taking will be rewarded in the next five years, especially as some traditional safe havens will eventually be deemed risky as well.

During the Great Depression, Aldous Huxley published his famous 1932 novel *Brave New World*. It has become somewhat passé to praise Huxley's foresight in accurately describing our current world.[1] Nevertheless, Huxley's vision has some relevance when describing an unequal, technologically advanced, consumerist society, in which governments interfere in the private sector – even infringing on individual freedoms. For instance, would it have been possible a year ago to imagine being forced into 'lockdown' or 'quarantine'? And therefore to be consuming more digital media than ever before?

1. A sentiment displayed for instance in a July 2020 New York Times play review: "Brave New world arrives in the future it predicted", https://www.nytimes.com/2020/07/13/arts/television/brave-new-world-peacock.html.

And yet, it's not a brave new world as it is unlikely that the post Covid-19 era will mark the beginnings of a completely new world. There is much talk about a 'new normal'. This is no wonder, considering the great divide emerging in the global economy, which can be seen most clearly in the discrepancy in performance between the technology sector and the non-tech sector since the 23 March trough. What this suggests is that the global economy's sudden standstill in 2020 has created a structural break. In fact, this is an acceleration of a tectonic shift that was already in the making. It's not a new normal, but the old normal amplified. What was bubbling under the surface in the old normal has gradually become more real and more urgent. The larger trends are still present: high non-financial corporate leverage, declining trend growth, ever widening wealth and inequality gaps and shrinking monetary and fiscal policy space – all themes discussed in detail in previous Expected Returns editions.

So, that being said, we don't believe the dark, deeply ironic undertones of *Brave New World* reflect the future. Without resorting to irony, it's not a brave new world that will emerge in the next five years; it is a brave *real* world.

It's a brave real world because medical workers and researchers are caught in a frantic race to solve the largest global health crisis in decades. The acronym of the proposed Democratic fiscal package this summer, the HEROES act, reflects this sentiment. Without a solution for the health crisis, a sustained economic recovery seems implausible.

It's a brave real world in the making, because a post Covid-19 recovery will remain incomplete and lopsided if only sustained by the virtual world. Covid-19 has highlighted the fact that digitalization was falling short of its potential in many sectors before the pandemic began. The outbreak has ensured that the productivity benefits of working from home, online learning and telemedicine have come to the fore. Nevertheless, a saturation point will

be reached, requiring us to get real instead of virtual. Growth needs trust and trust needs proximity and real-life interaction. Returning to normal life means ensuring conditions are safe enough for vulnerable groups to visit shopping malls and participate in offline services.

It's a brave real world looking to overcome the challenges of achieving a sustainable, greener future. The lockdown episodes have increased our awareness of the true impact our current economic structures have on climate change. We're now potentially on track to recording the largest drop in greenhouse gas emissions since the Second World War.[2] This stresses both the importance and the difficulties of meeting the Paris Agreement objectives that aim to limit global temperature rise to below 1.5-2 degrees Celsius above pre-industrial levels. To this end, EU leaders have initiated the European Green New Deal, which will encourage and inspire further ESG-related engagement.

2. https://www.nature.com/articles/d41586-020-01497-0

It's a brave real world for policymakers who, facing the deepest recession since the Great Depression, have pulled out all the stops to prevent an even worse outcome for the global economy than the one we're currently experiencing. The degree of monetary and fiscal stimulus greatly outweighs the response to the global financial crisis more than a decade ago. In fact, in the US it has been unprecedented. A key question to consider in scenario thinking is whether policymakers will succeed in getting real rates low enough for a substantial period of time to facilitate a self-sustaining economic recovery. We believe they will. But their success will depend, more than ever in post-war history, on close collaboration between the monetary and fiscal authorities.

Expanding the macro framework

In last year's five-year outlook, we stated that "The monetary policy space – and increasingly so the fiscal policy space, too – provides the building blocks for the states of world we deem likely and the interplay between these two policy tools is a common thread throughout our scenario thinking." In our current scenarios, our four building blocks are: solving the health crisis, crisis relief, aggregate demand management, and addressing the policy failures along the way. The coordination between fiscal and monetary policy will still largely determine the success of aggregate demand management, but this depends on solving the global health crisis and providing effective crisis relief first. How effectively these four building blocks are implemented in actual policy will also largely determine the type of economic recovery path for countries and regions, as well as the behavior of asset markets.

In our base case, 'Credible fiscal financiers', the post-pandemic recovery starts off lopsided as the existing divide opens further between tech-savvy sectors with a low degree of in-person services and those sectors that lack the leverage of further digitalization. Small corporates, especially those in the leisure and hospitality sector, recover incompletely with restructurings and defaults lingering for longer. However, in-service sectors catch up significantly after 2022 as Covid-19 vaccines deliver herd immunity and recovery becomes less fragmented and asynchronous. Growth increases to trend towards the end of our projection period, while inflation in developed markets increases to 3% in the US by 2025.

Compared to last year's base case, we see a higher degree of coordination between policy makers. Central banks adapt effectively to their new roles and delay the erosion of sovereign debt sustainability. After exhausting the conventional monetary tools (bringing policy rates to zero) and subsequently running into diminishing returns with unconventional ones (stimulating aggregate demand via central bank balance sheet expansion), central banks enter a phase where the primacy of aggregate demand management is shifted to governments.

Playing second fiddle, central banks focus on their new role as facilitators of the fiscal experiment: keeping nominal rates close to the effective lower bound and monetizing fiscal deficits in order to ensure government debt service costs are low enough to facilitate government payouts and the stimulation of aggregate demand. We have been here before. For instance, after the Second World War, the Fed had a tacit commitment to the US Treasury to stabilize the latter's cost of financing the war debt until 1951, when the Fed established its independence from the Treasury. At the end of our projection period, central banks reorient their strategy as they finally see a persistent satisfactory inflation level, and possibly even an overshoot of the target range.

In our bull case scenario, 'A reboot for growth with echoes of the 1970s', economic growth retains momentum after an initial rebound in 2021. The first phase, solving the health crisis, is more successful. A larger number of effective Covid-19 vaccines are brought into circulation in 2021 and the virus doesn't mutate its spike proteins, keeping those vaccines effective for longer. In terms of crisis relief, a fiscal cliff is avoided with no significant delay between the expiry of liquidity provisions by governments and the emergence of a self-sustaining recovery that generates cash flows. This phase is managed better than in our base case, as the European example of targeted preventive measures to keep workers employed for longer is more widely adopted.

In contrast to the base case, the paradox of thrift (i.e. excessive saving inhibiting the aggregate demand recovery) largely vanishes. The recovery in the labor market is strong and very low real rates encourage household and corporate dissaving as the economy gets on a stronger footing. Fiscal stimulus proves to be very effective with higher multipliers caused by more technology spillovers to sectors in which digitalization has so far missed its potential. Aggregate demand overshoots trend as a wave of pent-up spending takes shape. Given a sluggish supply-side response in labor and commodity markets relative to demand-side improvements, inflation in developed markets overshoots the 2% inflation target in 2022, and accelerates to 3% as feverish catch-up spending takes hold.

Central banks start thinking about raising rates earlier than in our base case, with the Fed initiating a tightening cycle by 2023 as US core CPI edges up to 3.5%. In this bull case, the paradox emerges: policy coordination has worked so well in kickstarting the economy that central banks find reason to distance themselves from their role as fiscal financiers, wanting to signal independence.

Our bear case, 'The great Covid-19 stagnation', sees the cracks in the global economy get wider. The pandemic can barely be brought under control, with setbacks in vaccine research owing to unexpected mutations of the virus. Distribution of an effective vaccine is thus delayed until 2022. Economic actors remain in crisis mode as the seesaw between lockdowns and reopenings tips towards lockdowns. The crisis-relief toolkit is exhausted and a fiscal cliff develops before a self-sustaining recovery can set in.

With fiscal and monetary policy space in some parts of the global economy depleted, another recession takes hold. This W-shaped path is followed by stagnation. The issues this publication has focused on in recent years come to the fore: excess corporate leverage, rising income inequality, and the erosion of trust in institutions and geopolitics. All those risk factors that would typically have ushered in a classic recession even if the Covid-19 crisis hadn't occurred are still very much with us, only aggravated by the pandemic. The role of central banks as fiscal financiers fails, against a background of lower consumption growth due to strong disinflationary forces, forced deleveraging, and a lower wealth effect. A prolonged episode of disinflation and very low real growth follows.

What does this scenario analysis imply for investors in the next five years?

Investors are entering a brave real world. The defining feature of this investment environment is ultra-low nominal interest rates and significantly negative real interest rates for longer, as inflation in both our base case and bull case picks up. This echoes 1971-1977 when developed countries had a negative real cash return of on average -2.4%.[3] But the echo will be faint: note that we have not penciled in an outright stagflation scenario.

3. Another analogous event would be the streak from 1946-1952, which saw consistent negative real rates in developed markets.

In such an environment, investors must boldly reorient themselves regarding stores of wealth and hedging capabilities of traditional safe haven assets. The mild inflation overshoot caused by policy makers in our base case transforms the *risk-free returns* of cash and bonds increasingly into *return-free risks*. We expect a negative return on cash for Eurozone investors and negative returns for developed sovereign bonds.

So, the brave real world is a paradoxical one: there will be risky safe havens. We expect risk taking to be rewarded in the next five years, even as volatility levels remain elevated. The preoccupancy of financial markets will shift from central banks to governments. This will bring about higher levels of asset and foreign exchange volatility as politicians offer guidance and policy implementation that is less smooth compared to those from their central banking counterparts.

For most risky asset classes, the expected reward for the volatility risk is substantial, leading to attractive Sharpe ratios. Despite elevated risk premiums, absolute asset returns will remain below their equilibrium values.

Table 1.1: Expected returns 2021-2025

	5-year annualized return	
	EUR	**USD**
Bonds		
Domestic AAA government bonds	-1.75%	-0.25%
Developed global government bonds (hedged)	-0.75%	0.00%
Global investment grade credits (hedged)	0.25%	1.00%
Global corporate high yield (hedged)	2.25%	3.00%
Emerging government debt (local)	2.00%	3.50%
Cash	-0.50%	0.25%
Equity		
Developed market equities	4.75%	6.25%
Emerging market equities	6.75%	8.25%
Listed real estate	3.00%	4.50%
Commodities	5.00%	6.50%
Consumer prices		
Inflation	1.75%	2.00%

Source: Robeco. September 2020. The value of your investments may fluctuate and past performance is no guarantee of future results.

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Expected returns 2021-2025

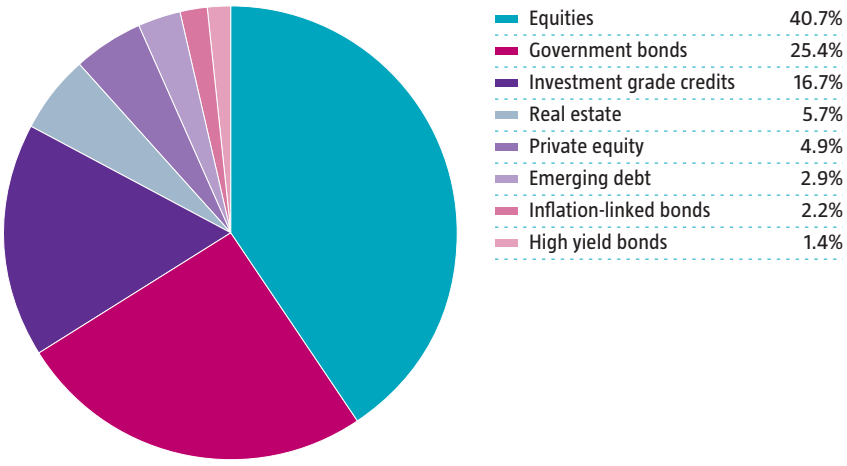
Valuation

Is value really dead? The recent underperformance of cheap value stocks relative to more expensive growth stocks has spurred the debate: does value-based investing lead to better performance? While the current discussion focuses on value investing within equity markets – see, for example, Fama and French (2020), Israel et al. (2020), and Arnott et al. (2020), value signals across asset classes have also proven to be fragile return predictors, especially in the short run. For longer-term horizons, the evidence is somewhat better. This is why we incorporate current valuation of asset classes in our forecasts for a five-year investment horizon. In this chapter, we lay out our views on the valuation of each asset class. In the following chapters, we examine whether these valuations correspond with our long-term macroeconomic outlook.

The global multi-asset market portfolio is the natural starting point for every investor, as it shows how the average invested dollar is allocated across asset classes. Figure 2.1 displays the weight of each asset class of the global market portfolio at the end of 2019.[1] We see that listed and private equities have a combined weight of 45.6%, which is substantially lower than the 52.0% average that Doeswijk, Lam, and Swinkels (2014) observed for equities over the period 1959-2012. This is the result of more debt issuance and capital gains on existing bonds caused by lower interest rates, as well as more opportunities for financial investors to invest in real estate over recent decades. There is no reason for the weights of the market portfolio to revert to their historical averages, as future weights depend on the prices of existing assets as well as new issuance of bonds, shares, and other assets. Nevertheless, the graph suggests that there is currently more tradeable debt than on average since 1959.

1. Description of the data sources in Doeswijk, Lam, and Swinkels (2014). Annually updated data can be found here: https://doi.org/10.25397/eur.9371741

Figure 2.1: Global multi-asset market portfolio



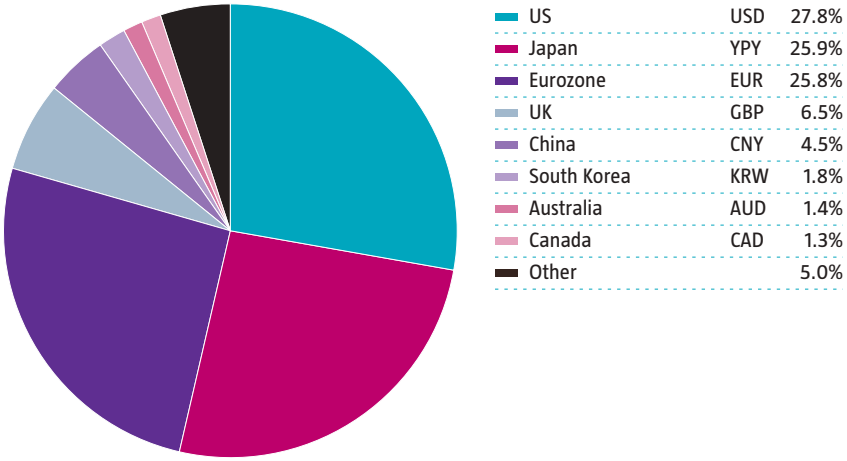
Source: Doeswijk, Lam, Swinkels (2014) and Erasmus University Data Repository of Laurens Swinkels for annual updates https://doi.org/10.25397/eur.9371741. Figure contains market capitalization weights as of 31 December 2019.

2.1 Government bonds

We assess the valuation of major government bond markets using three metrics: carry, the term premium, and mean reversion. As Figure 2.2 demonstrates, the US, Japan and Germany are the three major markets, with the last being the least risky country – the largest with an AAA rating – representing the Eurozone government bond market. The credit rating for the US is AAA and for Japan A+.[2] Note that countries with their own central bank never need to default on local currency nominal debt, as they can always print money to pay this off. The three major markets together represent a little over three-quarters of the global investment grade government bond market.

2. The credit rating here refers to the median sovereign credit rating issued by Standard and Poor's, Moody's, and Fitch rating agencies.

Figure 2.2: Currency composition of global investment grade government bonds



Source: Barclays Live, Robeco. Currency composition of the Bloomberg Barclays Global Treasury Index as of 30 June 2020. Other currencies includes the Indonesia Rupiah, Thai Baht, Malaysia Ringgit, Mexican Peso, Poland Zloty, Russia Ruble, Danish Krone, Singapore Dollar, Swiss Franc, Israel Shekel, Czech Koruna, Swedish Krona, New Zealand Dollar, Hungary Forint, Norwegian Krone, Chile Peso and Hong Kong Dollar.

2.1.1 Carry

Instead of trying to predict interest rates to determine the value of government bonds, we can start by determining the return should the interest rate curve remain unchanged. The return in this case is what we call the carry. Here, we ignore the second-order effect of the roll-down, and compare the yield to maturity of different segments of the global bond market.

Table 2.1 shows the maturity distribution of each of the three bond markets as well as the corresponding durations and yield to maturities as at 30 June 2020. The maturity profiles of Germany and Japan are similar, even though Japan has financed itself substantially more on the longer segment. Even though the weight in the 20+ segment is somewhat lower for Japan, the modified duration of 24.0 versus 20.4 for Germany indicates that the Japanese bonds have a longer maturity within this segment. The US is heavily financed with short-dated bonds; as evidenced by the 55.5% weight below five-year maturity, which is 39.6% and 34.5% for Germany and Japan respectively.

For a five-year outlook, the yield on a five-year zero-coupon bond would be the nominal risk-free rate. This is the nominal return that can be locked in at the start of the five-year period, assuming no defaults over the investment horizon. This yield is typically close to the medium-term five to seven-year maturity segment, with a duration slightly under six years. For Germany, this is -0.69%, only slightly higher than that of short-dated bonds of the one

Table 2.1: Maturity distribution and yields of three major government bond markets

	Germany			United States			Japan		
Maturity	**Weight**	**Duration**	**Yield**	**Weight**	**Duration**	**Yield**	**Weight**	**Duration**	**Yield**
1-3 years	22.1%	1.9	-0.70%	32.7%	1.9	0.17%	19.2%	2.0	-0.15%
3-5 years	17.5%	3.9	-0.72%	22.8%	3.9	0.24%	15.3%	4.0	-0.12%
5-7 years	9.6%	5.8	-0.69%	13.8%	5.7	0.40%	10.5%	6.0	-0.11%
7-10 years	20.4%	7.8	-0.58%	9.8%	7.8	0.57%	15.1%	8.3	-0.03%
10-20 years	13.6%	12.3	-0.33%	2.4%	14.7	1.03%	24.6%	13.8	0.24%
> 20 years	16.8%	20.4	-0.12%	18.5%	20.1	1.35%	15.4%	24.0	0.52%
Index	**100.0%**	**8.3**	**-0.53%**	**100.0%**	**7.2**	**0.50%**	**100.0%**	**10.0**	**0.08%**
Medium – Short			0.00%			0.23%			0.04%
Index – Medium			0.16%			0.09%			0.18%
Long – Short			0.37%			0.86%			0.39%

Source: Barclays Live, Robeco. We use the Bloomberg Barclays Treasury Indexes for Germany, the US, and Japan. 'Weight' represents the market capitalization weight of the maturity segment. 'Duration' is the option-adjusted modified duration of the maturity segment. 'Yield' is the yield-to-worst of the maturity segment, which is the worst-case yield that can be obtained without default. 'Medium – Short' is the yield of the '5-7 years' segment minus that of the '1-3 years' segment. 'Index – Medium' is the yield of the Index minus that of the '1-3 years' segment. 'Long – Short' is the yield of the '10-20 years' segment minus that of the '1-3 years' segment. Data is from 30 June 2020.

to three-year segment comprising -0.70%. At the bond index level, the yield is -0.53%, and long-dated bonds in the ten to twenty-year segment yield only -0.33%. These numbers show that for Germany, the carry is close to zero. Short-dated bonds yield the same as medium-dated bonds and the yield at the index level is only 0.16% higher. The gap between long and short-dated bonds is only 0.37%. Although the yield level is about 0.5% higher in Japan, the yield differences across maturities are similar to those in Germany. In the US, the yield curve is somewhat steeper, with a 0.23% yield difference between medium and short-dated bonds, and a 0.86% difference between long and short-dated bonds. Since its index has a duration close to that of medium-term bonds, the additional yield pickup of the index is small, with only 0.09%.

As short-dated bond yields are close to cash yields, these numbers indicate that carry-based valuation of government bonds is expensive compared to the 0.75% premium we expect in the steady state for Germany and Japan. However, it is close to fairly valued for the US.

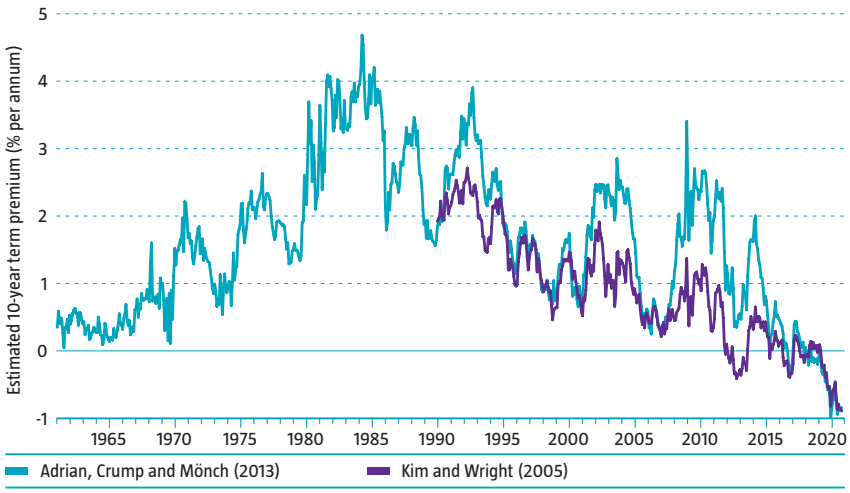
2.1.2 Term premium

The term premium refers to the additional return an investor expects to receive from holding a government bond rather than rolling over bills until the same maturity. Since the expected path of short-term interest rates cannot be observed, the challenge is to come up with a good estimate. For example, if the expected yield of bills until bond maturity is the current bill yield, the term premium would be equal to the carry discussed above. Another option would be to use the market-implied forward interest rates as the expected future short rates. This would by definition lead to a term premium of zero, i.e. the expected return on bonds equals the expected return on bills. This would contrast with the term premium observed since 1900.

Recently, researchers have been making considerable effort to determine the expected path of the short-term interest rate. See, for example, Adrian, Crump and Mönch's (2013) model at the New York Federal Reserve Bank, and Kim and Wright's (2005) model held by the Board of Governors of the Federal Reserve System, which are compared in more detail by Adrian, Crump, Mills and Mönch (2014). Figure 2.3 shows the US 10-year term premium resulting from both models, which has been updated up to 30 June 2020.

The term premium was low but positive in the first half of the 1960s. It then increased during and after the inflationary shocks in the 1970s and started to gradually decline after 1985. Since 2016, term premium estimates are mostly negative for both models. Although both models deviate at certain points substantially, they are in agreement about the latest 10-year term premium estimate with an estimate of -0.84% and -0.89% for the Adrian, Crump and Mönch (2013) and Kim and Wright (2005) model, respectively. In Figure 2.3 we show the 10-year term premium, as this is what most economists look at. For the five-year term premium, which relates to the horizon of our outlook, the estimates are close, but slightly lower at -0.78% and -0.75% for the Adrian, Crump and Mönch (2013) model and Kim and Wright (2005) model respectively.

Figure 2.3: US 10-year term premium estimates



Source: Updated data from Adrian, Crump and Mönch (2013) is maintained online by the Federal Reserve Bank of New York and from Kim and Wright (2005) by the Board of Governors of the Federal Reserve System. Data updated up to 30 June 2020.

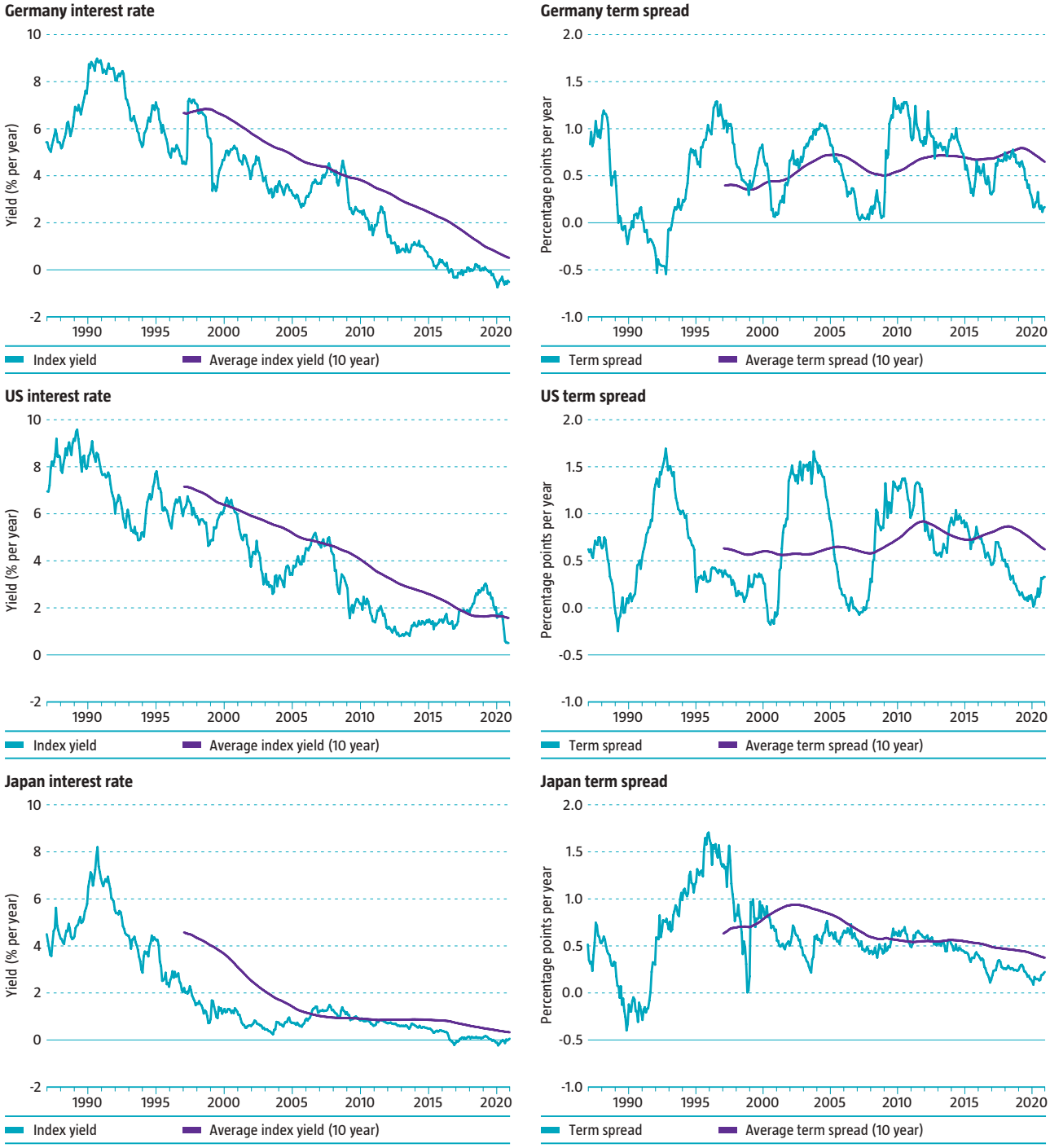
A negative term premium means investors are willing to pay a premium to invest in bonds rather than bills, for several possible reasons. First, the investor base for bonds has changed over time. Central banks are now major players in government bond markets, and unlike typical bond investors, they aim to achieve their monetary goals rather than primarily the risk-adjusted return of their investment portfolio. Secondly, regulation, in which liabilities of pension funds and life insurance companies are marked-to-market, ensures long-dated bonds provide the risk-free rate for these investors. Instead, these investors need to be compensated to take on risk, i.e. purchase short-dated bonds. Thirdly, as Campbell, Sunderam and Viceira (2017) argue, the correlation of bond returns with equity returns determines the existence of a term premium. A negative correlation implies that when equity markets crash, bond markets will generate positive returns. This type of insurance against adverse economic circumstances may be worth paying a premium for by all investors, even the price-sensitive ones. However, this last argument may not be as relevant today, as the current historically low yield levels are unlikely to go down even further to protect against a future crash.

Updated term premium estimates for the other two major markets are not readily available. McCoy (2019) estimated term premiums for German government bond markets and found negative term premiums since 2014, with a term premium of around -1% at the end of his sample period, June 2018. Mönch (2019) showed that the term premium for Japan, too, has become negative since 2016. His sample period ends in September 2018. Even though these estimates are somewhat dated, we believe that the current situation is likely to be similar.

2.1.3 Mean reversion

Another popular way to look at valuation is to forecast a reversion to the mean. For example, Asness, Moskowitz and Pedersen (2013) use mean reversion as their main valuation signal. This is inspired by the excess returns documented by DeBondt and Thaler (1985) for equity strategies based on mean reversion signals.

Figure 2.4: Mean reversion of interest rates and term spread



Source: Barclays Live, Robeco. The left side contains the yield to maturity of the Bloomberg Barclays Treasury indices for Germany (top), the US (middle), and Japan (bottom), and its 10-year moving average. The right side contains the yield difference between the Bloomberg Barclays Treasury indices and the one- to three-year segment of the same indices, and its 10-year moving average. Data for the period January 1987 to June 2020.

The challenge with mean reversion signals is to determine the level the asset is supposed to mean revert to. To keep things simple, we compare the interest rate to its 10-year average rate. This is long enough for the average to cover business cycles, but short enough for it to adapt if there are structural changes in the level of interest rates. Figure 2.4 shows the interest rate of the bond index since 1987 (left) and the term spread (right), i.e. the difference in the yield of the bond index relative to the short interest rate for Germany, the US and Japan. The interest rate level is currently well below its 10-year average for Germany and the US, with a gap of about 1.0%, while for Japan it is 0.3%. Although it is tempting to look at mean reversion in the index yield, this does not take into account the short interest rate. The term spread looks at the difference between the two, and mean reversion in the term spread predicts that medium-term yields are going to rise more than short-term rates. We also see that the term spread is below its 10-year average for all three countries. The biggest gap is for Germany, with a spread of 0.5%, followed by the US with 0.3%, and Japan with 0.2%. Hence, from a mean reversion perspective, all bond markets are expensive – both when looking at the interest rate levels, as well as on a relative basis to short-term yields.

2.1.4 Summary

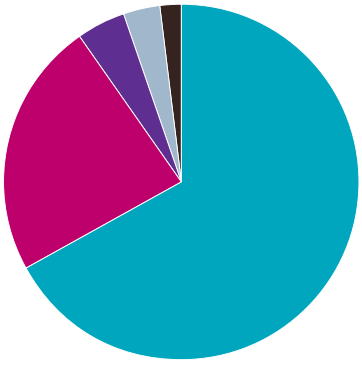
We have looked at three different measures for government bond valuation in the three main markets. Our conclusion is that global government bonds are expensive.

2.2 Corporate bonds

The corporate debt market is dominated by bonds issued in US dollars and euros. The US dollar is even more dominant for the high yield index than for the investment grade index, with a weight of 82.5% versus 67.0% respectively. The investment grade market has about 10% of issuance outside the two main currencies, but for high yield this is only 1.6%. The issuers are also mainly from the US, but the country composition is more diverse, as can be seen from Figure 2.5. Companies in emerging markets readily issue high yield bonds denominated in US dollars (see figure bottom right). For instance, companies in Brazil, Turkey and China do this most often after the US, holding 4.6, 3.7, and 3.3% of the index respectively. This market contains bonds of more than 100 countries. The category 'Other' contains countries with a weight below 1% of the index, which still adds up to 17.3%.

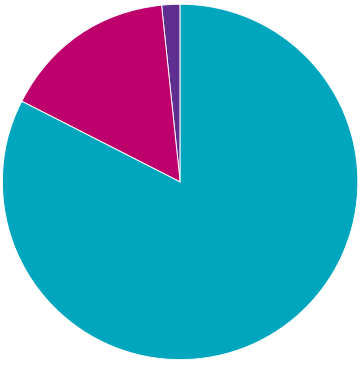
Figure 2.5: Currency and country composition of the investment grade and high yield corporate bond market

Currency distribution investment grade



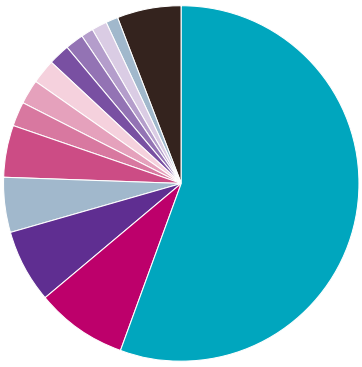
US	USD	67.0%
Eurozone	EUR	23.3%
UK	GBP	4.6%
Canada	CAD	3.3%
Other		1.7%

Currency distribution high yield



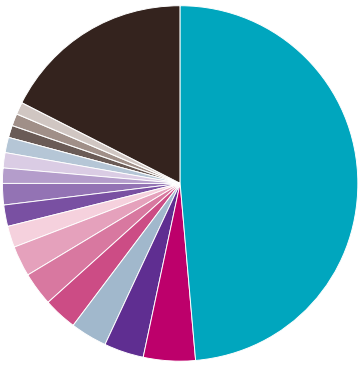
US	USD	82.5%
Eurozone	EUR	15.9%
UK	GBP	1.6%

Country distribution investment grade



US	55.7%
UK	8.4%
France	6.7%
Germany	4.8%
Canada	4.7%
Japan	2.4%
Netherlands	2.3%
Australia	2.0%
Switzerland	1.9%
Spain	1.7%
Italy	1.3%
Belgium	1.2%
China	1.1%
Other	5.8%

Country distribution high yield

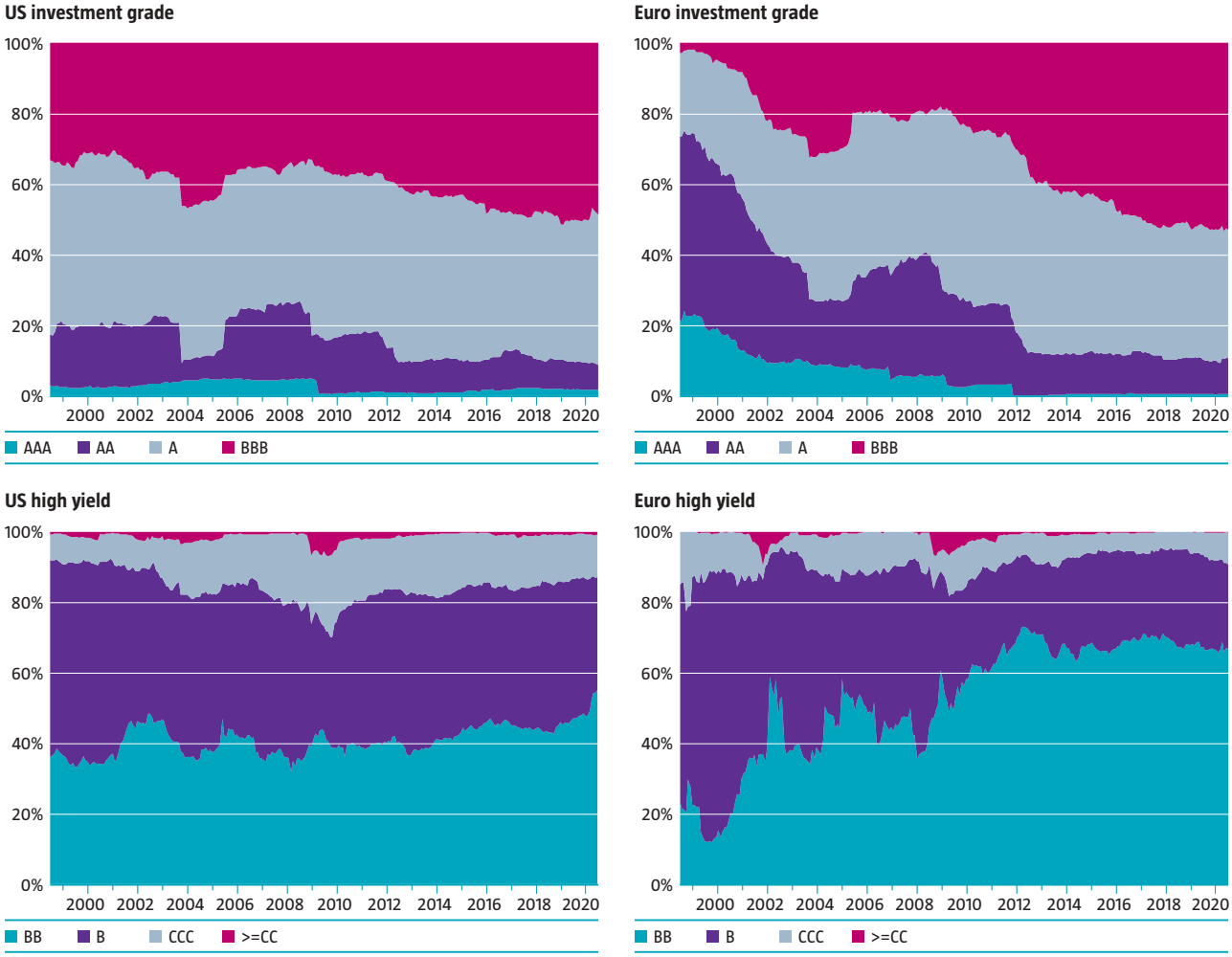


US	48.8%
Brazil	4.6%
Turkey	3.7%
China	3.3%
Italy	3.2%
UK	2.9%
Mexico	2.8%
Germany	2.1%
Canada	2.0%
France	1.8%
Luxembourg	1.4%
Argentina	1.4%
Spain	1.3%
Netherlands	1.2%
South Africa	1.2%
Egypt	1.1%
Other	17.3%

Source: Barclays Live, Robeco. We show the composition of the Bloomberg Barclays Global Corporate Investment Grade index (left) and the Bloomberg Barclays Global High Yield index (right) on 30 June 2020. The top row contains the currency distribution while the bottom row contains the country of the issuer.

When analyzing the valuation of US dollar and euro corporate credits, we exclude issuers from emerging markets. This is typically a separate category and valuation of emerging market corporate credits tends to be affected by the credit rating of the sovereign nation in which they are domiciled. Figure 2.6 shows that the quality of bonds in the investment grade index has gradually decreased over time, especially for euro-denominated bonds. On the other hand, the credit quality of the high yield index has increased. We therefore focus on yields for BBB (investment grade) and B (high yield) indices for the valuation analysis. By choosing one specific representative rating category, we avoid yield differences resulting from the changing credit quality of the index.

Figure 2.6: Credit quality of the investment grade and high yield corporate bond market

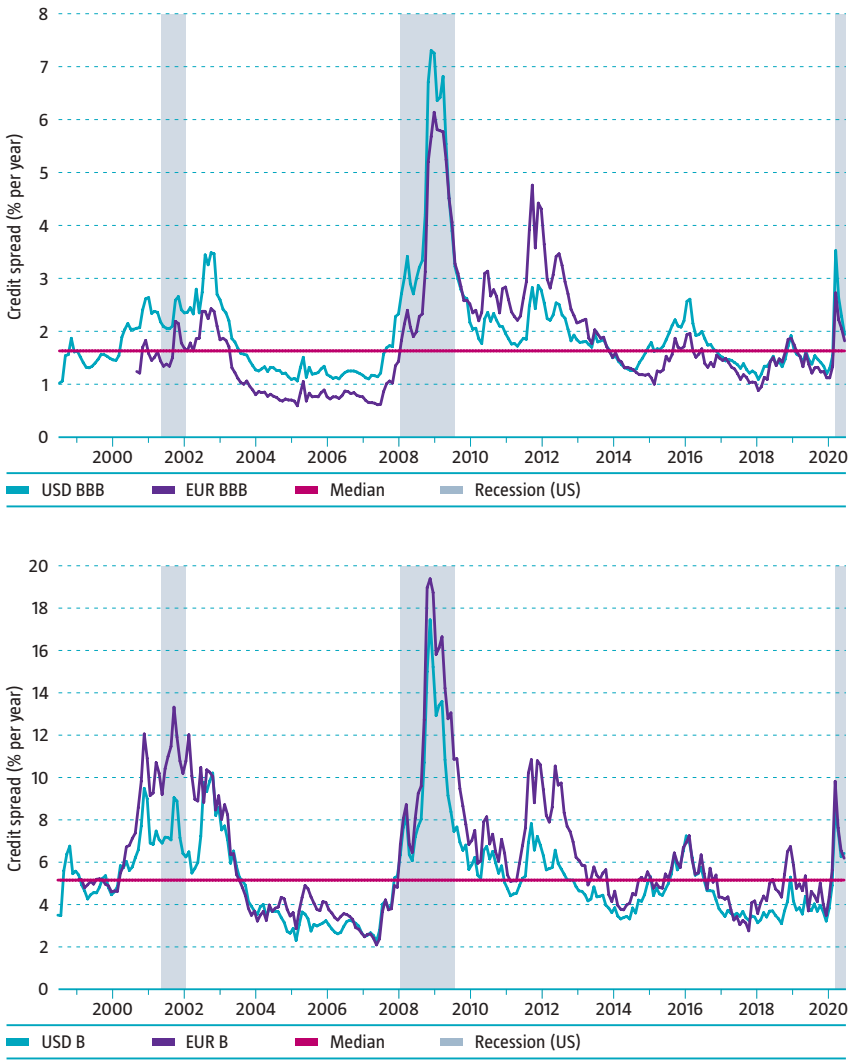


Source: Barclays Live, Robeco. We show the credit quality of the Bloomberg Barclays US Corporate Investment Grade index (left top), the Bloomberg Barclays Euro Corporate Investment Grade index (right top), the Bloomberg Barclays US High Yield index (left bottom), and the Bloomberg Barclays Euro High Yield Index (right bottom) over the period June 1998 to June 2020.

2.2.1 Mean reversion

Figure 2.7 shows a similar situation for BBB-rated and B-rated corporate bonds. The spreads shot up as a result of the Covid-19 lockdowns across the globe. After central banks provided ample liquidity to the market, spreads contracted quickly and are now only just above the median spread levels of 1.6% and 5.2% for investment grade and high yield markets respectively. The spread is relatively low, given that we are currently in a recessionary period. Spreads in the past have seen elevated levels of 2.5% and 8.8% for investment grade and high yield markets on average. This, combined with massive stimulus from banks, may mean markets are expecting a quick recovery from the Covid-19 crisis, without pricing in substantial bankruptcy risk. The likelihood of future macroeconomic scenarios will be determined in the next chapter. Here, we continue with an analysis to determine how easily corporations can use their income to pay back debt-related cash flows to their creditors.

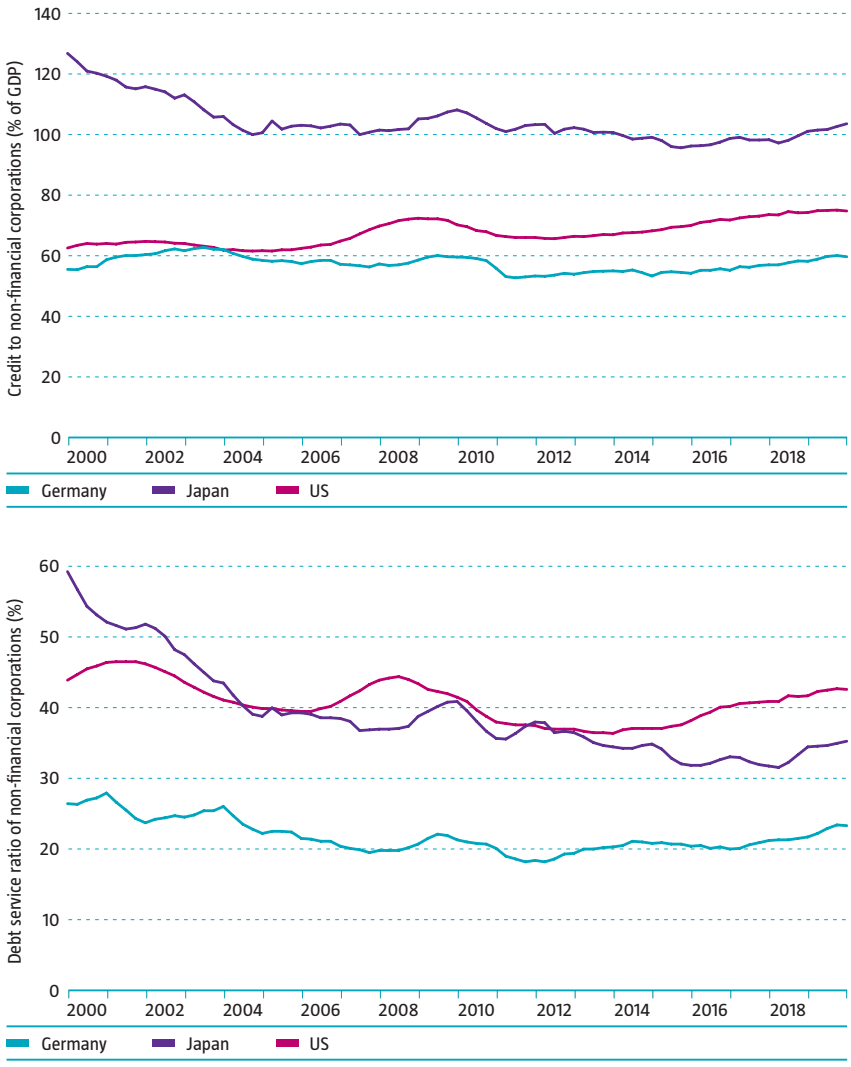
Figure 2.7: Credit spread of BBB- and B-rated corporate bonds



Source: Barclays Live, NBER, Robeco. The top figure shows the option-adjusted credit spread of BBB-rated bonds from the Bloomberg Barclays US Corporate index and the Bloomberg Barclays Euro Corporate index. It also contains median credit spread over the shown sample period. The bottom figure shows the option-adjusted credit spread of B-rated bonds from the Bloomberg Barclays US High Yield index and the Bloomberg Barclays Euro High Yield index. It also contains median credit spread over the shown sample period. Areas indicate NBER contraction periods.

Figure 2.8 (top panel) illustrates the total credit to non-financial corporations as a percentage of GDP for major developed economies. The amount of credit to GDP has been on the rise over the last couple of years for each market. This increased indebtedness is a potential risk for corporate bond investors, especially as the quality of covenants deteriorates – typically a sign that credit quality is declining. However, due to the substantial fall in interest rates, debt servicing remains manageable. The debt-service ratio shown in Figure 2.8 (bottom panel) represents the ratio of interest payments plus amortizations to income. This is why the slightly increasing ratio for each country can be seen as a negative for future debt servicing. Provided that interest rates remain below the income growth of corporates, high debt loads are manageable. However, a strong pickup in interest rates or a large drop in corporate earnings could represent a significant challenge for the credit market.

Figure 2.8: Credit and debt-service ratio to non-financial corporations



Source: Bank for International Settlements, Robeco. The top panel contains the data item "Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks" obtained from the BIS at www.bis.org. The data item code is Q:DE:N:A:M:770:A, where DE stands for Germany and is changed to JP for Japan and US for the US. The bottom panel is the "Debt-service ratio" with data item codes Q:DE:N, Q:GB:N, Q:JP:N, and Q:US:N. Data is quarterly and from December 1999 to December 2019.

2.2.2 Rule of thumb

A challenge for most models of credit risk is to estimate a time-varying expected default loss. Long-run estimates are more readily available, as there is a long history of corporate bond defaults. For example, Pedersen (2015) uses Moody's figures from 1920 to 2010 to derive a 0.24% average default loss for investment grade and a 1.8% default loss for high yield bonds.

However, when we only use long-run estimated expected default losses, each change in the credit spread is a one-to-one change in the expected return. This seems unrealistic as, to a certain extent, periods of increasing yields seem to predict increasing defaults. Therefore, we use the rule of thumb that half of the credit spread is the expected return. While it may be crude to assume that half of the credit spread change is due to changes in expected default losses, at least it helps us recognize that spread changes are partially driven by expected cash flows (and partially by changing discount rates). Table 2.2 shows that the excess return estimates from this method are close to or at 0.75%, equal to our long-run (steady-state) estimated value. For high yield, the average returns following from this model are substantially above our long-run estimate of 1.75% per annum, with 3.2% for the US dollar and 2.6% for the euro.

Table 2.2: Excess credit returns when they are equal to half the credit spread

	USD		EUR		Global		Long-run estimate
	Spread	Return	Spread	Return	Spread	Return	Return
Investment grade	1.50	0.75	1.49	0.75	1.57	0.79	0.75
High yield	6.3	3.2	5.1	2.6	6.6	3.3	1.75

Source: Barclays Live, Robeco. September 2020. Table contains the option-adjusted spread for the Bloomberg Barclays Corporate Bond and Bloomberg Barclays High Yield indices for the US, Eurozone, and global. The return column is half the option-adjusted spread. The long-run estimate is obtained from our Long-term Expected Returns document.

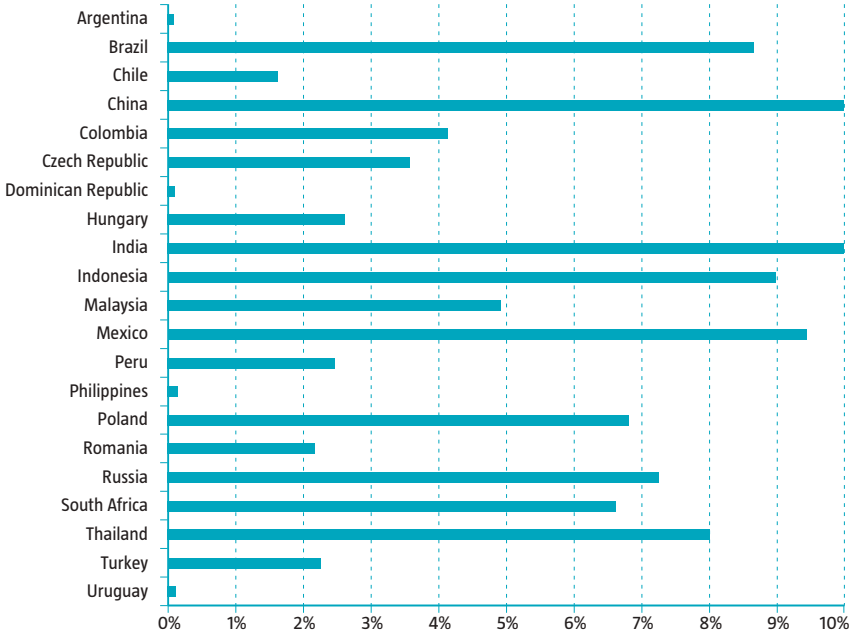
2.2.3 Summary

Having compared two measures for corporate bond valuation for the US dollar and the euro, we conclude that investment grade corporate bonds are fairly valued, and high yield bonds are attractively valued.

2.3 Emerging market debt

To examine the valuation of emerging market local currency sovereign debt, we have opted to use the JPMorgan Government Bond Index-Emerging Markets (GBI-EM) Broad Diversified Index. Although this benchmark is rarely used, it does include China. We believe that Chinese bonds will be included in most investors' benchmarks in the coming years: hence our preference. The weights of this index at the end of June are displayed in Figure 2.9.

Figure 2.9: Country weights in the local currency bond market index

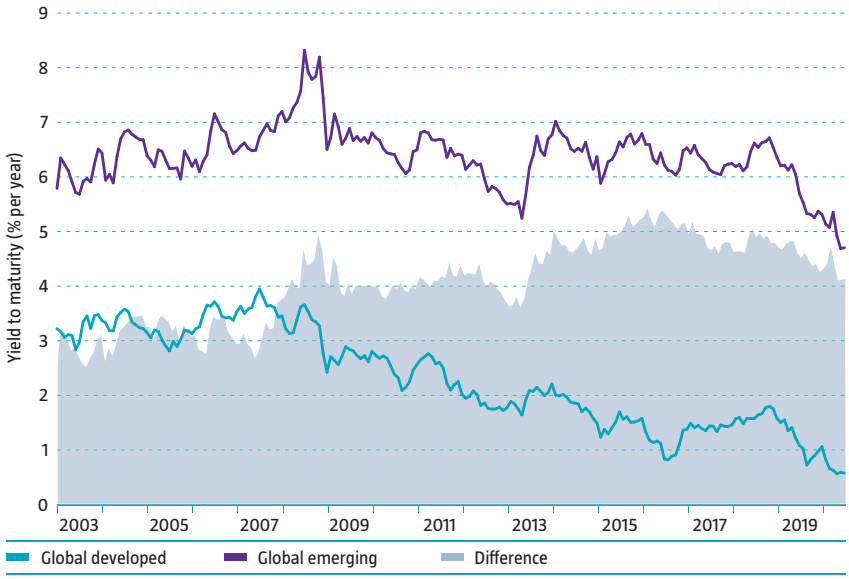


Source: J.P. Morgan, Robeco. Index weights of the J.P. Morgan GBI – Emerging Markets Broad Diversified Index per 30 June 2020.

2.3.1 Yields

Figure 2.10 contains the yield to maturity of global developed and emerging debt markets, where the nominal yield for emerging markets has always been higher. Since 2003, emerging debt markets have yielded around 6% per annum, with a short spike to 8% during the global financial crisis. When yields approached 5%, the Fed's 2013 taper tantrum made rates jump back up to 7%. Over the past year, yields have decreased to below 5%. Note that the difference in yield with developed markets has increased since 2003, mainly due to the decrease of their interest rates. The nominal yield pickup, or carry, is still over 4%.

Figure 2.10: Yield to maturity of global developed and global emerging markets



Source: J.P. Morgan, Robeco. Index weights of the J.P. Morgan GBI – Emerging Markets Broad Diversified Index per 30 June 2020.

Table 2.3 provides an idea of how attractive local currency emerging market debt is from a yield perspective compared to developed market debt. We subtract the inflation from the yields to obtain the real yields for both regions. The difference in real yields is 2.24%, similar to last year, but substantially less than two years earlier. The real yield difference may contain a compensation for credit risk, while there is virtually no credit risk on nominal debt for sovereign nations that can print their own currency to pay off that debt. However, such money printing is expected to lead to inflation and currency devaluations, and the credit risk should be viewed as a currency risk from the perspective of a hard currency investor.

Table 2.3: Real yield differences of local currency EMD and developed government bonds

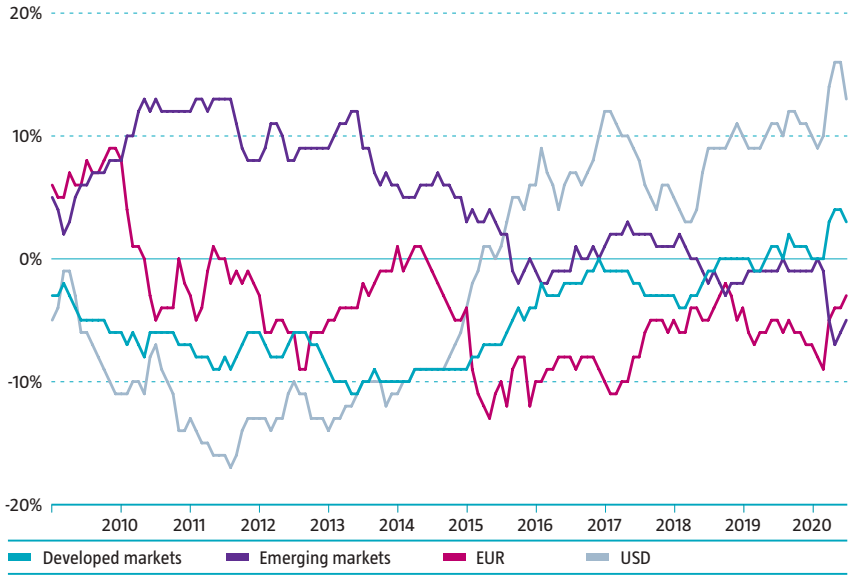
Yield	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***
Emerging	6.81	6.55	6.26	6.38	5.33	4.72
Developed	1.58	1.38	1.46	1.58	1.06	0.58
Difference	5.23	5.17	4.81	4.80	4.27	4.14
Inflation	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***
Emerging	4.21	3.67	3.47	3.25	3.41	2.86
Developed	0.29	0.68	1.67	1.97	1.36	0.96
Difference	3.92	2.99	1.79	1.29	2.05	1.90
Real yield	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***
Emerging	2.61	2.88	2.80	3.13	1.92	1.86
Developed	1.29	0.70	-0.22	-0.39	-0.30	-0.38
Difference	1.32	2.19	3.01	3.52	2.22	2.24

Source: IMF, J.P. Morgan, Robeco. The year 2020* indicates yields from 30 June 2020 and the average of the forecasted inflation rates for 2020 and 2021 by the IMF World Economic Outlook (April 2020). For other years the average inflation over the year is used and the yields at the end of the year. The country-level variables are combined using index weights at 30 June 2020.

2.3.2 Currencies

For overall valuation, we need to look at currency valuation as well. For this, we use BIS real effective exchange rates (REERs) for the emerging market index, based on the index weighting at the end of June 2020. We have scaled the REERs against their 15-year history as we assume it should be valued neutral over such a long period. In Figure 2.11, we compare the scaled emerging market REER with that of the US dollar and the euro. From 2009 to 2014, emerging market currencies were overvalued, while the latest valuation shows that these currencies are about 8% undervalued compared to the index basket of their developed market counterparts. Emerging market currencies are even more undervalued relative to the US dollar, while versus the euro, valuation looks neutral.

Figure 2.11: Currency valuation using real effective exchange rates



Source: BIS. The BIS real (CPI-based) effective exchange rates are compared to their 15-year historical average. The emerging markets and developed markets lines are combined based on individual currencies using index weights at 30 June 2020. NB: For the Dominican Republic and Uruguay the BIS does not report REERs, so we have assumed both are fairly valued. Both countries have a weight of only 0.1% in the index.

2.3.3 Summary

We conclude that yields in emerging markets are fairly valued versus a basket of developed market countries, but that their currencies are relatively cheap. This leads to a positive valuation signal for local currency emerging debt. The asset class is also valued attractively versus the US and Eurozone. For a US investor, the currency component seems attractive and yields fair, while for a German investor, the currency component seems fairly valued and the yield difference even attractive. Either way, emerging market bonds look cheap from a valuation perspective.

2.4 Developed market equities

There is evidence that equity premium can be predicted, despite much variation in the realizations typically remaining unexplained. One of the predictors that stands out is Campbell and Shiller's (1998) cyclically adjusted price-earnings (CAPE) ratio; see, for example, Ilmanen et al. (2019). This is the main indicator we discuss here in addition to Tobin's Q and the Buffett indicator. These measures indicate absolute valuation levels of equities and do not necessarily describe how expensive they are relative to bonds. This might be important, because – all other things being equal – lower bond yields mechanically increase equity prices due to a lower discount rate for future cash flows.

2.4.1 CAPE ratio

The CAPE ratio is a valuation measure that uses real earnings per share (EPS) over a 10-year period to smooth out fluctuations in corporate profits that occur over different periods of a business cycle. Table 2.4 contains the CAPEs for the largest developed equity markets. For most countries, the data history for the CAPE starts in December 1981, giving us nearly four decades of international data. As structural differences between countries might lead to different CAPEs, we compare each country to its own valuation history. Except for the Netherlands, Switzerland and the US, all other countries are cheaper by this measure. The US, with its large weight in the world index and its CAPE of 29.9 at the end of June 2020, puts the world index on the expensive side. While the difference between the current CAPE of 26.2 and its historical average of 24.8 is positive, it is much smaller compared to the US average since 1881 of 17.0, which we think is less useful in determining stock market value today.

Table 2.4: Cyclically-adjusted price earnings ratio for developed countries

Country	Start	Average	Current	Valuation	Weight
Australia	Dec-81	20.4	19.1	↓	2%
Canada	Dec-81	23.7	21.1	↓	3%
France	Feb-99	25.3	20.0	↓	3%
Germany	Dec-81	23.0	18.7	↓	3%
Hong Kong	Dec-81	20.3	15.3	↓	1%
Italy	Apr-93	23.1	18.6	↓	1%
Japan	Dec-81	43.3	19.6	↓	8%
Netherlands	Dec-81	19.1	28.0	↑	1%
Singapore	Dec-81	22.6	13.1	↓	0%
Spain	Jan-89	19.8	12.7	↓	1%
Sweden	Dec-81	24.9	21.1	↓	1%
Switzerland	Dec-81	24.4	27.7	↑	3%
UK	Dec-81	17.6	14.8	↓	4%
US	Dec-81	23.7	29.9	↑	66%
World		24.4	26.0	↑	
Europe		20.1	19.3	↓	

Source: Barclays Research, MSCI, Datastream, Robeco. The CAPE ratio for each country above has been calculated by Barclays Research using levels of country-specific indices published by MSCI representing the equity markets for the relevant country, adjusted for inflation using data from Datastream. The column with 'Start' indicates the start of the sample period, and with 'Average' the monthly time-series average of the CAPE ratio from the start of the sample to June 2020. The arrows in the column 'Valuation' indicate whether the current CAPE ratio is above (arrow up, indicating expensive) or below (arrow down, indicating cheap). The last column 'Weight' is the weight of the country in the MSCI World index at 30 June 2020. The row for Europe is data from Barclays Research, but the row with World is a weighted average (using the weights in the final column) of each of the individual country numbers.

Bunn and Shiller (2014) show that when companies buy back shares, the original CAPE might be somewhat biased because the growth rate in EPS is affected, leading Shiller's data page to include a 'total return CAPE' to adjust for this. While the traditional CAPE for the US stands at 29.9 at the end of June 2020, the total return CAPE stands at 32.7, suggesting even higher valuations. At first sight, this seems elevated, but when we compare it to its long-term average since 1881, we see that the traditional CAPE is 17.0 and the total return CAPE 20.5. Hence, the historical average gap between the two is 3.5. Since the current gap is similar at 2.8, conclusions based on the traditional metric will be the same, at least for the US.

Jivraj and Shiller (2017) refute several objections that have been raised against using the CAPE. First, the earnings that enter the equation might not be the best way to measure corporate profitability. Secondly, why cyclically adjust the earnings with 10 or 12 or any other number of years? Thirdly, because accounting rules have changed over time, earnings now and in the past are not comparable, leading to a biased measure. A further criticism put forward by Philips and Ural (2016) is that there is no absolute level that the CAPE needs to mean revert to. Comparing the current CAPE ratio to a shorter horizon average of, for example, 40 years, might well be more useful than a comparison with the full sample average. The level of stock market participation and the cost at which one could invest in a diversified portfolio has changed materially over the past 150 years. In addition, Jivraj and Shiller (2017) show that the CAPE's out-of-sample performance is strong when compared to many of its competitor valuation signals.

2.4.2 Tobin's Q

Tobin's Q is the market value of equities divided by their net worth measured at replacement cost, which is typically a better fair value metric than the historical cost, especially in times of high inflation. The natural 'fair value' of Tobin's Q is one, where the stock market pays exactly the same as the replacement rate of assets, and an investor is indifferent to buying the shares or setting up the same company from scratch. However, it turns out that historically speaking, the average ratio is below one, in the range of 0.6-0.7. Estimates of Tobin's Q for the US from 1900 to 2002 are reported in Wright (2004) and available from his homepage.[3]

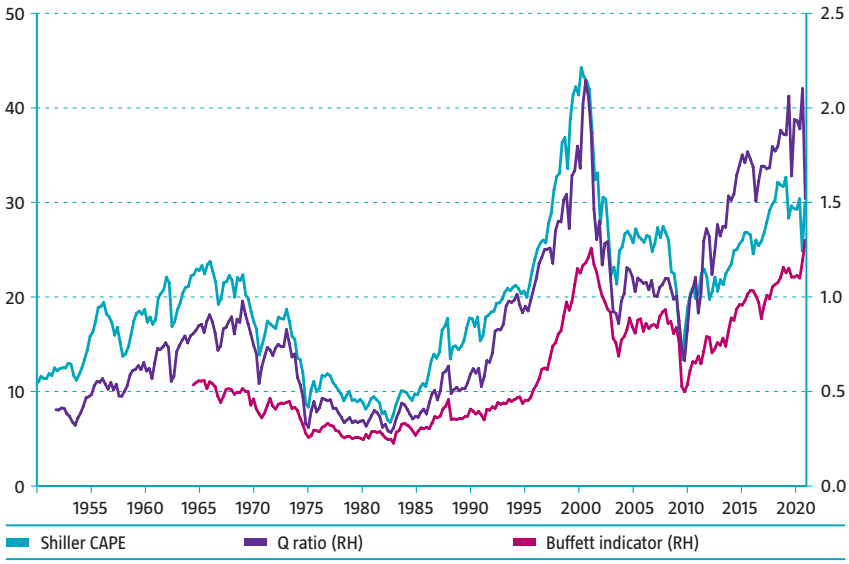
In Figure 2.12, we show that Tobin's Q is currently[4] at 1.5, substantially above its historical average and the theoretical value of 1.0, even after the decline from its peak of 2.1 at the end of 2019.[5]

3. http://www.bbk.ac.uk/ems/faculty/wright/pdf/Wright2004dataset.xls

4. The last available value is from Q1 2020.

5. This data is from the Federal Reserve's Flow of Funds Accounts of the United States Z1. A disadvantage of using this data series in real time for asset allocation purposes is that it may be revised, and when this happens the historically available series are not the same as point-in-time series.

Figure 2.12: Tobin's Q, Shiller CAPE, and Buffett indicator for the US equity market



Source: Refinitiv, Federal Reserve, Robeco. The Q Ratio is Fed's item FL103164103 (Datastream: US10KMKLA) divided by Fed's item FL102090005 (Datastream: US10NWMVA). The Buffett indicator is the market value of S&P 500 companies (Datastream: S&PCOMP(MV)) divided by the Gross Domestic Product of the US (Datastream: USGDP...B).

2.4.3 Buffett indicator

Warren Buffett popularized the market value of equities relative to the nominal GDP of a country as a measure of over- or undervaluation. Lleo and Ziemba (2019) find that using this ratio for market timing can generate additional returns, mainly through predicting crashes rather than equity market rallies. Figure 2.12 shows that the Buffett indicator is at its all-time high with a value of 1.3, suggesting that the US market is overvalued.

An international comparison for this figure is challenging, as it is affected by the percentage of companies that are publicly traded compared to those that are private, or whether the country is attractive to list in for multinational corporations. The ratio may be affected by new equity issuance instead of valuation changes even for a particular country across time.

2.4.4 Summary

While most developed equity markets are fairly or even cheaply valued, the US is quite expensive, as evidenced by valuation indicators popularized by three independent thinkers on financial markets. We therefore conclude that developed market equities are slightly expensive.

2.5 Emerging market equities

2.5.1 CAPE ratio

As with developed market equities, we can also look at the CAPE for the valuation of emerging market counterparts. Historically, this ratio has also contained useful information for emerging market valuation; see Klement (2012). Although the numbers are not entirely comparable because CAPE data on emerging markets starts substantially later than for developed markets, Table 2.5 shows that the average level is typically lower than that of developed markets. Therefore, for valuation purposes, it may be more relevant to compare each country to its own past CAPE level. When doing this, we see that only two countries, Brazil and Taiwan, are above their historical average, with even single-digit CAPE ratios for Russia and Turkey. While these valuations are low, they are more moderate when compared to their own historical averages of 9.9 and 13.5 rather than the averages we have seen in developed markets. Nevertheless, based on their CAPEs, emerging markets are on average attractively valued.

Table 2.5: Cyclically-adjusted price earnings ratio for developed countries

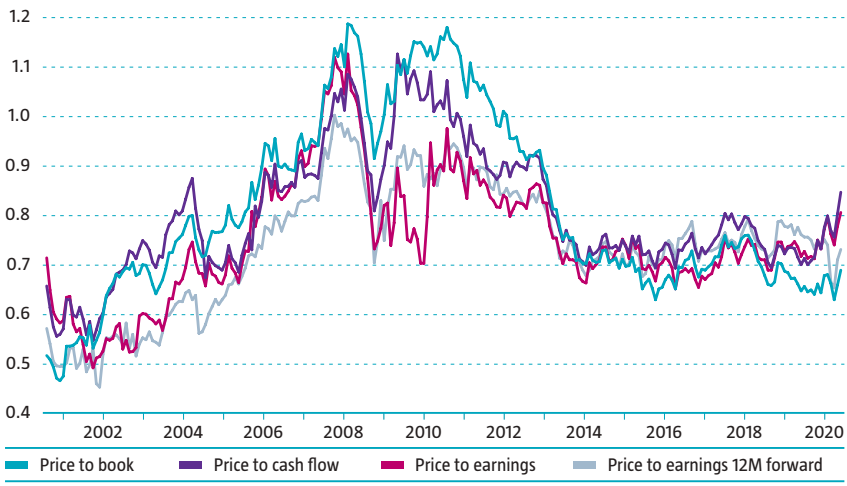
Country	Start	Average	Current	Valuation	Weight
Brazil	May-11	13.9	18.3	↑	6%
India	Aug-03	24.1	20.2	↓	9%
Mexico	Jan-01	23.5	17.2	↓	2%
Poland	May-04	15.9	9.7	↓	1%
Russia	Nov-05	9.9	8.0	↓	3%
China	Oct-04	19.5	16.2	↓	47%
Turkey	Jan-01	13.5	8.2	↓	0%
South Africa	Aug-04	21.3	18.2	↓	4%
Israel	Sep-04	22.2	15.0	↓	2%
Korea	Sep-04	16.5	12.9	↓	13%
Taiwan	Jul-04	22.3	22.6	↑	15%
Emerging markets		19.9	17.2	↓	

Source: Barclays Research, MSCI, Datastream, Robeco. The CAPE ratio for each country above has been calculated by Barclays Research using levels of country-specific indices published by MSCI representing the equity markets for the relevant country, adjusted for inflation using data from Datastream. The column with 'Start' indicates the start of the sample period, and with 'Average' the monthly time-series average of the CAPE ratio from the start of the sample to June 2020. The arrows in the column 'Valuation' indicate whether the current CAPE ratio is above (arrow up, indicating expensive) or below (arrow down, indicating cheap). The last column 'Weight' is the weight of the country in the MSCI Emerging Markets Index at the end of June 2020. The row for emerging markets is a weighted average (using the weights in the final column) of each of the individual country numbers.

2.5.2 Other relative valuation measures

For the robustness of the CAPE above, we also look at other bottom-up measures of value: price-to-book, price-to-cashflow, price-to-earnings, price-to-forward earnings. Figure 2.13 shows that since 2014, valuations of emerging markets have been consistently below that of developed markets, with a discount of 20-30%. Just like with the CAPE, we expect the ratio to be below unity on average. However, given the current level of financial integration, the discount of around 25% is on the high end.

Figure 2.13: Emerging markets versus global equities valuation ratios



Source: Refinitiv Datastream, MSCI, Robeco. Each month we divide the bottom-up calculated valuation ratio of the MSCI Emerging Markets Index by the same valuation ratio of the MSCI World Index. The latter only contains developed markets.

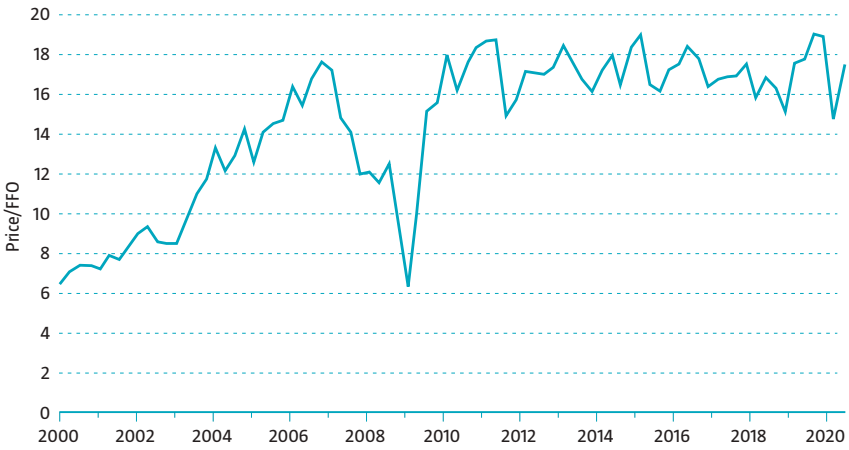
2.5.3 Summary

The CAPE of emerging markets points to relatively attractive valuations for most countries. Other commonly used relative valuation measures show a similar picture. This leads us to give an attractive valuation signal for emerging equity markets.

2.6 Real estate

We compare listed real estate valuation with that of global equities. Although a price-earnings ratio is admittedly not an ideal measure for assessing valuations of real estate investment trusts, it is the best measure available at a global level. According to our CAPE metric, the global real estate valuation stands at 14.4. This is 5.5 less than its 19.9 average since 2000, and 3.4 less than last year's value of 17.8. The CAPE of global equities is substantially higher, making real estate a relatively cheap asset class right now.

Figure 2.14: REIT-specific valuation ratio for US REITs



Source: S&P Global Market Intelligence, Nareit T-Tracker, Robeco. The valuation ratio specific for Real Estate Investment Trusts is the price (P) divided by the funds from operation (FFO).

A valuation measure commonly applied to real estate investment trusts is to compare the price to its funds from operation (FFO). The FFO is the net income plus depreciation and amortization minus gains on the sale of property. For the US market, the price-to-FFO is reported at the market level. Figure 2.14 shows this valuation ratio over time, up to the second quarter of 2020. The first quarter of 2020 saw the valuation come down from record highs at the end of 2019 due to a 30% price drop, while FFO dropped only 10%. In the second quarter, the price rebounded by more than 10%, but the FFO reduced by more than 20%, leading the valuation ratio to increase to 17.5. It is difficult to determine what a normal valuation ratio is, given that this valuation ratio has only been available for a short time. If we use the limited data we have since 2000, it would appear that real estate is still somewhat highly valued compared to the past, but similar to global equities.

2.7 Currencies

Currency valuation was briefly mentioned in the section that compared local currency government bonds of developed and emerging countries. We saw that the US dollar is relatively expensive, while the euro and emerging market currencies are relatively cheap.

Table 2.6: Valuation signals for developed currencies

	BIS			Economist Big Mac index		Gov bond yields
Country	**Rel REER**	**REER**	**NEER**	**Raw**	**GDP-adjusted**	**(3-5 year)**
Australia	-20.5	-33.7	-42.2	-19.8	-15.5	0.36
Canada	-25.1	-40.0	-44.1	-11.1	2.3	0.32
Euro area	-15.7	-24.5	-21.0	-16.2	2.0	-0.73
Japan	-21.0	-41.9	-35.6	-36.3	-21.8	-0.14
New Zealand	-14.9	-18.9	-23.4	-23.8	-8.2	0.69
Norway	-28.8	-41.9	-51.1	-2.8	-15.3	0.20
Sweden	-24.2	-32.7	-32.3	0.8	8.0	-0.33
Switzerland	-6.6	-12.1	4.0	20.9	4.3	-0.63
United Kingdom	-21.3	-22.1	-3.0	-25.1	-10.8	-0.07
United States	0.0	0.0	0.0	0.0	0.0	0.24

Source: BIS, The Economist, Barclays, Robeco. September 2020. The first column 'Rel REER' contains the Real Effective Exchange Rate (REER) relative to its 15-year history. The second and third column contain the raw data of the Real and Nominal Effective Exchange Rates (REER and NEER). The next two columns contain the raw difference in the price of a Big Mac and a GDP-adjusted price difference. The last column contains the 3-5 year government bond yields of each country on 30 June 2020.

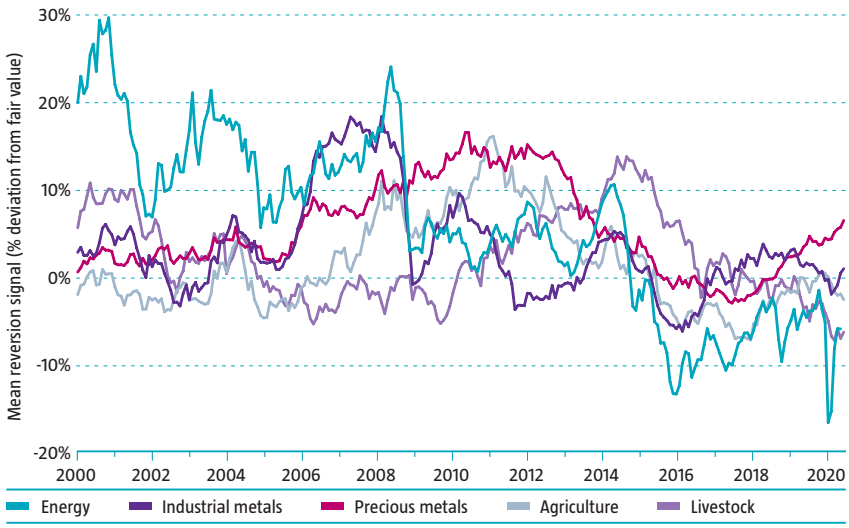
The first column in Table 2.6 contains the 'relative REER' that was used in the previous section, but that has been normalized so that the US dollar is at zero for comparability with other measures. The absolute REER and the nominal effective exchange rate (NEER) are in the adjacent columns. Each of these columns shows that the US dollar is expensive, apart from when it is compared to the Swiss franc, which is similarly expensive. If we compare the US dollar with the euro and the New Zealand dollar, the overvaluation is 15-25% less than for the other countries. For comparison, the Economist's Big Mac Index was also included, which should present a comparable number to the NEER (but obviously only based on one consumer item rather than the representative consumption basket used by the BIS). The raw number looks at price differences on the Big Mac index between these countries, and the GDP-adjusted number corrects this for the GDP per capita. This adjustment is necessary as countries with higher productivity rankings tend to have higher prices (see Balassa (1964) and Samuelson (1964)). Based on the Big Mac Index, Australia, Japan, Norway and the UK have relatively cheap currencies.

The last column contains the three to five-year bond yields. The difference in these yields is the opportunity cost in case an investor wants to hedge their foreign currency risk. The yields are mostly close to zero and show differences that are less than 1%. If only one third of the US dollar's strength, which equals 15.7% compared to the euro, disappeared in the next five years, this would mean a break-even strategy, given the approximately 1% interest differential per year. Stronger mean reversion will lead to gains from a long position in the euro, and has also been predicted by the academic literature. The early literature (Rogoff 1996; Frankel and Rose 1996) found that, on average, half the PPP gap closed in about five years for developed currencies. More recent estimates by Rabe and Waddle (2020) find that half of the convergence occurs within three years.

2.8 Commodities

For commodity valuation, we use the definition presented by Asness, Moskowitz and Pedersen (2013). That is, we compare the current spot price with the average spot price from four and a half to five and a half years ago. Instead of calculating the valuation for each traded commodity separately, we distinguish the five main commodity categories: energy, industrial metals, precious metals, agriculture, and livestock.

Figure 2.15: Valuation signal for commodities

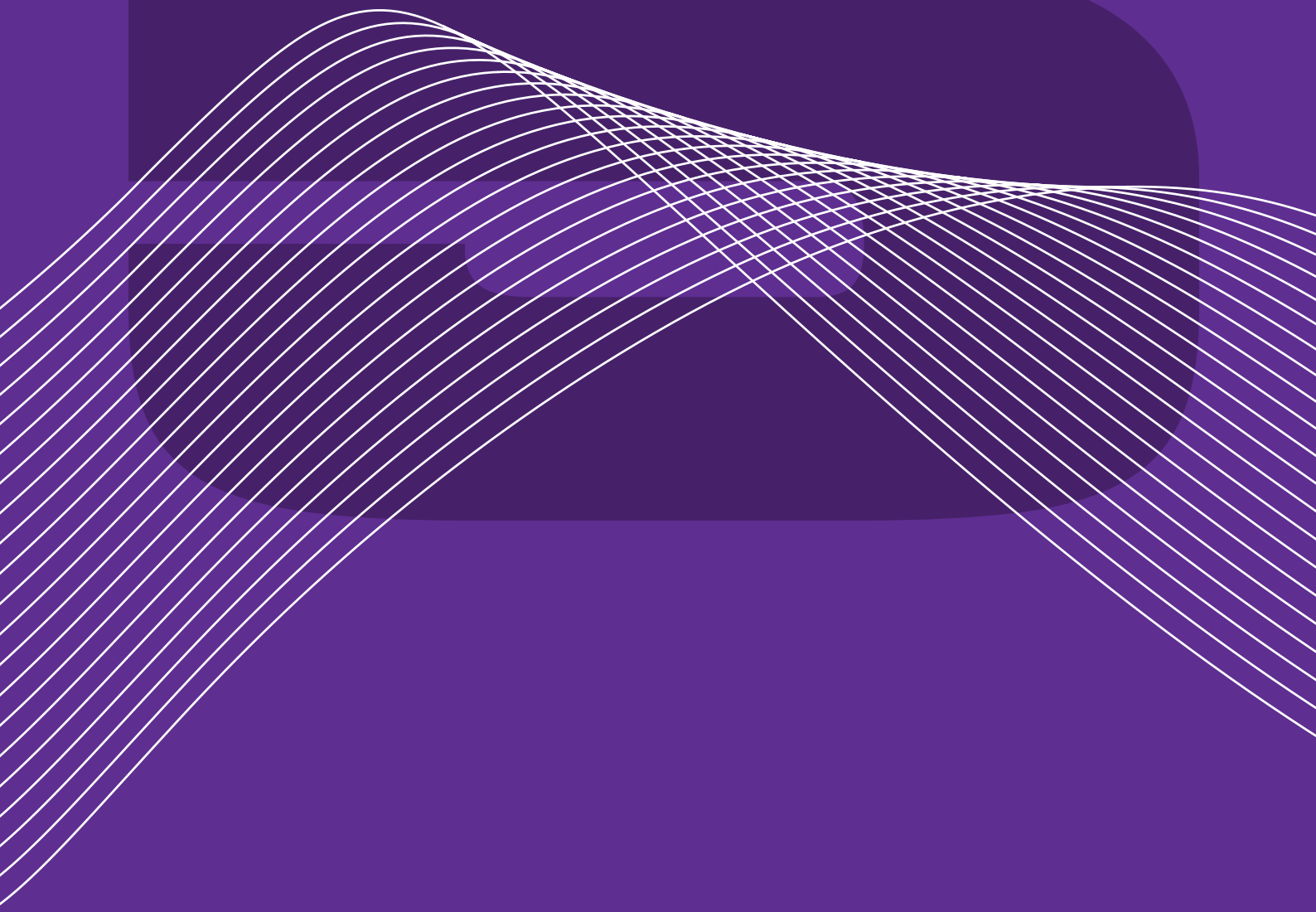


Source: Refinitiv Datastream, S&P GSCI, Robeco. The figure shows the natural logarithm of the commodity category price index divided by the natural logarithm of the average from 5.5 to 4.5 years ago of the same price index, minus one. Monthly data in USD.

Figure 2.15 shows that energy commodities have mostly been overvalued from 2000 to 2014. In 2015, there was an undervaluation of almost 15%. This then reduced to almost zero before the Covid-19 crisis hit. The valuation then went below -15%. It has recovered since, but was still undervalued at approximately 6% by the end of the sample. Precious metal lost most of its overvaluation in the aftermath of the global financial crisis. However, since early 2019, precious metal prices have been increasing again, leading to an overvaluation of 6%. Industrial metals and agriculture were fairly valued by the end of the sample, while livestock was undervalued at 7%. Typical commodity indexes tilt towards energy, followed by agriculture. We therefore currently deem commodities to be rather cheap.

Special topics

Long-term investors generally face long-term challenges. In this section, however, we address five topics that institutional investors may very well be facing right now or in the near future.



FACTOR INVESTING

THERE IS MORE THAN JUST FAMA AND FRENCH'S FIVE FACTORS

2010 to 2019 was a lost decade for the factors in Fama and French's widely used five-factor model. Over this period, the equity factors – Value, Size, Profitability and Investment – delivered a negative return on average, while the return on each individual factor was well below its long-term average. Nevertheless, dismissing factor investing altogether based solely on these results would be short-sighted.

As it turns out, these five factors have rebounded before. The dismal performance between 2010 and 2019 is not unprecedented. New research by Robeco shows that the returns in this period were actually remarkably similar to those generated between 1990 and 1999. Yet this did not prevent them from making a strong comeback in the following decade. Moreover, we find that many time-tested alternative equity factors that are not considered in the Fama-French model did generate positive performance between 2010 and 2019.

Performance of the Fama-French factors

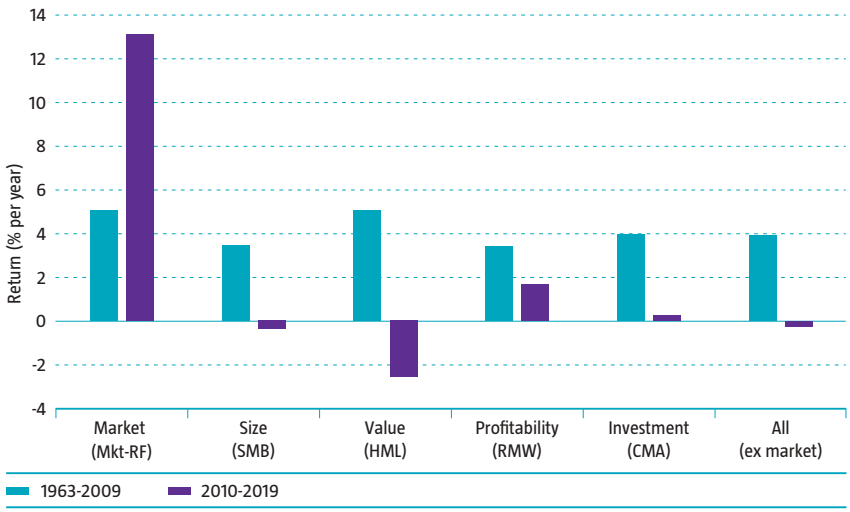
The academic literature is heavily influenced by the work of Professors Eugene Fama and Kenneth French. Back in 1993, they proposed a three-factor model, which extends the basic capital asset pricing model (CAPM) to include size and value factors. More recently, in 2015, they enhanced this widely used model with two additional factors – profitability and investment – and the resulting five-factor model has since become the new standard for academic research. Return series for all these factors are publicly available from Kenneth French's data library.[1]

1. http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Figure 1 compares the performance of the Fama-French factors before and after 2010. In the most recent decade (2010-2019), the return on each of these factors was well below its long-term average. Size and value even experienced a negative decade, with the latter performing so poorly that it prompted a series of empirical studies into whether the value premium might have disappeared for good.[2] The studies concluded that statistically speaking, the value factor remains well within the range of possible outcomes despite its recent disappointing returns.

2. See for example: Arnott, Harvey, Kalesnik and Linnainmaa (2020). See also: Israel, Laursen and Richardson (2020). See also: Fama and French (2020).

Figure 1: Performance of the Fama-French factors



Source: Robeco, Kenneth French Data Library. Sample period: July 1963 to December 2019.

Size and value weren't the only factors to have a rough ride. Over the past decade, the premium on the investment factor also failed to materialize, with a return close to zero. Only the profitability factor generated a positive return, but this premium was only around half the size it had been before 2010. The weak performance of these two newly added factors is particularly striking, since they were introduced in Fama and French's 2015 study, which used data until the end of 2013. In other words, part (40%) of the most recent – disappointing – decade was taken into account in the study that proposed the two new factors. In the end, despite a promising start in the early 2010s, the two factors did not experience a strong decade. This finding complements evidence from other studies,[3] which find that profitability and investment performed poorly in the period up to 1963, which precedes the sample used by Fama and French.

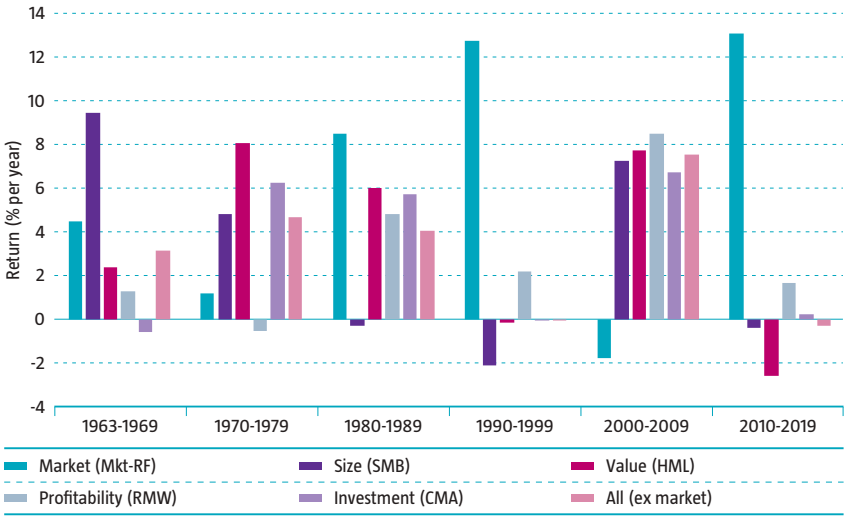
3. Linnainmaa and Roberts (2018)

Yet these widely accepted factors have recovered before. In fact, the period from 2010 to 2019 bears a remarkable similarity to that from 1990 to 1999, which was also marked by (i) a negative size premium, (ii), a negative value premium, (iii) an investment premium

close to zero, and (iv) a profitability premium that was positive but well below its long-term average. As a result, the four factors combined also failed to deliver a positive return between 1990 and 1999. And the similarities do not end here, as they also happen to be the only two decades with double-digit excess returns for the market factor. Conversely, the two decades during which the market premium failed to materialize – 1970 to 1979 and 2000 to 2009 – were also those during which other factor premiums were the highest. Thus, there appears to be an inverse relationship between long-term market returns and factor premiums. Of course, we cannot rule out that we are overinterpreting these results, as these inferences are based on just six independent decade-long observations. But the results are nonetheless intriguing.

'The four factors combined also failed to deliver a positive return between 1990 and 1999'

Figure 2: Performance of the Fama-French factors per decade



Source: Robeco, Kenneth French Data Library. Sample period: July 1963 to December 2019.

Performance of other factors in Kenneth French's data library

The data library maintained by Kenneth French also tracks the performance of various factors that are not considered in Fama and French's five-factor model. These include:

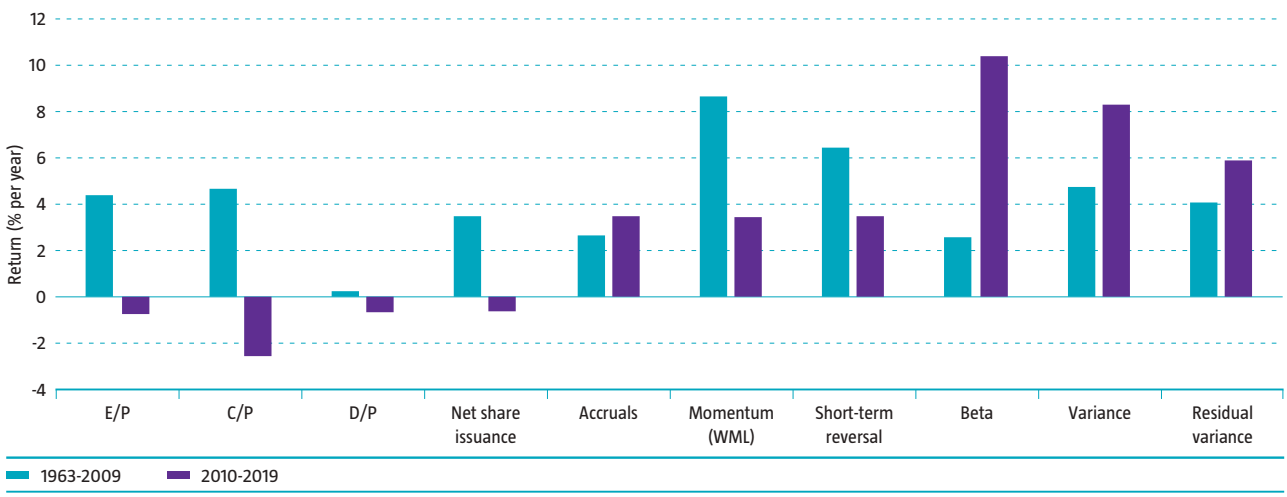
- three alternative value metrics: earnings-to-price, cash-flow-to-price and dividend yield
- momentum: 12-1 month price momentum
- short-term reversal: one-month price reversal
- an alternative investment factor: net share issuance
- accruals: change in operating working capital to book
- three low-risk factors: 60-month market beta, 60-day variance and 60-day residual variance.

We make the risk factors beta neutral by levering up the long low-risk leg and levering down the short high-risk leg to market betas of exactly 1.

The performance of these factors is shown in Figure 3. The three alternative value metrics all had a negative return over the last decade, similar to Fama and French's conventional value factor (HML, High Minus Low). The alternative investment factor, net share issuance, also ended up in negative territory. With a return of 3.5% for the period from 2010 to 2019, the accruals factor fared better and even generated a slightly higher return than in the preceding period. This is consistent with a study carried out in 2016, also by Fama and French, which

found that the five-factor model has difficulties explaining the performance of accruals portfolios. Results for the period from 2010 to 2019 in fact show that the accruals factor can do well when the Fama-French factors struggle.

Figure 3: Performance of the other factors available in Kenneth French's data library



Source: Robeco, Kenneth French Data Library. Sample period: July 1963 to December 2019.

We now turn to momentum, a factor that is often used to augment the Fama-French factor models; for example, by turning the five-factor model into a six-factor one. Momentum returned a shocking -82% in 2009, turning 2000 to 2009 into a lost decade for the factor. Some researchers even started to question the existence of momentum, arguing that "momentum profits have become insignificant since the late 1990s", based on data up to 2012.[4]

4. Bhattacharya and Sonaer (2017)

For the period from 2010 to 2019, we observe an average premium of around 3.5% for the momentum factor. Although below the long-term average, this is still well within positive territory. So, it seems premature to discard momentum altogether. Interestingly, the factor also did well between 1990 and 1999 – the other tough decade for Fama and French's factors. In fact, this turned out to be momentum's best decade to date.

Meanwhile, the short-term reversal factor delivered a return of around 3.5% in the last decade, which, like for momentum, is below its long-term average but well above zero. Most notable in Figure 3, however, are the three low-risk factors, which generated premiums of around 6 to 10% in the period from 2010 to 2019. This makes it the second-best decade ever for low risk, after 1980 to 1989. In their 2016 study, Fama and French claim that the low-risk anomaly is subsumed by their five-factor model, but the most recent decade shows that the low-risk factor can shine when the Fama-French factors fail to deliver.

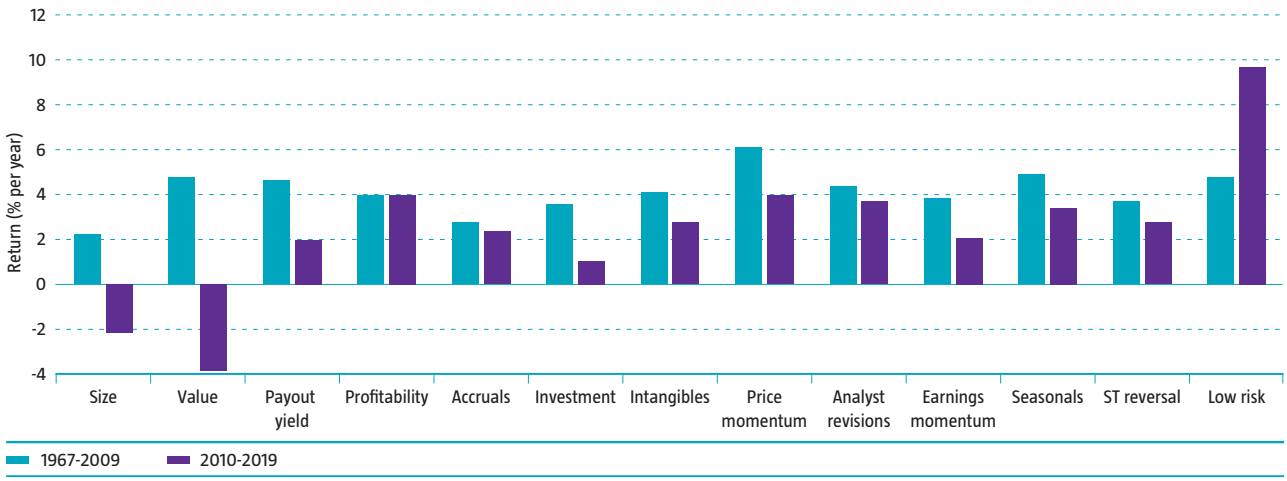
In sum, the factors documented in Kenneth French's data library that are closely related to the factors in the five-factor model struggled just as much as the factors considered in the model. Meanwhile, all the other, fundamentally different factors included in the data library had decent positive returns. The low-risk factor even posted a very strong performance. Similar results can be drawn from the international sample that the library offers from July 1990 onwards.

Performance of factors in the Hou-Xue-Zhang data library

The data library maintained by Hou, Xue and Zhang contains value-weighted decile portfolios for about 50 individual factors taken from Kewei Hou, Chen Xue and Lu Zhang's 2020 paper.[5] Since most of these factors were first documented well before 2010, the past decade enables us to test them outside the sample period that was originally used. To that end, we combined closely related factors into composite factors by averaging their returns, which brings down the number of factors to 13. For example, the data library maintained by Hou, Xue and Zhang contains five separate seasonal factors, which we combined into one composite seasonal factor. The performance of these composite factors is shown in Figure 4.

5. Hou, Xue and Zhang (2020)

Figure 4: Performance of the factors available in the Hou-Xue-Zhang data library



Source: Robeco, Hou-Xue-Zhang data library. Sample period: January 1967 to December 2019.

Consistent with our findings, the composite size and value factors exhibit a negative premium for the most recent decade. Remarkably, however, the other 11 composite factors all exhibit positive returns for the period from 2010 to 2019: payout yield, profitability, accruals, investment, intangibles, price momentum, analyst revisions, earnings momentum, seasonals, short-term reversal, and low risk. For profitability, price momentum, short-term reversal and low risk, these results confirm earlier findings for the Kenneth French versions of these factors. For the other factors, it is an additional insight. The main takeaway is that while the Fama-French factors experienced a lost decade between 2010 and 2019, many alternative factors actually had a decent or, in some cases, even very good recent decade.[6]

6. Blitz (2020)

Implications

Only time will tell if Fama and French's factors are able to stage another comeback in the decades ahead. In the meantime, their recent weak performance will have implications for asset pricing research. For one, the five-factor model will generally have a hard time explaining strong CAPM alphas between 2010 and 2019, as positive loadings on the Fama-French factors will not help to explain returns if the Fama-French factors themselves have no premium to begin with. Our findings also challenge the ambition to reduce the entire 'factor zoo' of hundreds of alleged factors reported in the academic literature to just a handful of truly relevant ones that can explain the entire cross-section of stock returns. Although the Fama-French factors still show strong long-term performance, they have now experienced two lost decades during which various other factors were able to deliver. Therefore, it seems that more factors are needed for an accurate and comprehensive description of the cross-section of stock returns.

INTEREST RATES

DON'T BE SO NEGATIVE

With the Covid-19 outbreak and related measures having pushed the global economy into recession, the discussion about negative interest rate policies (NIRPs) has heated up. Central banks that have not yet resorted to such policies, including the Federal Reserve (Fed) and the Bank of England (BoE), are under pressure to consider to 'go negative' as well. Meanwhile, central banks that have been running a NIRP for a number of years – such as the European Central Bank (ECB), Swiss National Bank (SNB) and the Bank of Japan (BoJ) – are increasingly searching for ways to mitigate their negative side effects, as the net marginal benefits of NIRP seem to be diminishing. Or, put differently: because the so-called 'reversal rate' – the unobserved, theoretical rate at which an accommodative interest rate policy starts to reverse its intended effect[1] – is rising over time. This begs the question how fashionable NIRPs will be in five years' time.

1. Brunnermeier and Koby (2018)

This special topic outlines three scenarios exploring the potential prevalence of NIRPs over the coming years:

1. Revenge of the reversal rate – which envisages an end to the NIRPs
2. Further negativity – which assumes that NIRPs are here to stay and may be embraced by more central banks in developed markets
3. Deep dive – which foresees the widespread adoption of deeply negative policy rates

Before we present the scenarios and their corresponding bond return implications in more detail, we first provide an overview of which central banks have adopted NIRP over the past years and why, what measures NIRP-adopters are taking to try to mitigate the currently known negative side effects, why Sweden's Riksbank ended its NIRP in 2019, and why other developed market central banks have decided not to implement the policy, at least so far. There, the Fed and BoE serve as case studies.

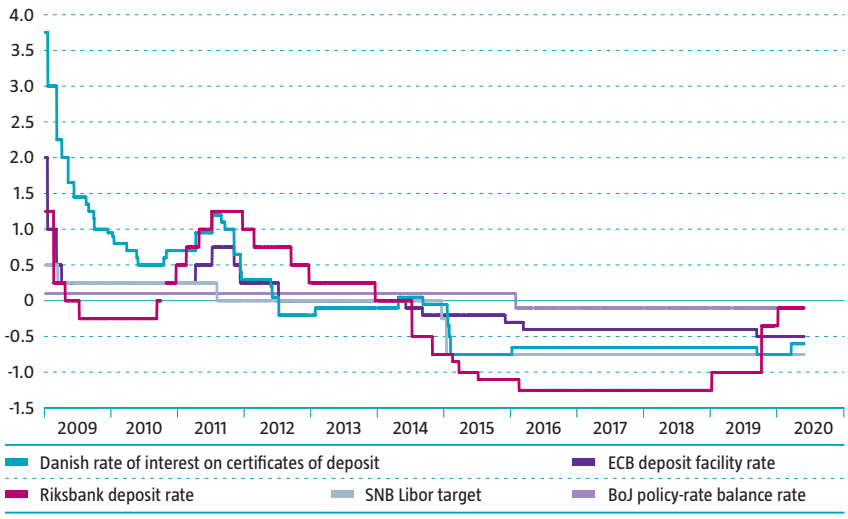
The focus in this article will be on NIRPs in developed markets. Although we can't rule out central banks in emerging markets ever adopting NIRPs, we feel this may be even more complicated, given the generally less developed financial structure and the FX risks linked to emerging markets.

Central banks that have adopted NIRPs – and why

As highlighted by the BIS,[2] Sweden's Riksbank was the first central bank to introduce negative policy rates. It lowered its overnight deposit rate to -0.25% in July 2009, but as the amount of funds parked overnight was tiny, the impact was negligible. In mid-2012, Danmarks Nationalbank (DN) cut the rate on certificates of deposit into modestly negative territory, keeping it there until April 2014. The real adoption of negative rate policies, however, occurred six years ago, when the ECB, DN, the Riksbank and the SNB all cut their key policy rates to below zero percent from mid-2014 to early 2015. The BoJ followed in January 2016 (see Figure 1).

2. "How have central banks implemented negative policy rates?", *BIS Quarterly Review*, March 2016.

Figure 1: Policy rates of five NIRP-adopter countries



Source: Bloomberg

The reasons why these central banks embraced such policies are manifold. First, in the past three recessions, major Western central banks such as the Fed have cut rates by 500 to 600 basis points. But since the global financial crisis, the scope to deliver such monetary help has presented a challenge for those central banks such as the BoJ and ECB that only managed to hike rates to a limited extent, if at all, during their expansions.

Secondly, as expected inflation rates fall during slowdowns, if those central banks with rates already nearly at zero did nothing, then real rates would rise, tightening financial conditions. Negative policy rates seem in fact to have helped bring down market interest rates and bond yields – by lowering expectations for future short-term interest rates as well as the term premium embedded in long-term bond yields. As such, they have helped reduce nominal financing costs for many governments, consumers and businesses.

Thirdly, NIRPs are seen as having incentivized banks to expand lending volumes so as to avoid negative interest on their excess reserve holdings with the central banks. Fourthly, as former ECB President Mario Draghi pointed out, a NIRP also lowers financing conditions via the exchange rate, especially for open economies. This may help explain why the likes of Sweden, Denmark and Switzerland embraced such policies, although evaluations in the literature are mixed.[3]

3. See Hameed and Rose (2017) and Thornton and Vasilakis (2019)

Measures NIRP adopters take to try to mitigate the negative side effects

As well as their intended effects, NIRPs also have potentially negative consequences – and because these policies are relatively new, there may also be consequences still to be identified. Besides depressing returns for savers – possibly prompting increased saving rather than consumption – and putting pressure on life insurance companies and defined-benefit pension funds, NIRPs stand accused of encouraging risk taking and dampening banks' profitability.[4]

4. Molyneux et al (2019) indeed found that bank margins and profits fell in NIRP-adopting countries compared to countries that did not adopt such a policy. Recent ECB research (Boucinha and Burlon, 2020), however, shows that while NIRPs have had a negative effect on banks' net interest income, this has been offset by a positive effect on overall profitability as a result of higher lending volumes and improved borrower creditworthiness.

The ECB has pointed out that fears that negative policy rates lead to large-scale cash hoarding by households, corporates or banks themselves have not yet materialized. This is partly because interest rates on most retail deposits haven't as yet fallen below zero, generally speaking, but also due to the cost of hoarding and insuring cash. However, as the ECB also acknowledges, protracted periods of negative rates could hamper the transmission of monetary policy, as many of the benefits for financial institutions – such as gains in asset prices – wear off. The point at which the detrimental effects on the financial sector start to outweigh the benefits of negative rates has been dubbed the 'reversal rate' by Brunnermeier and Koby, and was estimated to be -1% for the Eurozone in 2019.[5]

5. Brunnermeier and Koby (2019) identify four key determinants of the 'reversal rate': 1) banks' holdings of long-term fixed-income assets, 2) banks' equity capitalization, 3) the tightness of capital constraints, and 4) the deposit supply elasticity faced by banks.

Against this backdrop, central banks running NIRPs have introduced measures to mitigate their negative side effects. The first counter-measure is tiering, designed to avoid excessive interest rate penalties for banks' reserves held at the central bank. Early examples of tiered remuneration come from the SNB and the BoJ, the latter of which implemented a three-tier remuneration system in 2016 when it adopted a NIRP. In September 2019, the ECB introduced a two-tier system, resulting in part of commercial banks' excess liquidity holdings becoming exempt from negative remuneration at the ECB's depo rate.

A second mitigant is to adjust the interest rate charged on loans to banks. To this end, in April 2020 the ECB cut the borrowing rate for banks on three-year refinancing operations to 50 basis points below the depo rate, provided the funds would be used to provide new loans to the real economy. This is aimed at reducing the negative impact on banks' net interest income. The BoJ also adopted a similar program recently, extending loans to banks at zero interest and paying 0.1% interest to the banks on the amount they lend to companies.

Why did Sweden's Riksbank end its NIRP?

As said, Sweden's Riksbank already introduced negative rates in 2009, and was the first to take its main repo rate — the rate at which commercial banks borrow money – negative in early 2015. However, the Riksbank ended its five-year experiment in December 2019, when it raised the rate by 0.25% back to zero. The move was rationalized by the changed inflation outlook. But in an indirect acknowledgment of reversal-rate concerns, the accompanying monetary policy report stated that if negative rates were "perceived as a more permanent state, the behavior of economic agents may change and negative effects may arise".

The Riksbank had already concluded earlier that due to the negative policy rate, bank loans to households in Sweden may have been more subdued than normal under an expansionary monetary policy. And that if the repo rate had been cut to below the trough of -0.5%, monetary policy might have become less expansionary. Another research paper[6] suggested that the move to negative might already have been counterproductive, finding that Swedish banks that rely more heavily on deposit funding cut back on lending relative to other banks once the repo rate turned negative.

6. Eggertsson, Juelsrud, Summers and Getz Wold (2018)

Why the Fed and BoE haven't gone negative yet

Ever since the 2008/2009 crisis, the Fed has been reluctant to take its key policy rate negative, with staff memos initially stating concerns about the adverse impact on the money market fund (MMF) industry. A 2010 staff memo[7] highlighted several further legal and practical obstacles, including the view that banks might opt to replace their reserve balances for cash at a rate of -35 basis points or lower. So, some institutional aversion to the policy has been clear from the outset.

7. Burke, Hilton, Judson, Lewis and Skeie (2010)

After the Fed cut its funds target rate to zero in March 2020, Fed speakers referred to the October 2019 Federal Open Market Committee (FOMC) meeting for a recent conclusion on negative rates, which ruled the tool out for three reasons:

1. The financial industry is set up differently in the US than in many other countries.
2. The effect on financial institutions' willingness to lend is uncertain.
3. The evidence of the effectiveness of negative rates in other countries was mixed.

Regarding the first point, the financial industry in the US is indeed set up differently, with the important role of MMFs as a saving vehicle being a relevant distinguishing factor. Government money market funds[8] typically invest in securities that are issued at a discount, with prices moving to par at maturity. This allows the funds to trade at a stable net asset value (NAV). A negative rates environment would upset this model, although there are practical solutions. For example, the funds could keep a stable NAV and either charge higher fees or cancel shares, as European MMFs did after 2008, until the practice was banned in March 2019.

8. The 2016 money market reform act forced money market funds to adopt a floating NAV. An important exception was made for funds that invest in government securities. Currently, around USD 4 tln out of the USD 5.2 tln invested in MMFs is invested in government funds.

This brings us to the second point. How would US financial institutions respond to negative rates? In 2017, a Fed working paper[9] concluded that "policy makers should be less concerned about negative rates undermining the strength of monetary transmission and more focused on the financial stability concerns". In particular, "the focus should be greatest on the soundness of those institutions more heavily engaged in... short-maturity lending". There is clear persistent reluctance at the Fed to bring official rates into negative territory. But dire conditions call for dire measures, and practical limitations can be overcome if it is believed that negative rates would be beneficial or that additional stimulus can no longer be provided through further QE.

9. Arseneau (2017)

As for the BoE, since a 2016 review by its staff concluded that the effective lower bound in the UK was "close to, but a little above, zero", there have been no meaningful Monetary Policy Committee deviations from the view that negative interest rates are not a viable policy tool for the UK.[10] The review warned about the impact of negative rates on the viability of small banks and building societies in the UK as well as the provision of credit to the economy, given the large reliance on deposit finance from those institutions. Throughout his tenure, former Governor Mark Carney was adamant that he was "not a fan of negative rates", going so far as to warn G20 finance ministers in 2016 that such measures were a global "zero-sum game" that could take the global economy "closer to a liquidity trap".

10. https://www.bankofengland.co.uk/monetary-policy-summary-and-minutes/2016/mpc-august-2016.

Current Governor Andrew Bailey initially seemed to have maintained his predecessor's stance.[11] And yet, the debate and thinking within the BoE has recently shifted to a certain degree. With the policy rate now close to the zero lower bound, the BoE is reviewing whether a negative rate could provide economic stimulus. What is more, although the August 2020 Monetary Policy Report preliminary concluded that negative policy rates at the current juncture might be "less effective in providing stimulus to the economy" given the negative impact of the Covid-19 shock on banks' balance sheets, Governor Bailey acknowledged that they have become part of the BOE's toolbox.

11. Appointment hearing Andrew Bailey, UK parliament, 17 February 2020.

Three scenarios for NIRPs over the coming years

The Covid-19 crisis has made NIRP adopters more susceptible to the negative side effects for banks in particular and put non-adopters under pressure to at least reassess their stance. This leads us to the question, how big will the group of central banks maintaining NIRPs be in five years' time, and what form will the NIRPs take? Table 1 outlines three scenarios for the coming years, as well as the implications for sovereign bond returns. Note that under scenario 2, we consider two types of negative policy rate landscapes, described in sub-scenarios 2A and 2B. The probabilities we assign to the scenarios reflects our current best guess and could shift in either direction, depending on how quickly the global economy recovers from the Covid-19 crisis.

'How big will the group of central banks maintaining NIRPs be in five years' time, and what form will the NIRPs take?'

Table 1: Scenario overview[12]

	Scenario 1: Revenge of the reversal rate	Scenario 2: Further negativity		Scenario 3: Deep dive
Sub-scenario		**2A**	**2B**	
Probability	30%	40%	20%	10%
Assumptions	Most, if not all, of the four central banks currently running a NIRP end it by 2025, and the Fed and BoE resist going negative as well.	Ongoing NIRPs are in place at the ECB, BoJ, SNB and DN, with increased efforts to mitigate the negative side effects, especially for banks. While the BoE and Fed could apply negative rates in some of their lending programs, they refrain from taking the key policy rate negative.	Besides ongoing NIRP by the ECB, BoJ, SNB and DN, this sub-scenario assumes that besides other (smaller) DM central banks such as the RBNZ[13] and the Riksbank, both the BoE and Fed also introduce modestly negative policy rates within the next 12 months, after first expanding the size and scope of their QE programs.	Deeply negative policy rates (of up to -1%) are implemented over the next few years, with strong efforts to mitigate the negative side effects. Not just in the Eurozone and Japan, but also in the US, the UK and some other DM countries.
	As time progresses, the impact of the negative side effects on banks, pension fund systems and insurance companies, reinforced by ongoing central bank QE policies, increases, despite ongoing efforts to mitgate it. This translates into a gradual rise in the estimated 'reversal rate' towards zero percent in the Eurozone.	There is some further pass-through of negative policy rates to banks' retail deposit rates.	The Fed's move is possibly catalyzed further by additional strength of the USD or by concerns about diminishing benefits of more QE.	Banks increasingly pass on negative rates to large depositors, but governments try to keep shielding small depositors from negative interest rates.
	The ending of NIRPs is also facilitated by an economic recovery after the Covid-19 crisis, which helps push the nominal 'neutral' rate back into positive territory.	Ongoing and more broadly-based adoption of aspects of NIRPs is deemed necessary to keep real interest rates negative in view of a very low 'neutral' rate, muted inflation/disinflation pressures and high sovereign and overall indebtedness.		A more broadly-based adoption of deeply NIRPs is deemed necessary to steer real interest rates negative in view of increasingly negative 'neutral' rates, strong disinflationary pressures and high sovereign and overall indebtedness.
	Policy rates, however, generally stay at historically low levels, to keep real rates low in the face of high sovereign and overall indebtedness and contained inflation pressures, amid prevailing conditions such as demographic headwinds and lower trend growth.			In the most extreme version of this scenario, as proposed by Ken Rogoff, policy rates fall well below 1% – prompting more deeply negative 5-year government bond yields as well. To preclude large-scale cash hoarding, particularly by financial firms, pension funds, and insurance companies, this is likely accompanied by what Rogoff refers to as "combinations of regulation …and a phasing out of (large-denomination) banknotes". We add that this likely also requires the strict regulation of digital currencies.
5-year yields	5-year government bond yields of Germany, Switzerland, Japan are projected to eventually rise to the 0.0-0.5% area. In the US, 5-year yields gradually rise back above 1.0%.	5-year government bond yields stay well below zero in Germany for most of the next few years, and below 0.75% in the US and the UK.	5-year government bond yields in the US and the UK also turn negative for a sustained period and stay below 0.25% for most of the next five years.	5-year (safe haven) government bond yields stay well below zero in the Eurozone and Japan for most of the next few years, as well as in the US and the UK.

Source: Robeco. September 2020.

12. The 'neutral' rate is the policy rate at which monetary (interest rate) policy is considered neither accommodative nor contractionary, i.e. neither stoking nor slowing economic growth.
13. In their August Monetary Policy Statement the RBNZ signaled that future policy stimulus could include a negative policy rate complemented by a Funding for Lending Programme.

The charts below show the exact projections for policy rates and five-year government bond yields in the US and Germany for the coming years in each scenario – as well in scenario-weighted terms.

Figure 2: US Fed Fund lower bound projections (in %)

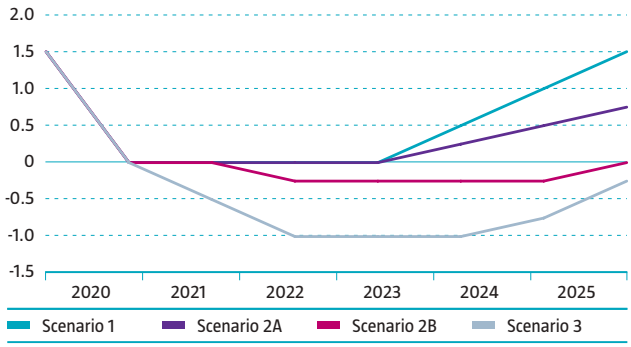


Figure 3: ECB depo rate projections (in %)

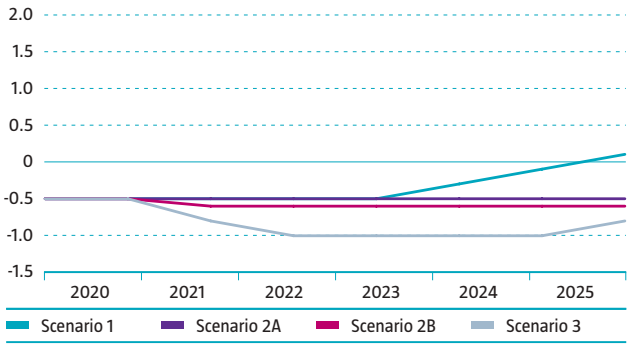


Figure 4: US 5-year yield projections (in %)

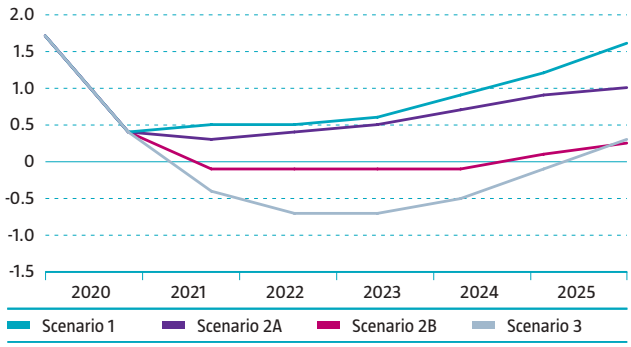


Figure 5: Germany 5-year yield projections (in %)

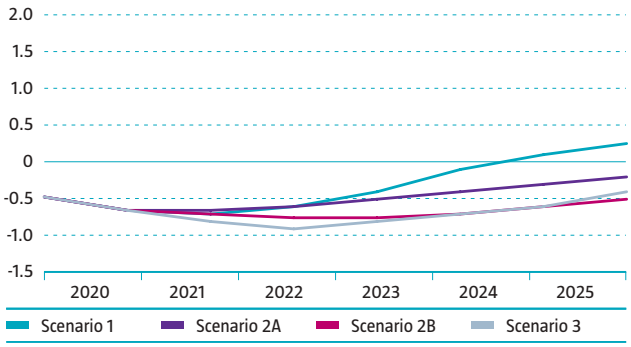


Figure 6: US scenario-weighted projections (in %)

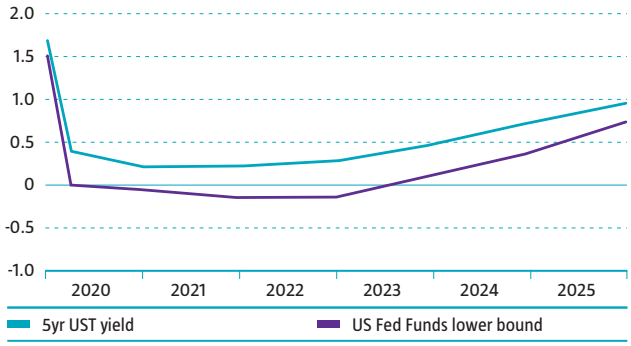
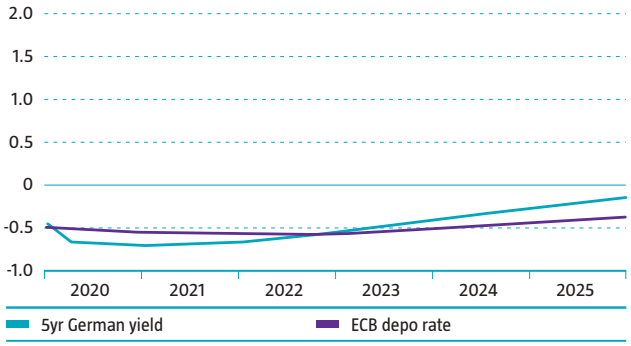


Figure 7: Germany scenario-weighted projections (in %)



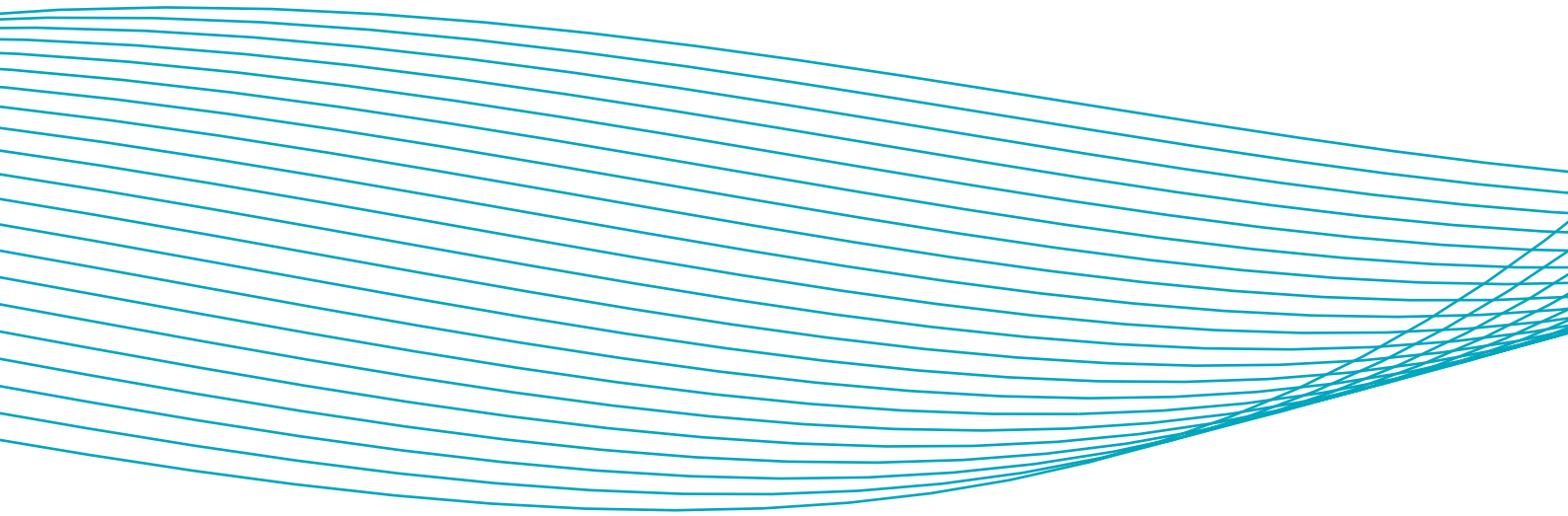
Note: scenario-weighted outcome calculated using the following probabilities: scenario 1 (30%) scenario 2A (40%); scenario 2B (20%); scenario 3 (10%).
Source: Robeco. September 2020.

Conclusion

As said, the probabilities we have assigned to the outlined scenarios could shift. But we currently believe that the chance of a number of additional developed market central banks adopting an NIRP is roughly the same as NIRPs being ended within five years by those who currently maintain NIRPs (i.e. 30%). It may be that we are too negative or positive in our outlook – depending on how one views NIRPs. In any case, we hope the scenarios and associated yield projections may be of use to investors in assessing expected bond returns for the next five years.

CARBON PRICING

ASSET ALLOCATION AND CLIMATE GOALS



As of February 2020, 194 countries have signed the 2015 Paris Climate Agreement, expressing their commitment to limit the global temperature rise caused by greenhouse gas (GHG) emissions to 1.5°C and well below 2.0°C by 2100. Without alternatives such as GHG extraction and storage or geoengineering currently available or viable, global emissions must be curtailed instead. The financial industry has a significant role to play in facilitating the transition to a low-carbon economy, not least because asset returns are expected to be hit hard by the impact global warming has on the real economy.

Institutional investors around the world are therefore evaluating their investment policies with regard to climate risks and opportunities. In a survey on climate risk perceptions among more than 400 such investors, 10% of respondents ranked the financial implications of climate risk for their portfolios first, and 55% said that climate risks had already begun to materialize.[1] Several studies have also found that institutional investors have already started decarbonizing their portfolios.[2] One such study reports that between 2001 and 2015, US institutional investors in aggregate reduced their 0.5% overweight to high carbon-emission stocks relative to a market cap-weighted portfolio to an underweight of around the same size. Another finds that the Paris Agreement has acted as a catalyst for institutional investors in Europe and Asia to divest from carbon-emitting companies.

1. Krueger, Sautner and Starks (2020)
2. Choi, Gao and Jiang (2020), and Bolton and Kacperczyk (2020)

In this article, we summarize the recent academic literature on the relationship between climate change, policies to limit climate change and asset pricing. Moreover, we develop a carbon risk factor that can be used to gauge the carbon risk exposure of investment portfolios.

The impact of climate change on the economy and financial markets

The 2007 Stern Review on the Economics of Climate Change concludes that the benefits of strong and early action to mitigate global warming far outweigh the economic costs of not acting. This landmark publication has had a profound impact on policy makers and the academic community, despite some explicit concerns about the assumptions required to connect climate change models to the real economy.[3] Notwithstanding this criticism, the path-breaking work of William D. Nordhaus on integrating climate change into long-run macroeconomic analysis, which formed a key pillar for the Stern Review, earned him the Nobel Prize for Economics in 2018.

3. See, for example, Pindyck (2013) for a critical review of climate modeling for macroeconomics.

Climate models such as those developed by Nordhaus rely on the introduction of carbon pricing policies – either in the form of emission trading systems or carbon taxes – to eliminate excessive climate change risks.[4] An important question in climate economics is what the price of carbon emission taxes should be, and how adaptive that price should be to new insights in the relationship between carbon emissions and climate change. Since first developing his climate models, Nordhaus has become more pessimistic about the possibility of achieving the 2°C target from the Paris Agreement, even if ambitious climate policies were now to be put into place. Other studies also find that delaying the introduction of carbon taxes any further will lead to large economic losses in the future. The lack of government response is often attributed to the high degree of uncertainty involved in estimating exact relationships between GHG emissions and climate change. Therefore, it is important to develop a robust decision framework for setting carbon taxes, such that this uncertainty does not lead to inaction.[5]

4. Nordhaus (2019)
5. Barnett, Brock and Hansen (2020) develop such framework.

Although the exact magnitude of the economic impact of a business-as-usual approach to climate change is hard to predict, most scientists agree the risks are substantial and also likely to affect the financial markets, for example through the introduction of carbon taxes. Simulations suggest that in aggregate, the impact of climate change on the value of financial markets could be as large as 16.9% in the 1% of worst outcomes. However, when GHG emissions are reduced in line with the maximum 2°C temperature increase, the same 1% worst outcome declines to just 7.7% of global asset values. Others have argued that banks, insurance companies and pension funds may be severely negatively affected if prompt action is not taken, leading to the need for abrupt and larger policy responses in the future. The channels through which these losses could materialize are delinquencies in bank loans or corporate bonds or real estate values in coastal areas affected by rising sea levels. These studies collectively make a strong case for immediately reducing GHG emissions as an important risk management tool that will benefit all investors.[6]

6. Dietz, Bowen, Dixon and Gradwell (2016)

The price of climate risk

An important question for asset allocators is which risk premiums are present in financial markets. After establishing the existence of a risk premium, investors can decide whether exposure to the risk factor is desirable and consistent with their investment philosophy. The existence of a climate risk premium can be determined theoretically or empirically. An example of the former is the model developed by Pástor, Stambaugh and Taylor (2020), which features investors with different tastes for 'green' assets. Their model suggests a negative risk premium for green assets for two reasons: investor preferences for green assets and the ability of green assets to hedge climate risks. This theoretical model implies that companies with high GHG emissions should have higher expected returns, which can be interpreted as a positive carbon risk premium.

The empirical evidence presented in some studies for a carbon risk premium is contradictory. In line with the theory mentioned above, one found a positive carbon risk premium for both the US and many international equity markets in the period from 2005 to 2018.[7] Compared to the median company in their sample, companies with the highest 20% of carbon emissions were associated with an additional return of 2.85% per annum for the US and 2.34% for the global sample. Although changes in carbon emission levels carried a significant premium, there seemed to be no significant relationship with measures of carbon intensity, i.e. carbon emissions per unit of revenues. However, two other studies found that companies with low carbon intensities outperformed those with higher carbon intensities, suggesting a negative carbon risk premium that conflicts with predictions from the theoretical model.[8] These recent studies expanded on earlier academic work that collected voluntarily disclosed carbon-emissions data for the period from 2006 to 2008 and found that high carbon-emitting companies were valued lower than comparable ones with lower carbon emissions, and that non-disclosing firms were valued even lower.[9] The emerging literature on carbon risk premiums complements that on the possible existence of a 'sin stock' premium or a 'pollution' premium.

A major drawback of these empirical studies is their data sensitivity. They typically rely on short sample periods, which is challenging for standard asset pricing studies. In addition, they may use different data sources as inputs and considerable disagreements have been found between different ESG data providers. Most of the negative climate impacts are only beginning to be observed. Climate risks are therefore not well represented by historical data, as it is likely that markets have only started to price carbon exposure in recent years. As a result, traditional asset pricing methods are less suited for pricing carbon and other climate change-related risks.

Investment solutions to deal with climate change

Investors concerned with climate change can make a number of possible strategic asset allocation decisions. They can decarbonize their investment portfolios by divesting the largest GHG emitters, for example by creating a fossil-fuel free portfolio. However, divestment comes down to a transfer of ownership to other – potentially less sustainable – investors, and it is not obvious that this leads to a low-carbon society. Instead of divesting, institutional investors in the previously mentioned survey expressed a preference for engaging with high carbon-emission firms as a means to reducing GHG emissions.

Constructing portfolios that perform well when climate risks materialize is a challenging task. In addition to divestment policies to decarbonize broad equity portfolios, investors could also explicitly target investments in companies that help the transition to a low or zero-carbon society. This could, for example, be achieved through allocations to thematic funds or clean-tech private equity.

7. More precisely, Bolton and Kacperczyk (2020) find a positive carbon risk premium in North America, Europe and Asia, but not in Africa, Australia and South America.

8. Garvey, Iyer and Nash (2018) and In, Pank and Monk (2019).

9. Matsumara, Prakash and Vera Muñoz (2014)

The divestment from, or reduction in allocation to, high-emitting firms has consequences for portfolios. Fossil-fuel free investments have considerable relative risk to a capitalization-weighted market portfolio. In addition, radical carbon risk reduction may affect factor-based equity portfolio strategies. To mitigate this, we have developed a novel methodology to reduce the environmental footprint of the equity value factor at Robeco.[10]

10. Swinkels, Üsaitė, Zhou and Zwanenburg (2019)

Corporate bond investors could also divest from high-carbon emitters. Alternatively, however, they could force corporate change by insisting on carbon emission reduction covenants in corporate bond indentures and carbon policy performance bonds. On the financing side, green bonds can be used to fund carbon emission reduction projects, a market that is rapidly growing.[11] Several recent studies examine the pricing of green bonds relative to similar non-green bonds and find that the yield differences are close to zero and typically well below 10 basis points. The challenge with issuing separate green and non-green bonds is lower liquidity for both types. One way of solving this issue is by splitting a green bond into a regular bond and a green certificate that can be traded separately. The Danish government is considering issuing green government bonds in this novel way.

11. See Scholten and Moret (2020) for more details on the green bond market.

An alternative measure of carbon risk

We have looked at the difficulties in quantifying carbon risks and pointed out that there is even disagreement on the very existence of an expected-return premium for investing in carbon-intensive firms. Determining the effect of climate change on investment portfolios remains complicated for various reasons. Here, we delve deeper into the unique challenges that dealing with climate change poses to investors and introduce a different framework that is designed to address some of these issues.

To get an idea of how markets are exposed to carbon risks, it is helpful to consider the potential financial effects of a universal carbon tax. While the cash flows of some companies would be directly hit by such a tax, the impact for others would be lessened by their ability to raise prices or substitute their current emissions with low-emission alternatives. This, ultimately, is precisely the aim of introducing carbon-pricing policies. Companies without significant direct emissions might still be negatively affected, as their input products would become more expensive. In the case of banks, some of their borrowers might not be able to repay all of their debt. Such scenario analysis can be helpful in examining the financial impact of climate change on an investor's portfolio.

Another challenge revolves around data availability. Reliable corporate emissions data has been mostly lacking in the past. As a result, a commonly accepted framework on how to account for and report on emission activities was introduced in the form of the Greenhouse Gas Protocol in 1998. Since then, increasingly more data providers have started to publish corporate emissions data. Most of these providers offer data on Scope 1 and 2 emissions, which are direct emissions from corporate activities, and indirect emissions from the purchase of electricity, respectively. Scope 3 emissions are all other indirect emissions resulting from a company's upstream and downstream value chain. While this reporting category is the most reflective of carbon risks, these data emissions are still relatively scarce, with only a handful of current providers. Hence, most investors base their decisions on information from Scope 1 and 2 emissions. For a similar reason, academic research is largely focused on Scope 1 and 2 emissions as well, and as a result most academic studies deal with data sets that provide limited historical and relatively narrow coverage.

Investors generally use company-level emissions data as a proxy for carbon risk. While we acknowledge the relevance of carbon emissions to this end, we also point out that emissions may not completely reflect carbon risk exposures. For example, an oil exploration

company emits relatively little carbon in its daily operations, yet it is highly exposed to carbon risks in an indirect manner due to heavy reliance on the success of downstream companies. A downside of basing estimates for carbon risk on emissions data is that it is not effective in uncovering implicit economic links between companies. Although it is the most all-encompassing, Scope 3 data relies on simplifying assumptions regarding the inputs and outputs of corporate activity. To illustrate this point, compare a bank that holds a large portfolio of loans to the oil industry with a bank that actively finances sustainable projects. The methods used to estimate Scope 3 emissions will not always accurately reflect the vast differences in how the two banks are exposed to carbon risk.

Finally, the backward-looking nature of emissions data fails to capture a company's transition strategy. Abatement costs vary between companies, possibly due to having different technologies and intellectual property available for reducing carbon emissions or because of differences in pricing power that enable companies to pass abatement costs on to customers. Hence, some companies will be able to transform their businesses quickly and without significant costs, while others may continue to invest in the development of assets that become stranded. Some firms even stand to gain from the transition to a low-carbon economy and are thus negatively exposed to carbon risk – something that could occur independently of their current emissions. An electric car manufacturer and traditional manufacturer of gasoline cars may emit similar amounts of carbon in their production processes, yet they are expected to benefit from the transition to a low-carbon economy in radically different ways.

'The backward-looking nature of emissions data fails to capture a company's transition strategy'

We propose an equity market-based measure to estimate carbon risk in a complementary way. Assuming that carbon risk represents a systematic risk factor that partially drives returns, a multi-factor asset pricing model will be able to uncover asset-specific exposures to this risk factor. Key to this analysis is finding a suitable proxy for systematic carbon risk. A portfolio with long/short exposures to assets with roughly opposing footprint characteristics, or the price development of carbon allowances as traded in Emission Trading Schemes, might be suitable candidates for creating a carbon risk factor.

Regressing the return series of any financial asset on the return series of the carbon risk factor while controlling for other exposures to traditional factors allows us to estimate an asset's carbon risk sensitivity. An asset with high (low) carbon sensitivity generally rises (drops) in value when the carbon risk factor rises in value. Hence, it is highly exposed to carbon risks, even if it does not report on carbon emissions at all.

There is a large amount of literature in finance that states that company characteristics and exposures to risk factors contain complementary information. Assessing carbon risks by their carbon risk exposure might provide information not obtained by looking solely at carbon footprint characteristics. Moreover, an important feature of this methodology is that it does not necessarily require the availability of emissions data. As long as a suitable carbon risk factor can be found, estimating an asset's carbon sensitivity only requires the availability of the asset's return series. It also means that the analysis can be used for other asset classes besides equities. Assets for which emissions data does not yet exist, for which it is not available, or to which it is not relevant, can be assessed in a similar manner. For commodities, private equity or real estate, such insights might prove valuable.

5. Conclusion

In a business-as-usual scenario, the societal and economic consequences of climate change are expected to be devastating. Investors are generally well aware of this looming threat and have started to actively focus their actions on mitigating climate change. However,

the literature still disagrees on many of the financial implications of climate change. While research on climate finance is rapidly gaining momentum, issues regarding data availability and questions concerning suitable research methods remain.

In this article, we examined the current state of the literature on carbon pricing and suggest a method for assessing portfolio risk exposures that are not captured by available emissions data. Combining these insights with emissions intensities could help investors better reduce unwanted exposure to climate change risks. Long-term investors should make sure they develop the toolbox required to address climate change from all possible angles. The literature suggests that the earlier action is undertaken, the smoother the transition will be, and the lower the associated costs for society.

INFLATION

MONEY FOR NOTHING, INFLATION NOT GUARANTEED

Governments and central banks have launched extensive fiscal and monetary stimulus packages to cushion the impact of the coronavirus. While these measures were an absolute short-term necessity, there are concerns about the longer-term implications for inflation. This special offers direction on the long-term core inflation outlook for both developed markets (DM) and emerging markets (EM), by first discussing the most important drivers of inflation from monetary, cyclical and secular angles. We then place those drivers in a scenario-analysis framework to get a numerical sense of how inflation will behave for the next five years. Before we present the scenarios and inflation outcomes in more detail, we first discuss the monetary angle on inflation. Then we discuss the cyclical angle and drivers of inflation and finally two very important secular drivers of inflation.

Monetary trends

The Covid-19 pandemic is not the first major economic disruption and each shock over the past century has been unique in its own way. However, in the current crisis we have seen falls in production last registered in the 1930s, making it worth briefly revisiting that decade and the lessons learned then.

Most importantly, as leading 1930s economist Irving Fisher[1] suggested, avoiding a debt-deflation spiral should be prioritized. In order to prevent a contraction in loans and a decline in price levels, liquidity should therefore be abundant. As we confront today's economic disruption, it is comforting to see that Fisher's message is visible in today's monetary and fiscal policy response. Money growth in particular has accelerated sharply in the US, for example, both in the monetary base (which is controlled by the central bank) but also in measures of broad money, such as M2 (which typically comprises currency in circulation and deposits of households and businesses). Indeed, US M2 expanded by 17.7% and global M2 expanded by 6.6% since February of this year.

1. Fisher (1933)

However, with Milton Friedman's proclamation of inflation being "always and everywhere a monetary phenomenon"[2] firmly anchored in their minds, many pundits are questioning whether the current flood of money could send inflation levels soaring in the future. In this, they make reference to the infamous quantity theory of money equation popularized by Friedman:

2. Friedman (1970)

(1) M*V = P*Q (or Y)

where M is Money, V is the velocity of money, P is the price level, Q is quantity of goods produced (as a proxy for the number of transactions, T, used in the original equation) and Y is nominal GDP. If M explodes, V stays stable and Q falls, surely this will lead to a higher P – right?

Well, it's more subtle than that. First of all, velocity doesn't need to remain stable. Velocity is another word for the speed at which money circulates in the economy, and is very hard to measure properly. Many people look at past velocity trends from a (P*Q or nominal GDP)/M angle, and draw inferences from that. We would caution that there is a circularity in such an ex-post analysis, with V being primarily driven by M, and may be of little relevance going forward. Moreover, during sharp economic downturns, certainly in the early stages, a sharp increase in broad money growth typically reflects precautionary cash hoarding by the private sector. This also seems to be behind the current surge in M2 growth globally. If that money is saved and not spent, how can increased M generate higher inflation? This brings us to the phrase Friedman used to explain the process of how inflation is generated: "too much money chasing after too few goods".

'Unprecedented central bank support could effectively sustain and further increase broad money growth'

Can we expect a significant amount of broad money creation to effectively start chasing those goods (and services) over the coming 12 to 24 months? To assess this, we first must realize that this time round, the huge amount of money borrowed by governments – and effectively financed with fresh central bank money – for direct spending, transfers to households and, especially in Europe, employment subsidies to businesses, could be quite instrumental in such a chase. Even if grants transferred to households are initially hoarded, as savings rates of 20% in France and 33% in the US suggest, most of these could well be spent eventually.

In addition, unprecedented central bank support to relieve cash flow pressure in the private sector via special lending programs – such as the ECB's Targeted Long Term Refinancing Operations, the BoE's Funding for Lending Scheme and the Fed's Main Street Lending

Facility – could effectively sustain and further increase broad money growth. While we remain skeptical about the impact of this on consumer price inflation over the next 12 to 24 months, we are optimistic about the ability of these programs to prevent deflation.

We do acknowledge though that the close cooperation between monetary and fiscal authorities in fighting this downturn have increased the odds of an eventual inflationary uptick later in the coming five years. Here we do see a difference with previous crises. In this regard, we also note that Friedman explicitly placed his notion of inflation's ubiquity in a long-term perspective.

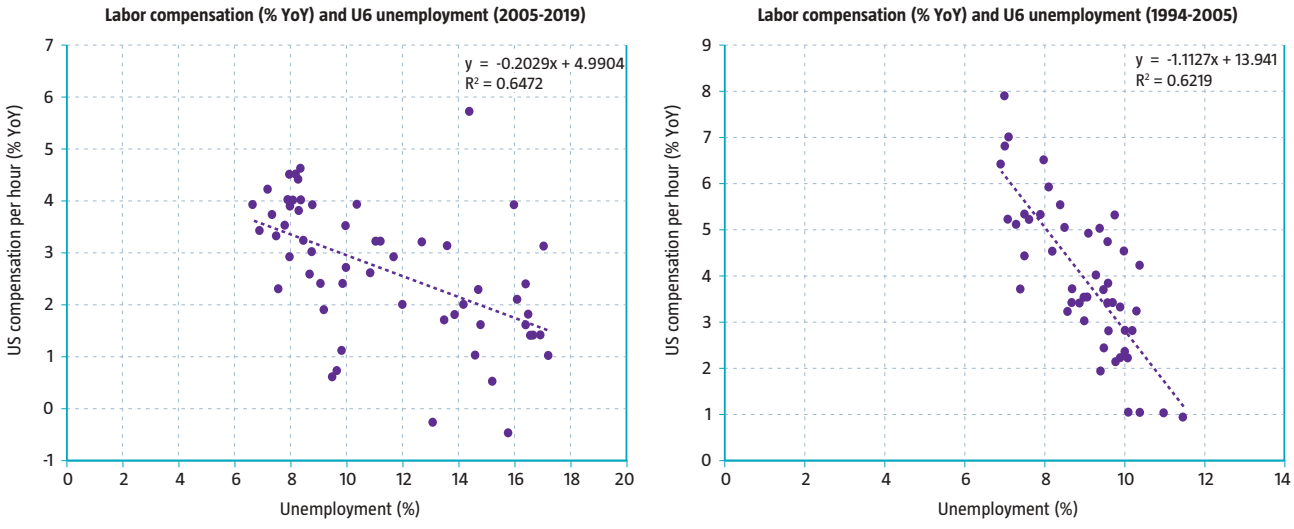
Cyclical trends

The lack of an uptick in wage growth and inflation in response to low unemployment rates was a topic of heavy debate going into the Covid-19 crisis. One of the immediate effects of the pandemic was a steep rise in unemployment. Even with jobs returning as economies reopen, we expect longer-lasting implications for the labor market that might affect compensation and hence influence inflation.

In July 2019, Fed Chair Powell told US Congress that in the past twenty years "the relationship between unemployment and inflation has become weaker and weaker." Powell explained this by the stabilization of inflation expectations. His conclusions are confirmed by an extensive analysis of 20 DM countries by Olivier Blanchard et al[3] and another of 19 EM countries by Bems et al.[4] Their research shows that the role of inflation expectations in setting inflation increased significantly at the end of the 1990s and has remained stable since. They could not find a significant relationship between inflation and unemployment anymore, as illustrated for the US in Figures 1 and 2.

3. Blanchard, Cerutti and Summers (2015)
4. Bems, Caselli, Grigoli, Gruss and Lian (2018)

Figures 1 and 2: US Phillips curves



Source: Bureau of Labor Statistics, Bloomberg and Robeco calculation

The scatter plots shows US compensation only seems to be related to unemployment if the latter is quite a bit below 10% for the most recent period. The relationship overall has weakened over time (e.g. much flatter Phillips curve) but also became more non-linear (wage increases tend to be concentrated at much lower levels of unemployment). Given the current high levels of unemployment, we should therefore expect, if anything, moderating effects from wage growth on inflation in the near but also medium term.

The supply-side view from the labor market is one of three important ingredients for the inflation outlook, with consumption and corporate behavior being the other two. Indeed, while the Covid-19 crisis is outsized by historical standards globally at this stage, typically we would also see an economic overreaction that in turn leads to a demand-deficient recession over time. This is described as a 'Keynesian supply shock' and is explained well in Guerrieri et al. (2020).[5] The immediate effect of the lockdowns was essentially the cessation of activity in contact-intensive businesses. As consumers spent less on those items, they redirected some of their spending towards other sectors. Some are clear substitutes for the goods and services directly affected: consumers unable to eat out spend more on food prepared at home. Other sectors are more complementary: consumers who cannot go to the gym spend less on sportswear. The question is whether, overall, consumers reduce their total spending by more or less than pre-crisis levels in the affected sector. If the forces of complementarity are strong enough, they will spend less, and the recession will spread.

5. Guerrieri, Lorenzoni, Straub and Werning (2020)

This process also has implications for corporate behavior. Elevated levels of unemployment and depressed global demand will force corporates to rethink their business model, hoard cash and cut costs. The easiest and fastest way to cut costs is to reduce investment, implement hiring freezes and dispose of assets, all options being disinflationary in theory. More importantly, Ang and Smedema (2011)[6] and Stone and Gup (2019)[7] show that changes in corporate behavior actually kick in after the recession has already begun.

6. Ang and Smedema (2011)
7. Stone and Gub (2019)

For now, both the corporate sector and households have seen unprecedented government support globally. Corporates have experienced direct support via bridge-financing facilities, direct grants from the governments, tax and regulatory holidays, and the ability to borrow with government guarantees and subsidies for wage costs. Likewise, support for household income has also been very strong with various work furlough schemes.

The support across DM countries has been much stronger than in EM countries, with China being the exception. We expect many of those stimulus programs to be extended over time but with consistently less generous terms given the large fiscal cost. As such, we expect a longer period with elevated levels of unemployment weighing on consumer spending and corporates being risk averse in terms of hiring and investment. Hence, our expectation for demand-pull inflation is low for the next five years out.

Secular trends

While these are often overlooked, we think a number of secular trends are relevant to the longer-term outlook on inflation, particularly in **globalization** and **technology**.

The impact of **globalization** on many aspects of society, including inflation, has been fiercely debated in recent decades. In an influential IMF study, Ken Rogoff concluded that deregulation and increased competition have depressed the pricing power of both quasi monopolists and unions. Together with prudent central bank policies and more restrictive fiscal policies, this has contributed to structurally lower inflation levels.[8] Over the years, many academic studies have come to similar conclusions.[9]

8. Rogoff (2003)
9. See amongst others: Claeys and Wolff (2015)

The Covid-19 crisis has exposed some of the vulnerabilities of globalization via disruptions in deep global integrated supply chains. Times were already tough for globalization years before Covid-19 hit, as seen in news headlines on trade disputes and trade data. International trade flow data from the CPB shows that global trade volumes grew at an annual pace of 5.5% between 2001 and 2005, and accelerated to only 1.9% p.a. between 2016 and 2019, after 0.8% p.a. during 2011-2015.

A 2018 study by the Bank of France[10] gives us some further insight into the impact of globalization on inflation. This study on French prices found an impact from three channels: substitution of domestic goods, increased imports and increased competition. Their combined effect was estimated to be -0.17% per year, or 3.5% in total for the twenty-year timespan of their study. These results confirm an earlier study by the Fed that estimated an inflation impact of less than -0.25% from Chinese exports across a large group of countries[11] Forbes (2019)[12] shows that globalization can be expressed as shared components in inflation. Indeed, based on data across 43 countries, Forbes found that the shared global inflation component more than doubled to 57% in the 25 years preceding 2017, while for core inflation it fell from 43% to 26% in the same period. Additional analysis shows a growing role for a global output gap and global commodity prices and a decreasing role for international price competition. Looking at the details of Forbes' findings, it is interesting to see that global factors gained in importance primarily between 2000 and 2005. This corresponds with the peak in global trade data from the CPB.

10. Carluccio, Gautier and Guilloux-Nefussi (2019)

11. Is China exporting deflation? Kamin, Marazzi and Schindler (2004), Fed discussion paper

12. Forbes (2019)

We can conclude that globalization passed its peak in recent years. Looking ahead, we expect this trend to continue, as confirmed by both a critical evaluation of supply chains and structural changes in international trade relationships. As globalization helped to moderate inflation, de-globalization will likely have the opposite effect is referenced by many analysts. We would caution against that view as globalization was premised on the economic rationale of labor differentials developed markets versus emerging markets. The current slow trend of de-globalization is happening at a time where we see increasing competition between labor and capital-intensive production ('man versus machine')[13]. In that sense, it is current competition of labor-intensive production in emerging markets versus new capital-intensive production in developed markets that we would not classify as inflationary.

13. Fueki and Maehashi (2019)

In terms of technology, beyond its contribution to greater online price transparency and facilitating increased competition in the retail sector, it has obviously had a direct downside effect on the price of a number of retail goods, most obviously audiovisual and communication goods as evidenced by Cavallo (2018)[14], as well as Golsbee and Klenow (2018).[15] However, one thing that may not be immediately apparent is that statistical measures of inflation are adjusted for changes in quality where possible. Advances in technology often improve the quality of products across a number of different dimensions and many statistical agencies around the world aim to capture this in their measure of inflation. This shows up as a decline in the price in the CPI. Golsbee and Klenow (2018) estimate this effect to be roughly 0.26% since 2014 for the US. It seems logical that a steeply rising technology trend also affects non-tech inflation components such as housing, retail trade and education or labor's bargaining power. Statistical agencies might not fully take these disinflationary effects into account.

14. Cavallo (2018)

15. Golsbee and Klenow (2018)

Scenario analysis

A five-year outlook for inflation requires us to consider how prices behave in different economic scenarios, ranging from weak growth (i.e. deep recession) to a strong expansion. In Table 1 we have described four scenarios based on differences with regard to the growth outlook, impact from policy responses, and the impact from secular forces such as technology and de-globalization. The probabilities we assign to the scenarios reflect our current best guesses and could shift in either direction, depending on how fast the global economy recovers from Covid-19.

Table 1: Scenario overview

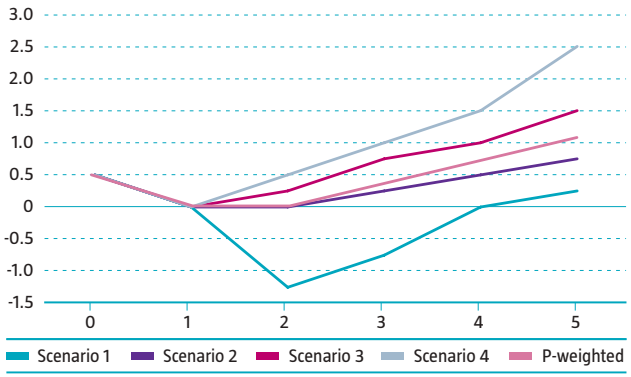
	Scenario 1: Depression	Scenario 2: Recession followed by shallow recovery	Scenario 3: Recession followed by recovery to end-2019 levels	Scenario 4: Full expansion
Probability	10%	50%	30%	10%
Cyclical scenario – growth assumptions	Deep recession for next three years followed by two years of very moderate recovery.	Deep recession followed by years of moderate recovery.	Deep recession followed by recovery and subsequent return to pre-crisis trend growth.	Deep recession followed by swift recovery and above-trend growth.
Policy scenarios – fiscal & monetary	Failure to reach adequate fiscal stimulus. Monetary policy aimed at preventing deflation.	More successful fiscal impulse but mainly counterbalancing crisis impact. Monetary policy aimed at preventing deflation.	Effective enough fiscal impulse to ignite recovery back to pre-crisis trend growth. Monetary policy aimed at preventing deflation and successful in combination with fiscal impulse.	Very effective fiscal impulse to ignite recovery back above pre-crisis trend. Fiscal policy remains overly supportive as authorities are reluctant to wind down stimulus Successful combination of monetary and fiscal policy.
Secular scenarios	Full reversal of globalization and strong rise of nationalistic economic policies. Very slow progress on technology as corporate and fiscal investment slows.	Strong trend of de-globalization and rise of more nationalistic economic policies. Slow progress on technology as corporate investment slows and fiscal investment is insufficient to counterbalance.	Slow trend of de-globalization and only shallow rise of nationalistic economic policies. Strong progress on technology as corporate investment is unchanged while fiscal investment is very strong.	No de-globalization and only very shallow nationalistic economic policies here and there. Very strong progress on technology as corporate and fiscal investment is very high.
Expected AE (advanced economies) **CPI estimate in 5 years**	0.25	0.75	1.50	2.50
Expected EDM (emerging and developing economies) **CPI estimate in 5 year**	2.60	3.60	4.60	6.00

Source: IMF World Economic Outlook (April 2020), Robeco.

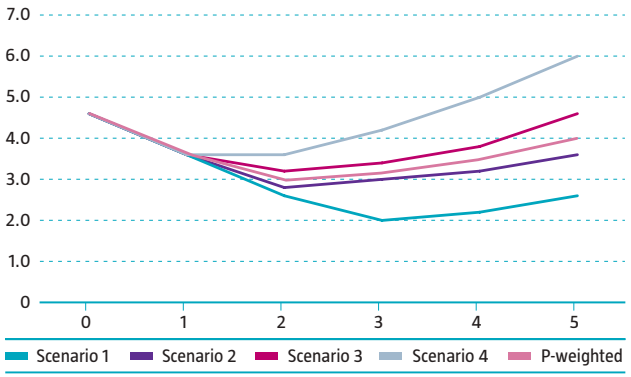
Figures 3 and 4 below portray the projections for DM and EM inflation for the next five years in the different scenarios, as well as for the probability-weighted outcome. In all scenarios we expect some recovery of inflation over the next five years, but only moderately so.

Figures 3 and 4: Scenario analysis for EM and DM inflation next five years

Advanced economies scenario analysis



Emerging and developing economies scenario analysis



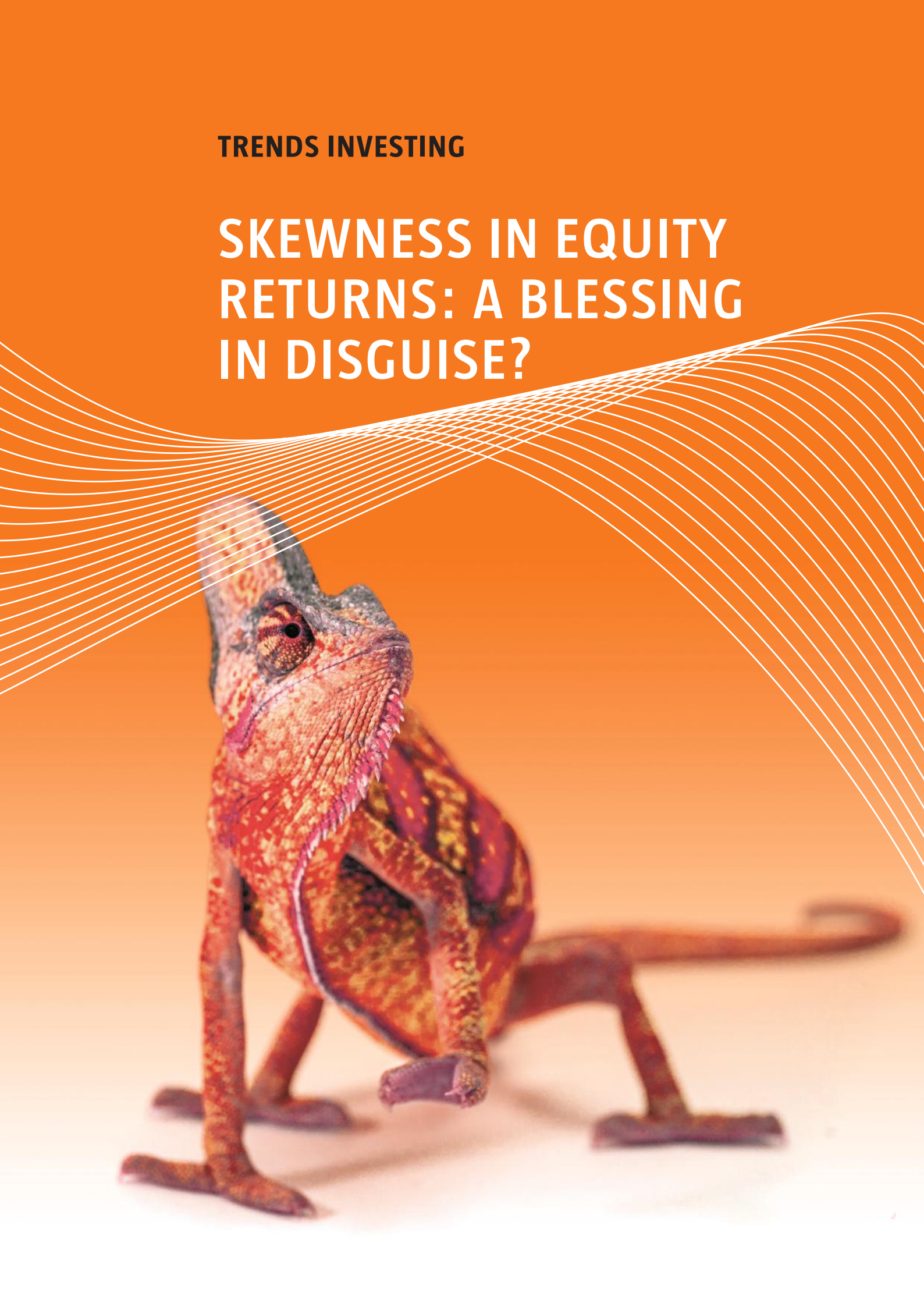
Source: Robeco. September 2020.

5. Conclusion

We don't expect much inflationary impact from the massive increase in money supply engineered by fiscal authorities and central banks, at least in the next few years. The disinflationary forces stemming from the disruption to demand will simply be too strong. Secular forces do not point to galloping inflation either. The odds of an inflationary uptick towards the end of the five-year horizon seem more pronounced, although importantly this would require the increase in money supply to be sustained and eventually associated with much stronger consumer and business spending, as "more money starts to chase fewer goods".

TRENDS INVESTING

SKEWNESS IN EQUITY RETURNS: A BLESSING IN DISGUISE?



Long-term investors might be surprised to find that a typical stock listed in the US from 1926 to 2019 had a buy-and-hold return of -2.8% over its entire lifetime.[1] In an international context, from 1990 to 2018 the typical buy-and-hold return of a stock was -14.9%.[2] This means that if an investor had picked a stock randomly, the most likely outcome would have been a loss of capital. The few winning stocks, on the other hand, have had enormous returns. That is a clear sign that the distribution of equity returns is skewed.[3] Why is this discrepancy important for investors? It shows that indiscriminate stock picking has very little chance of success. Investors need to find ways to improve theirs odds of selecting those companies that are not typical and belong to the small group of winning stocks.

1. CRSP, date retrieved: 07/06/2020
2. Bessembinder, Chen, Choi and Wei (2019)
3. We measured skewness over a monthly, annual, decade and lifetime horizon. US equity returns are positively skewed over all horizons. Data used is from CRSP retrieved on 08/06/2020.

We believe the concept of unanticipated economic profit,[4] embedded in a trends-focused investment process, significantly improves the odds of finding the winners. Financial theory suggests that economic profit and equity returns should be highly correlated over time, as equity returns should reflect the generation of economic value, as measured by economic profit, over longer time frames. Investors need to identify which companies are likely to create or destroy economic value. However, markets are largely efficient and reflect the aggregate expectations of all participants in the pricing of equities. Only when reality consistently exceeds or undershoots these expectations can we expect to see extraordinary long-term equity returns. Unanticipated economic profit is therefore crucial to finding winners and improving the odds of long-term investment success.

4. Economic profit is profit minus a charge for the capital used (i.e. the opportunity cost) to earn that profit. It measures the economic value that is created in the production of goods and services.

Wealth in the stock market is created by just a few winners

How is it possible that the typical stock has a negative return but the average return of the market is 8% over the last 100 years? This discrepancy exists because the distribution of equity returns is skewed. Stock market returns are positive and higher than the return of the typical stock thanks to a relatively small group of stocks producing exceptional returns. Exactly how exceptional was recently shown in a study by Professor Hendrik Bessembinder from Arizona State University, who calculated that just 4% of companies listed in the US were responsible for all wealth creation in the past 90 years.[5]

5. Wealth creation is defined as the difference between the present dollar value of investors' actual investment in a stock and the value that would have been obtained if the same capital investment had earned US Treasury Bill returns.

We use wealth creation as a measure to complement buy-and-hold returns because buy-and-hold returns do not reflect the experience of investors in aggregate. For example, as Bessembinder points out, General Motors filed for bankruptcy in 2009 after it had experienced a drop in price from USD 93 to USD 0.61 in the preceding decade. That is a buy-and-hold return of -99%. However, prior to its bankruptcy, it rewarded shareholders with more than USD 64 billion in dividends and share buybacks. Despite GM's dramatic buy-and-hold return, wealth creation for investors was positive. The concentration of wealth creation is even more extreme on a global scale. A follow-up study of 42 countries showed that just 1.3% of companies were responsible for all wealth creation in the last 30 years.[6]

6. Bessembinder, Chen, Choi and Wei (2019)

Not all industries are created equal

The small group of stocks that have created the majority of the wealth includes household names that we all know such as Apple, Microsoft and Amazon. Outside the US, stocks that have produced a disproportional amount of wealth are Tencent, Nestlé and Samsung. Financial theory asserts that economic profit and especially movements therein should be closely correlated to long-term equity returns. A study by McKinsey shows that the distribution of economic profit is skewed and that the bulk of it is earned by a relatively small group of companies.[7] Similar names pop up in the McKinsey study, with Apple and Microsoft again among the top creators of economic profit.

7. Bradley, Dawson and Smit (2014)

The link between the distribution of wealth creation and economic profit is highly suggestive of the causal link asserted by financial theory. In earlier Robeco research, we showed that equity markets reward companies that show improved and consistent economic profit but punish those that show declines.[8] These results hold for both individual stocks and aggregates of similar stocks such as industries. In fact, at the industry level we observe that relative profitability tends to remain steady over long intervals for most industries. Prosperous industries stay prosperous and poor industries stay poor.

8. Bergakker (2019)

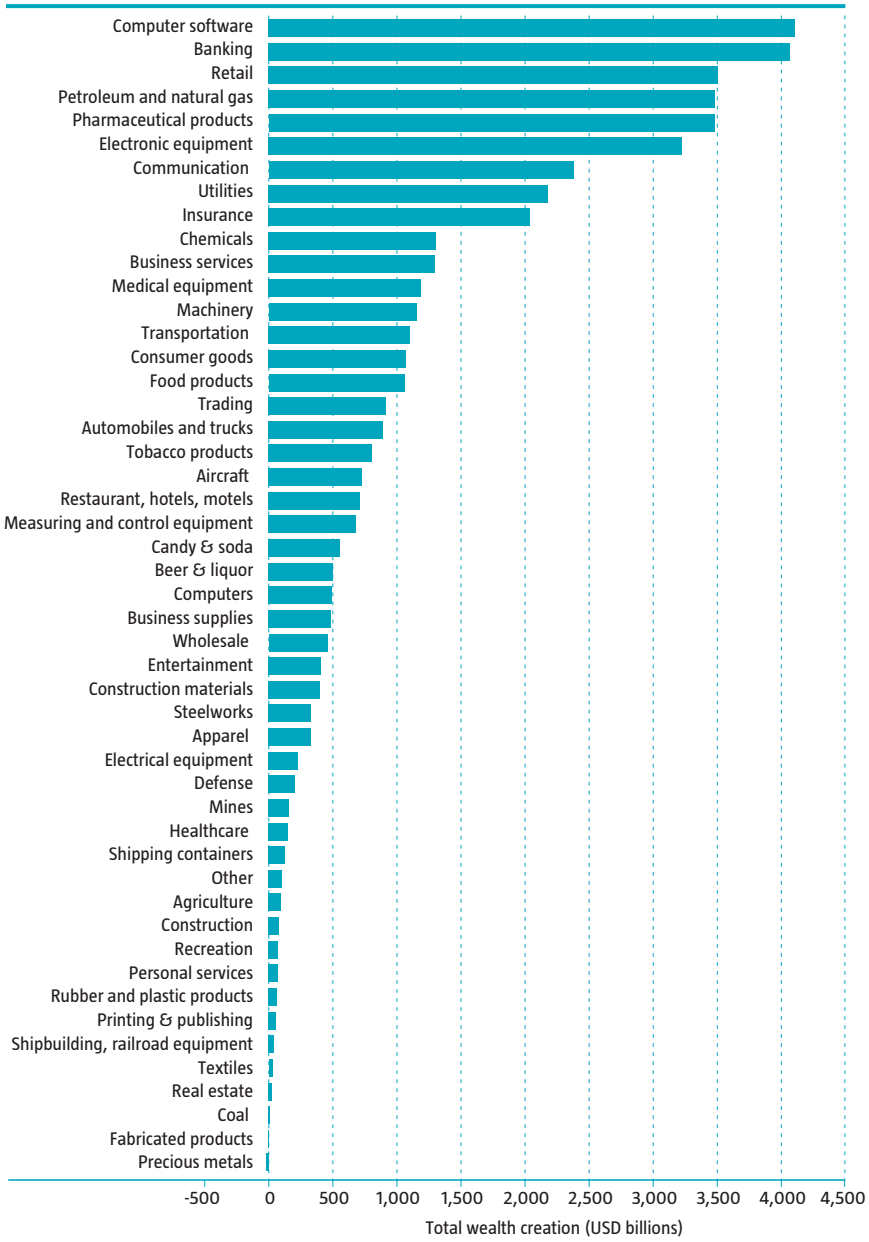
However, industries' fortunes do rise and fall on the rare occasion. The McKinsey study found that industry-moving trends primarily determine movements in economic profit. The emergence of new trends or disruptive innovations might cause long-term tail or headwinds for industries. For example, technological innovations facilitated improvements in internet

speeds and allowed for content to be stored centrally and streamed to customers. As a consequence, companies such as Netflix, Hulu and YouTube started offering video streaming services and have enjoyed tremendous success. At the same time, physical video rental stores such as Blockbuster suffered a structural headwind and eventually disappeared altogether.

To illustrate the differences in industries' fortunes we calculated how much wealth has been created in the past 93 years in each industry in the US. We found that there are large differences across industries. For example, Figure 1 shows that the software industry created USD 4.1 trillion in wealth for investors from its birth in the 1960s until now. On the other hand, the precious metals industry destroyed USD 17 billion in wealth.[9] This shows that not all industries are created equal and that some are more attractive than others over certain time periods. With their rising and falling fortunes, industries can go through lifecycles of their own.

9. All dollar wealth figures have been adjusted with a future value factor that translates dollar wealth created in the past to current dollar wealth. Thus, wealth creation from the past is directly comparable with current wealth creation.

Figure 1: Wealth creation by industry in the United States from 1926-2019



Source: CRSP, Robeco. Market: US. Time period: 1926-2019.

Trends can shape the fortunes of industries

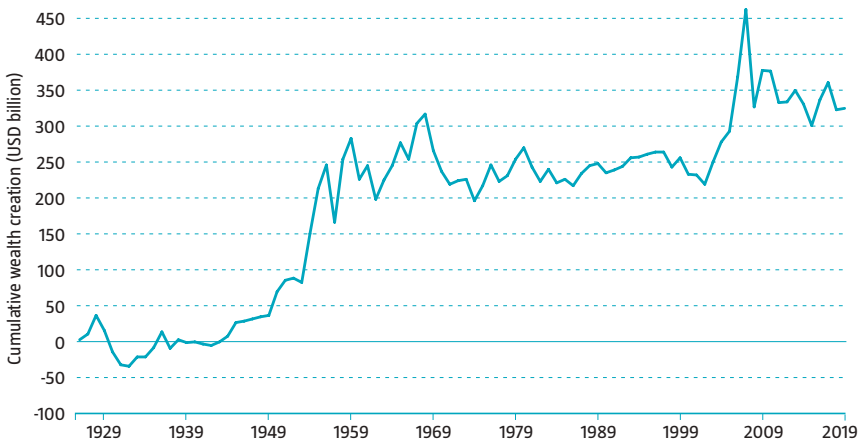
Industries' fortunes are influenced by socioeconomic trends such as socio-demographic change, policy-driven change and technological change. Socio-demographic change relates to changes in slow-moving and predictable patterns in society's dynamics and behavior. For example, aging populations or increasing urbanization. Policy-driven change encompasses changes to laws and regulations from governments or industry-specific institutions. For example, increased regulation in the financial and healthcare sector or government policy stimulating electric driving. Technological change relates to innovation and the adoption of new technologies among businesses and consumers. For example, digitization, automation and hyper-connectivity. Given their likelihood of influencing long-term equity returns, we believe it is important for investors to understand the trends that are shaping the fortunes of industries.

First, trends can cause industries to remain attractive by providing a long-term tailwind of growth and sustained profitability. Secondly, trends can also destroy the fortunes of an industry by making the business models or products sold by companies obsolete or less attractive. Thirdly, trends can positively influence the fortunes of an industry by facilitating new business models and profitable growth opportunities. Industries and companies go through lifecycles of creating wealth, stagnation and destroying wealth for investors and economic value creation.[10] Our contention is that long-term trends are an important underlying force driving the process of wealth creation, stagnation and destruction.

'Long-term trends are an important underlying force driving the process of wealth creation, stagnation and destruction'

Trends can accelerate or decelerate the birth, growth, maturity and decline lifecycle industries go through. A good example of this is the steel industry, which from 1945 to 1960 went through a wealth-creating period. Global demand for steel was high due to rapid population growth and the rebuilding of a war-torn world while supply was limited as many steel mills had been destroyed. However, from 1960 through 2000, demand and supply were more in balance and wealth creation in the steel industry was stagnant. The industry experienced a brief period of wealth creation from 2000 to 2010 due to the rapid economic expansion of China but has since stagnated again. As a necessary material for numerous goods, the steel industry will probably not disappear, but it has definitely declined in relevance in the economy.

Figure 2: Cumulative wealth creation by the steel industry



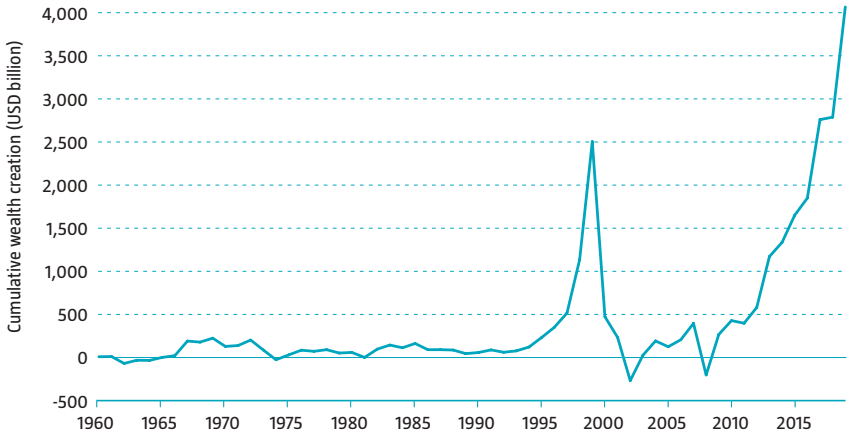
Source: CRSP, Robeco. Market: US. Time period: 1926-2019.

Another example is the software industry, which started to create enormous amounts of wealth for investors during the 1990s, some 30 years after its birth. Throughout the decade, the internet gained traction and growth was widespread. However, most companies had

10. With respect to economic value creation, see: Bergakker (2019).

little substance apart from dotcom in their name. Consequently, all wealth created in the previous decade was quickly destroyed when the dotcom bubble burst. However, in 2010s, software matured and found widespread adoption among consumers and businesses, disrupting many other industries. Consequently, the software industry once again created a vast amount of wealth for investors.

Figure 3: Cumulative wealth creation by the software industry



Source: CRSP, Robeco. Market: US. Time period: 1960-2019.

Go fishing among survivors and pick the ones that are thriving

The length of a company's lifecycle and its survival play a crucial role in the observation that equity returns are so skewed over the long term. The math is quite straightforward: a stock that survives over a long period can compound returns and produce exceptional shareholder value. The median length of time a stock is listed on the stock exchange is eight years. In such a short time period, it is quite difficult to compound returns and create a significant amount of wealth. We observe that the length of a stock's life is an important determinant of its lifetime buy-and-hold return.

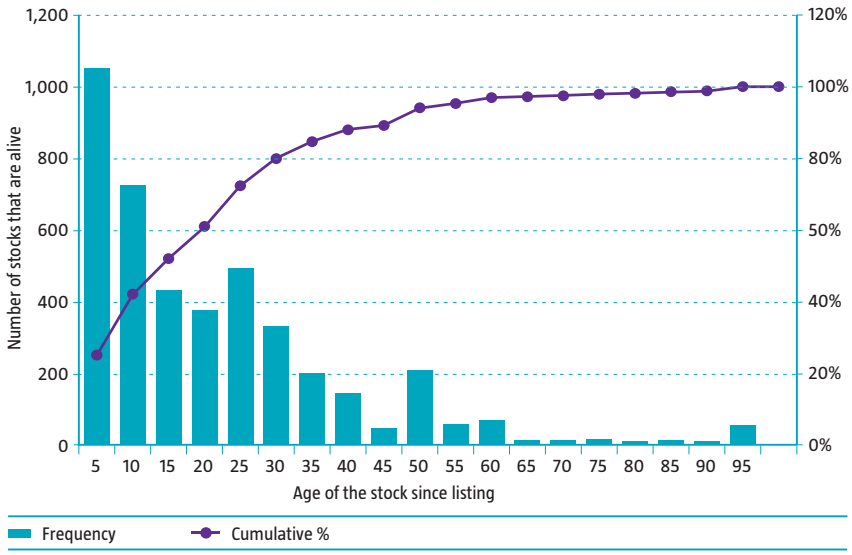
Figure 4: Older stocks have higher annual returns because they fail less often

Source: CRSP, Robeco. Market: US. Time period: 1926-2019.

Figure 4 shows that in the US stock market, the median stock's lifetime buy-and-hold stock return is negative for the youngest 60% of stocks. Only the top 40% oldest stocks have a positive median lifetime buy-and-hold return. In addition, only 20% of all stocks that have ever been listed in the US are still alive and many of them are relatively young stocks. Stocks have a relatively short lifespan (see Figure 5): before the age of ten, more than 60% of stocks have already disappeared from the stock market, as Figure 6 shows. Therefore we believe it is crucial to take into account the long-term prospects of a company in terms of competitive advantage, growth opportunities and profitability. In our opinion, industries and companies with a tailwind from a long-term trend often have more profitable growth opportunities and are more likely to survive.[11]

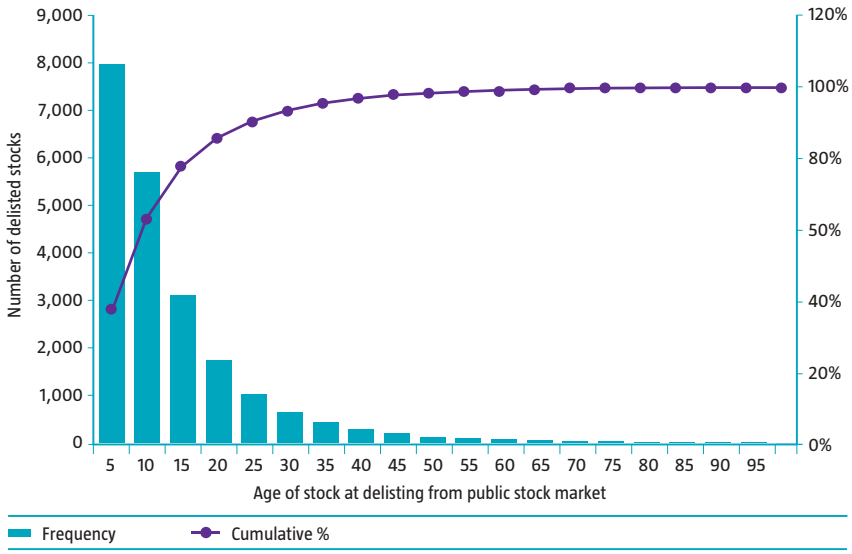
11. Survival can manifest itself on a stand-alone basis or within another company after a merger or acquisition. In fact, many small companies get taken over before they can reach a significant size and generate large amounts of shareholder wealth.

Figure 5: Most currently listed stocks are relatively young



Source: CRSP, Robeco. Stock market: US. Time period: 1926-2019.

Figure 6: A large number of stocks delist relatively young



Source: CRSP, Robeco. Stock market: US. Time period: 1926-2019.

The winners keep on winning

Bessembinder's recently updated research on wealth creation shows that the phenomenon of concentration has existed since we started being able to measure it.[12] However, in the last 25 years, the concentration of wealth creation has increased significantly. When comparing the average concentration of wealth creation over three-year periods before 1995 to the three-year periods after 1995, we see an increase of some 75 to 100%. At the same time, the percentage of companies that created wealth was roughly the same at 50%, which means that half of the companies on the stock market destroy wealth for investors.

12. Bessembinder (2020)

In addition to increased concentration, the composition of the top wealth creators has also changed dramatically. In the pre-internet era, vertically integrated capital-intensive businesses dominated the stock market. However, with the advent of the internet and adoption of the smartphone, a new class of businesses has emerged as the main driver of wealth creation in equities.

Table 1: Top wealth creators before 1995: predominantly rely on tangible assets

Company	Wealth creation (USD millions)	% of total wealth creation
Exxon Mobil	520,146	3.73%
General Motors	457,330	3.29%
AT&T	418,182	3.00%
General Electric	320,905	2.30%
Du Pont	263,197	1.89%

Source: CRSP, Robeco. Market: US. Time period 1926-1995.

Table 2: Top wealth creators from 1995 onwards: predominantly rely on intangible assets

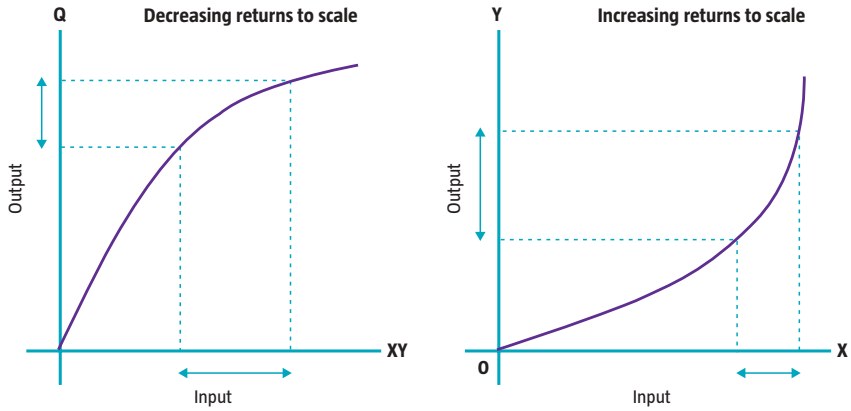
Company	Wealth creation (USD millions)	% of total wealth creation
Apple	1,643,878	4.59%
Microsoft	1,357,223	3.79%
Amazon	865,346	2.42%
Alphabet	718,434	2.00%
Exxon Mobil	505,472	1.41%

Source: CRSP, Robeco. Market: US. Time period 1995-2019.

We believe that inherently different economics are at play in the business models of the recent top wealth creators. Classic economics is based on the concept of diminishing returns: companies or products that get ahead in the market run into limitations, face increased competition, and as a consequence a predictable equilibrium in market shares and prices is reached. That theory more or less applies for companies that produce tangible goods such as Exxon Mobil, General Motors, and General Electric. These companies predominantly supply tangible rivalrous goods, where the consumption by one consumer prevents simultaneous consumption by other consumers. Naturally, production capacity in the form of factories and supply chains must scale with consumption of the goods they sell.

However, companies operating in a digital world supply mostly intangible non-rivalrous goods. For example, one app or operating system can be used by a multitude of consumers. Instead of diminishing returns, economics shift to increasing returns: the tendency for that which is ahead to get further ahead.

Figure 7: Decreasing/increasing returns to scale



Source: Robeco. September 2020.

Economist and complexity thinker W. Brian Arthur[13] laid the academic groundwork for the economic theory of increasing returns in the 1990s. His theory can be observed in practice when looking at the dominant businesses of today. For example, network effects at Facebook and software lock-ins at Microsoft are, in our opinion, typical examples of increasing returns. The marginal costs of production and distribution are negligible for these companies once they reach a critical size, converging to almost zero and they do not suffer from decreasing marginal benefits – revenue per user does not go down. In fact, with strong network effects this can even increase as the network gets more relevant for users as more users join.

13. Arthur (1996)

Expanding marginal benefits and compressing marginal costs are the recipe for increasing returns. As a result, instead of market equilibria with numerous players, we observe markets with winner-takes-most dynamics. Examples are intangible-rich products and services such as digital advertising, social networks and operating systems. Without technological innovations such as the internet that have propelled our world into an increasingly digitalized one these business models would not have been possible. Therefore, it is our belief that socioeconomic trends such as technological changes are crucial for investors to understand as they can influence which companies become the dominant wealth creators in the future.

Investment implications: what the past teaches us about the future

In the previous chapters we have picked up a number of valuable lessons from which we can distill an outlook for the future. We expect long-term equity returns to remain skewed and wealth creation concentrated. Average long-term equity returns might look unenticing given high valuations and an uninspiring macroeconomic outlook, but history has shown averages to be highly deceptive. There will likely be pockets of attractive returns that are supported by longer-term trends.

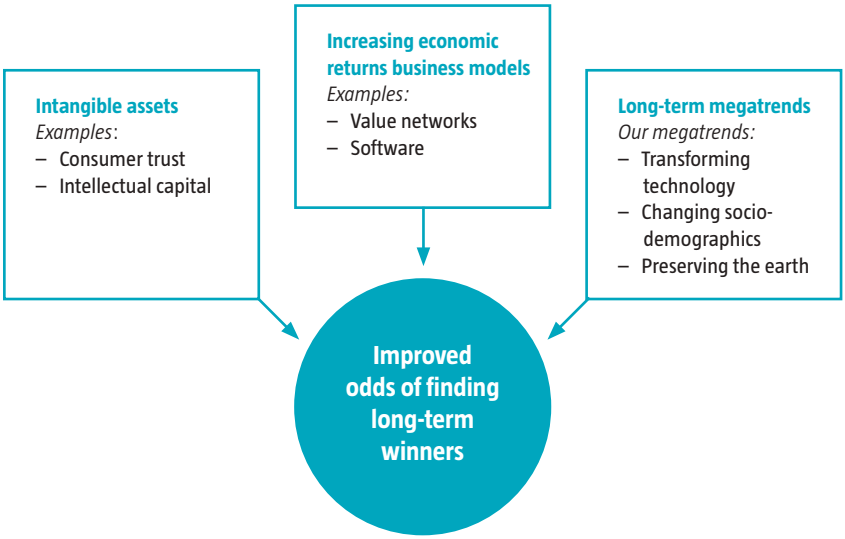
The changing composition of the top wealth creators and the economics of increasing returns displayed by some dominant business models might lead us to some of those pockets with attractive returns. In our outlook we believe that intangible assets will be the main engine of economic profit and wealth creation in more and more industries. Hard-to-replicate intangible assets such as intellectual capital obtained by research & development and consumer trust built on strong brands allow companies to build lasting competitive advantages. Research-and-development intensive industries such as pharmaceuticals, biotechnology and technology hard- and software are areas where

companies can get ahead by building intellectual capital. With respect to customer trust, consumer and business services industries such as software, internet software, financial services and professional services pass the test. We believe investors can improve their odds of finding the winners by fishing in these fertile pools and focusing on business models with increasing returns such as the ones found in network businesses.

Do you feel the breeze? Enjoying the tailwind of megatrends

By combining this approach with an understanding of long-term secular trends, investors can improve their odds even further. We have identified three megatrends that will shape the future and are likely the place where we can find the winners of tomorrow: transforming technology, changing socio-demographics and preserving the earth. These trends are determined by technological, demographic and policy-driven changes that are likely to shape our world in the years to come. The trends we have identified are high-level secular changes that play out over long time frames. Most trends can be broken down into lower-level sub-trends that play out over shorter time intervals and add an element of dynamism to the higher-level megatrends.

Figure 8: Finding long-term winners with a trends tailwind



Source: Robeco. September 2020.

We expect our three megatrends to impact several industries disproportionally in the coming years or even decades. For example, as a 'transforming technology' sub-trend, digital innovation is likely to impact the entire business world and especially finance, banking and retail. Another example comes from the 'changing socio-demographics' trend. With an aging population and more awareness for healthy living, the pharmaceutical, medical equipment and food products industries are likely to be impacted. Regarding 'preserving the earth', the collective effort of governments, companies and consumers to slow down or stop global warming is likely to impact the petroleum, utilities and transportation industries.

In our investment strategies we translate the identified trends into a portfolio of companies that are significantly exposed to those trends, but also well-positioned to create economic value from them. For example, in the 'transforming technology' trend we expect consumer behavior to become more digitized leading to growth in gaming, e-sports and streaming services related companies. Within the 'changing socio-demographics' trends we expect

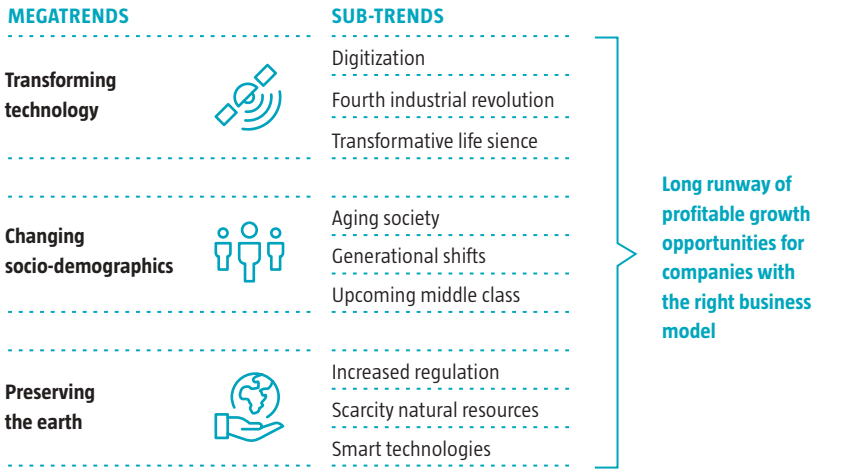
growth in companies with strong brands that speak to the mind of a rising middle class in emerging markets such as China and India. In the 'preserving the earth' trend, we expect companies active in electric mobility, water treatment and recycling to have a growth tailwind.

Adding a tool to the investors' toolbox: trends investing

Long-term winners are scarce, equity returns are skewed, valuations are unenticing and the macroeconomic outlook might be bleak but attractive pockets of returns do exist. Combining the growth tailwind of a megatrend with a business model that can monetize its potential and strong competitive advantages is likely to improve investors' odds of finding the long-term winners.

We believe exposure to industries and companies that are able to create substantial economic profit from megatrends is a valuable addition to investors' portfolios.

Figure 9: Three megatrends are shaping the world



Source: Robeco. September 2020.

Covid-19

We recently published a review of our trends and sub-trends that addresses the impact of Covid-19 which can be found on the Robeco website. The trends we have identified are high-level secular changes that play out over long time frames. Therefore, we believe the Covid-19 pandemic will not derail or stop the trends that are embedded in our investment strategies. The crisis could even accelerate the impact of trends such as digitalization through increased adoption of cashless payments and growth of e-commerce.

3

Expected returns 2021-2025

> ‘Only a few know, how much one must know to know how little one knows.’
>
> **Werner Heisenberg**, quantum physicist

Macro

It is telling when some 200 PhD economists, employed at one of the leading global institutions, throw in the towel. This is essentially what happened when the IMF decided, in its April World Economic Outlook, not to make any economic projections beyond 2021. A recognition of the fact that we are living in exceptional times of macroeconomic volatility. Heisenberg’s uncertainty principle is a useful analogy for these circumstances: here, too, is a fundamental limit to the precision with which the values for certain economic pairs can be predicted from initial conditions. Apparently, IMF economists decided this fundamental limit had been reached in April, citing “the high level of uncertainty in current global economic conditions” as a reason for not making economic projections five years into the future.

We all know what those initial conditions are. With the Covid-19 pandemic, the global economy has been confronted by an exogenous shock posing a policy-induced simultaneous supply and demand shock. The economy subsequently experienced the deepest recession since the Great Depression, with global output expected to contract by almost 5% in 2020. This is far from the rather mild 'smörgåsbord' type of recession expected in our most recent five-year outlook. So much for predictions.

This may be one of the shortest recessions of the past 100 years, but it is also the most severe – the dust has far from settled. Admittedly, the signal-to-noise ratio regarding a five-year global outlook is very low. The noise emanates from the nature of this recession: this is primarily a health crisis, which does not fall within the expertise of economists but virologists. As long as the health crisis remains unsolved, the near-term economic recovery path is at the mercy of the erratic pendulum of virus flare-ups and die-downs.

Lockdown has been the default policy choice, even from an economic point of view. The concept of a trade-off between saving lives through lockdowns and the economy is a half-truth. One study by Greenstone and Nigram (2020) used the age-specific, US Value of Statistical Life model, and found that US lives saved through social distancing were valued at over 1/3 of US GDP. What is more, the Swedish experiment to keep the economy open revealed this approach didn't lead to economic immunity from Covid-19 either. While their GDP declined less dramatically than that of other regions that went into lockdown, their Q2 2020 still recorded the worst quarterly GDP in Swedish history. The fact of the matter is, irrespective of lockdowns, people's behavior changes when they run the risk of contracting a potentially deadly virus.

Last year, we deemed the interplay between fiscal and monetary policy as crucial for the states of world which might unfold: "The monetary policy space – and increasingly so, the fiscal policy space, too – provides the building blocks for the states of world we deem likely and the interplay between these two policy tools is a common thread throughout our scenario thinking. The quest for policy space will remain a key focal point for the next five years."

This interplay is still a key element for global recovery in the next five years, but has now become an insufficient measure for gauging the direction in which we are headed. Impacted by the exogenous shock posed by Covid-19, the economic landscape has grown more complex and initial conditions have worsened dramatically. The mild 'smörgåsbord' recession we anticipated last year could have been relatively easily solved with 'standard' aggregate demand management, encapsulated by the envisioned interplay between fiscal and monetary authorities.

Today, we are confronted with a crisis that is anything but mild and far more complicated and far reaching, having generated the worst quarterly GDP numbers in the US since the Great Depression. In fact, at the time of writing, US unemployment numbers are still above the peak levels observed during the global financial crisis months. A more layered mental model is now needed to assess future states of world.

At the current juncture, we believe there are several overlapping and interdependent building blocks that will determine the state of world in the next five years.

1. Solving the health crisis
2. Providing crisis relief
3. Implementing aggregate demand management
4. Addressing policy coordination failures further down the road

The following sections will provide a short introduction as to why these building blocks matter. They will then be incorporated in our subsequent macro scenario analysis.

3.1 Building block 1
Solving the health crisis: a risky squeeze of clinical trial time

Common sense dictates it is essential to solve the current health crisis in order to return to a stable economic equilibrium and a 'new normal'. A vaccine is needed to develop herd immunity to Covid-19 so that lockdowns can be avoided, releasing the economy from the pandemic's grip. Vaccine development is highly complex, as a potential vaccine must clear several clinical trial phases.

Figure 3.1: Stages of vaccine development

1. Virus analysis
What causes the body's immune response to the virus infection?

2. A vaccine is developed
Which components should go into the vaccine?

3. Animals trials
Focus on effectiveness and tolerance

4. Human trials
Vaccine is tested on volunteers over different stages

5. Approval
EMA* or FDA* give go-ahead for vaccine

6. Mass production
Vaccine is produced for general population

Source: www.vfa.de. Accessed on July 2020 | * European Medicines Agency and US Food and Drug Administration

With a pandemic raging on, the critical sequential studies for human clinical trial trajectories (stage 4 in the graphic) are being shortened and squeezed. Within stage 4 a first, initial test to see whether using a vaccine is safe at all, regardless of its efficacy. This is followed by the vaccine being administered to a larger group of people, and in the final phase of human trials it is administered to an even larger group (usually between 1,000-100,000 people).

Although a number of promising advances have been made in human clinical vaccine phase 2 trials, at the time of writing, one crucial aspect could easily be overlooked. That is its efficacy among the elderly, who are the most vulnerable. This must be taken into account when headlines announce the arrival of a new and successful vaccine. As Calina et al. (2020) note: "Global immune deficiency is a risk factor for anti-Covid-19 vaccine efficacy,

particularly in elderly who have been exposed to a myriad of factors that contribute to weakening of the immune system". This risk factor means a potential vaccine could show a high efficacy in the working age population, but be ineffective in protecting the elderly. This has economic ramifications: i.e. a persistent aversion among the (often wealthy) elderly to fully participate in economic life as consumers of in-person services, even when a vaccine has proven to be effective for global citizens of a median age.

There are lots of other uncertainties concerning the efficacy of a vaccine. Even though the Covid-19 virus seems less prone to mutations than the common flu, if it does mutate, vaccines will need to be re-engineered. It is also very contagious compared to the common flu, and therefore likely to never completely vanish, even if an effective vaccine has been developed. The last stage in vaccine development – mass production and distribution – is a huge challenge as well. Hundreds of millions of vaccine samples will need to be produced via a process that usually takes up to at least six months and must make allowance for typical production errors. McKinsey reports that production capacity for 2020 is around 1 billion and can be increased to 9 billion in 2021.[1] Lastly, vaccination rates may not be sufficient to create herd immunity. As the Harvard Global Health Institute Director recently remarked: "It's not a vaccine that will save us, it is vaccination". Recent polls, at the time of writing, show that only 42% of those in the US plan to get vaccinated.[2]

For now, the health of the global economy seems to be closely tied to the availability of a Covid-19 vaccine. This link may be loosened if effective treatment becomes available, if immunity from infections increases or if the virus mutates so that it becomes less contagious.

1. https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/on-pins-and-needles-will-covid-19-vaccines-save-the-world

2. https://news.yahoo.com/yahoo-news-you-gov-coronavirus-poll-number-of-americans-who-plan-to-get-vaccinated-falls-to-42-percent-a-new-low-162000936.html

3.2 Building block 2
Crisis relief: avoiding a liquidity vacuum

As the economy ground to a sudden halt, governments and central banks have pulled all stops. Fed President Powell once said, "An ounce of prevention is worth a pound of cure", and indeed pounds of cure have been administered by central banks in the wake of the huge exogenous Covid-19 shock. The pace and size of these have far exceeded that of the dose following the global financial crisis. With debt at record levels around the world, central banks are unwilling to cure a debt deflation cycle before having first done everything possible to prevent one in the first place.

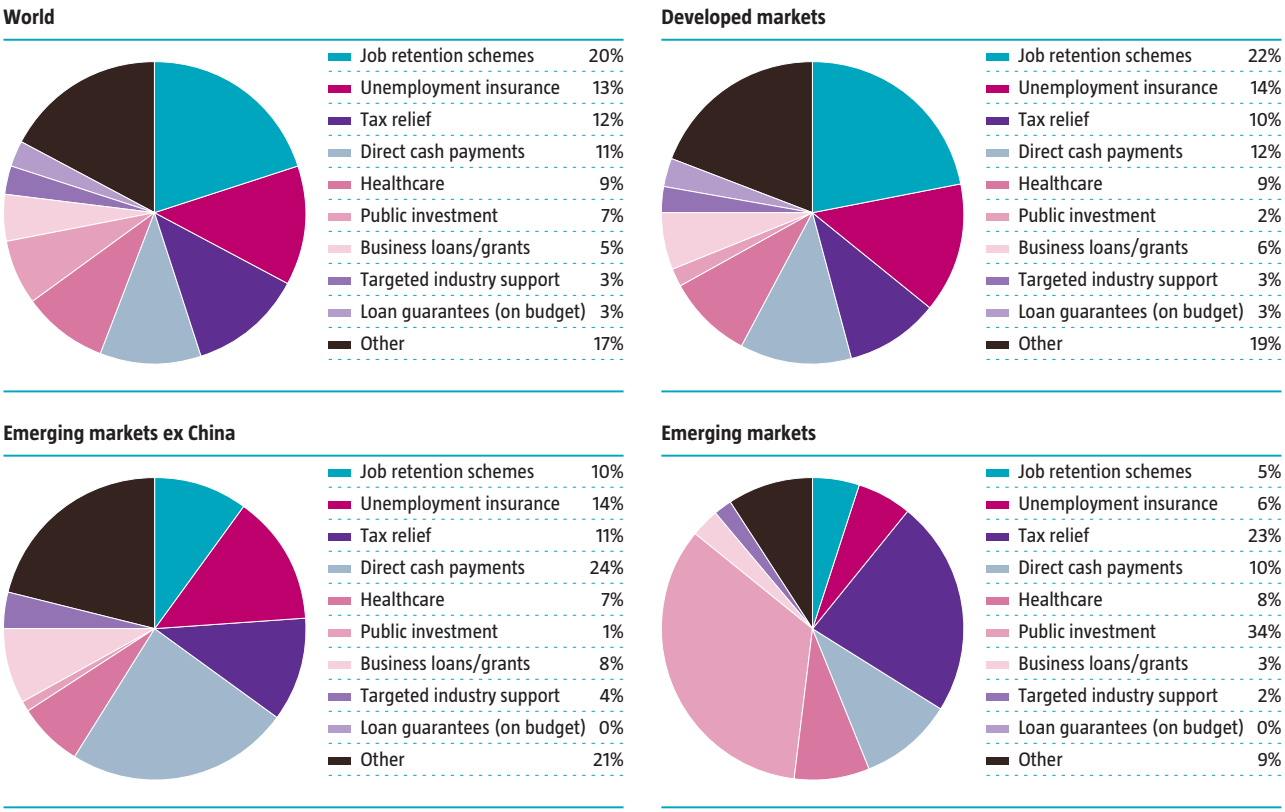
Developed market central banks have lowered their policy rates to levels close to the effective lower bound and massively expanded their balance sheets by unleashing a plethora of facilities. In the US, the Fed has created no fewer than nine new facilities to support liquidity and the flow of credit, including the primary market corporate credit facility to purchase new bonds and loans from companies. The focus on liquidity provision and easing financial conditions has effectively restored confidence in the functioning of markets after a couple of very turbulent weeks in March 2020.

From a central government perspective, not only have automatic stabilizers kicked in, but discretionary measures have been taken in unprecedented speed and size. The fiscal impulse now amounts to 5% of global GDP, diminishing the post global financial crisis response of around 1.5% of global GDP. Furthermore, the composition of the fiscal impulse is currently tilted more towards liquidity provision, with a sizeable chunk of government outlays going to direct cash payments and job retention schemes, spending categories that were virtually absent in the aftermath of that earlier crisis. These measures are aimed at addressing immediate needs. Around 20% of government emergency response has gone to

job retention schemes as this time, low-skilled labor in rural areas has been at the epicenter of the storm. This is sound crisis management. Preventing further structural damage to the labor market will allow the economy to recover faster once the health crisis is contained.

From a crisis relief perspective, though, challenges remain. By definition, relief programs are temporary. If the virus lingers for longer, liquidity support could dry up before the virus is beaten, creating a fiscal cliff effect. This could materialize as both fiscal and monetary space diminish. While avoiding this liquidity vacuum is key, monetary policy has already hit the zero-lower bound in many countries, except emerging economies. As we lay out in our special, central banks are wary about wading deeper into negative interest territory. The offsetting power of monetary policy for lapses in fiscal stimulus packages could diminish over time, though as we stated last year, one should never underestimate the power of unconventional monetary policies. Conversely, the same counts for fiscal policy as well.

Figure 3.2: Breakdown by fiscal stimulus



Source: UBS estimates. 29 July 2020.

3.3 Building block 3
Aggregate demand management: the tango between an active government and a passive central bank

In the previous section, it became clear that the extent to which central banks and governments can continue to fill the pandemic-induced income gap is uncertain. There is a potential duration mismatch between the exhaustion date economic buffers become exhausted and the date Covid-19 becomes extinct (if ever), both in the private as well as public sector.

The effectiveness of pursued government policies could become a big differentiator. As we said last year, "Monetary authorities can't eliminate the savings glut and they can't change consumer risk aversion in an environment of skyrocketing political uncertainty. Central bankers can't tweak factors like a lower degree of unionization, declining bargaining power for workers or the fact that global value chains have made domestic inflation more sensitive to global output gaps."

Here, aggregate demand management comes into play. In last year's publication, we credited governments as better equipped to move these crucial macro parameters than central banks, which have been too central. However, with Covid-19 likely to impact consumer and producer confidence profoundly for longer, it is questionable whether even governments are able to shift the key parameters of the global economy. What is clear, though, in the immediate aftermath of the Covid-19 shock, is that there should be far less doubt about governments' willingness to move the needle.

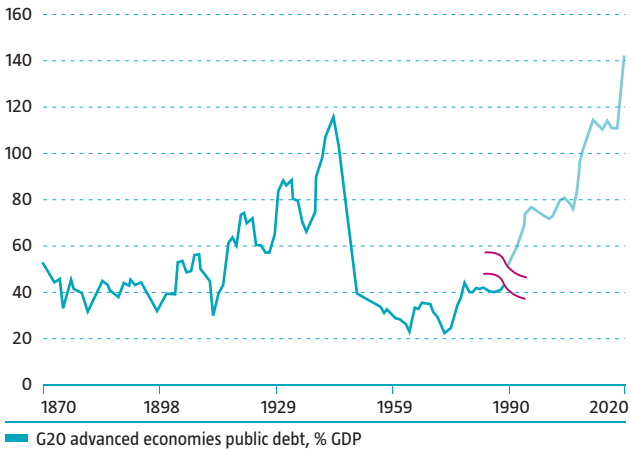
The big test ultimately is whether a larger government footprint in the economic landscape will move the economic recovery towards a self-sustaining, more durable and greener one. To achieve this in a world with record-high global debt to GDP levels requires a facilitator.

Last year, as we penciled in a recession in all three scenarios, we mentioned the increasing role of the interplay between monetary and fiscal policy in the aftermath of a recession. "The monetary policy space – and increasingly so the fiscal policy space, too – provides the building blocks for the states of world we deem likely and the interplay between these two policy tools is a common thread throughout our scenario thinking. The quest for policy space will remain a key focal point for the next five years."

This interplay is now unfolding at a fast pace, with central banks acting as fiscal financiers for governments. Central banks will take up that role of facilitator in the next expansion, playing second fiddle to the fiscal-authority soloist that is most closely watched by the audience.

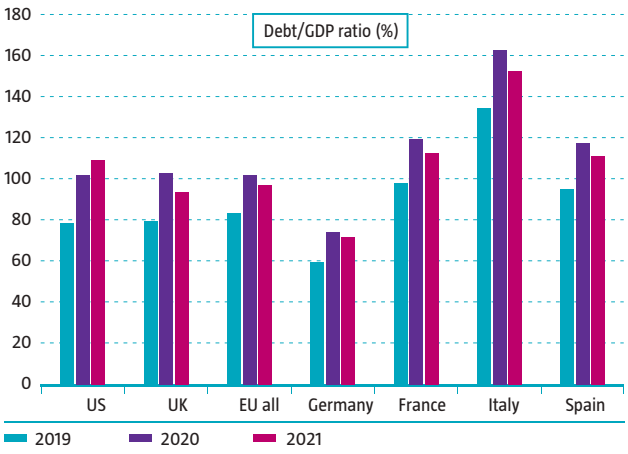
By keeping policy rates low and buying government bonds in the secondary market for the foreseeable future, government debt sustainability will be maintained, as long as debt service (r<g) exceeds rising fiscal deficits in the long run.

Figure 3.3: Public debt is likely to rise beyond WW2 levels for the advanced G20 economies



Source: IMF, Barclays Research. Note: There is a structural break in the IMF data in 1991.

Figure 3.4: Regardless of the starting point, the fiscal profile is likely to worsen dramatically across major advanced economies

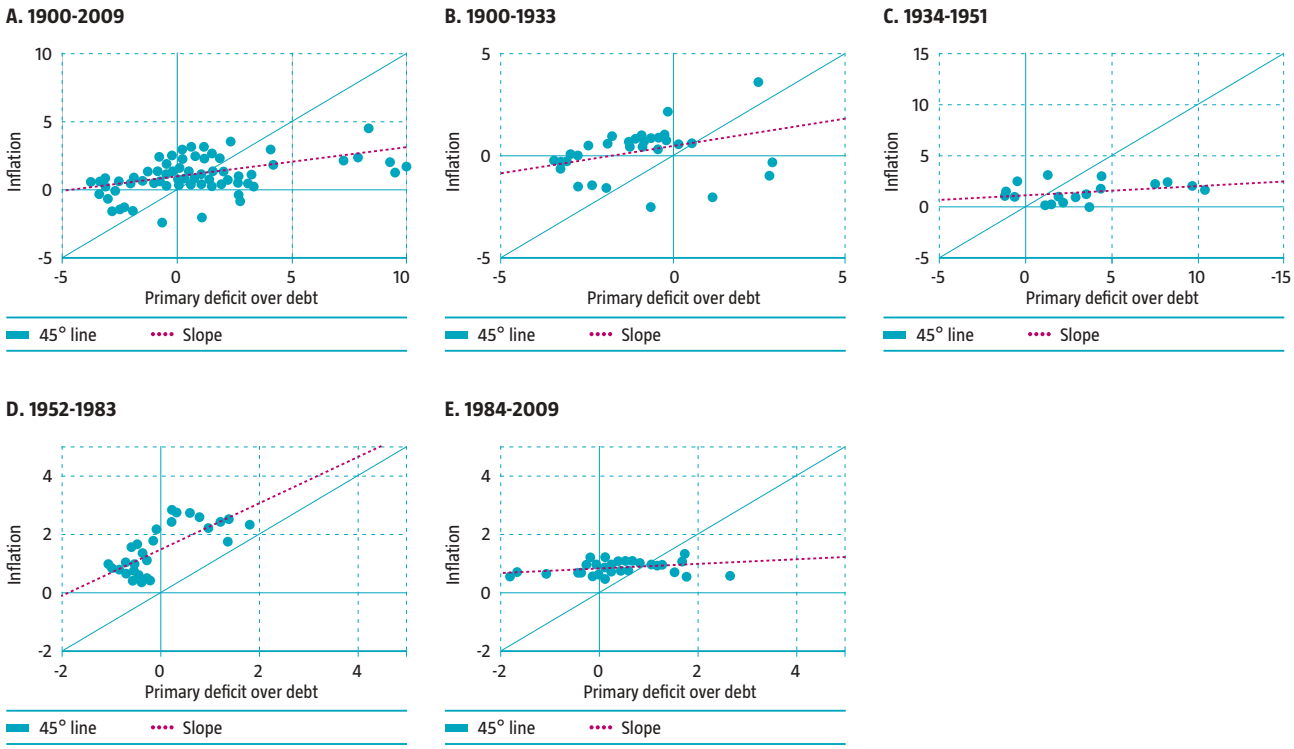


Source: CBO, OBR, Eurostat, Barclays Research

A body of literature suggests that fiscal multipliers are typically higher when monetary policy is at the effective lower bound (e.g Farhi 2016). In order to have real rates low enough to trigger a self-sustaining recovery, fiscal stimulus must coincide with higher inflation. The ability of fiscal stimulus to induce inflation is a key element to watch in the next five years.

History shows that episodes of rapid government debt expansion have been inflationary. The relationship between higher primary deficits and inflation was especially outspoken in the 1970s. Clarida et al. (2000) and Lubik and Schorfheide (2004) associate this decade with an active fiscal and passive monetary policy regime that hardly responded to inflation.

Figure 3.5: Scatter plots of filtered time series (ß= 0.95) of inflation and primary deficits over debt



Source: Deutsche Bundesbank

One important variable that determines the inflation outcome is the degree of Ricardian equivalence at work. As John Cochrane of the Chicago Business School neatly elucidated in this respect, back in 2009:

"To inflate, the government also has to make it clear that it will not pay back new debt. If we expect that debt or money will be retired with future taxes, then there is no great incentive to go out and spend to get rid of either. Only if it's clear the debt or money will soon be inflated away does it make sense for people to try to get rid of money or debt now, and go out and buy."

Looking back at the previous expansion phase, we have seen the most subdued US consumption recovery path of the post WW-II era and a move towards fiscal austerity propagated by the IMF in the aftermath of the global financial crisis. Both show that Cochrane probably had foresight in this respect.

So, the paradoxical lesson learned by governments from the global financial crisis is to behave less responsibly in order to take more responsibility for the economic recovery (and they did learn their lesson, looking at the increase in fiscal impulse now compared to the previous crisis). But this can only be effective if central banks, in their role as fiscal financier, behave less responsibly as well. As we wrote in last year's Expected Returns, "The problem central banks have faced in achieving their self-imposed inflation targets may be down to credibility: the market rightly does not believe central banks would be irresponsible enough to stay accommodative permanently and allow inflation to overshoot."

Things are clearly on the move on this front, with central banks not thinking about, or even thinking about thinking about, raising rates and an increasing shift towards inflation averaging, indicating an increased tolerance for a sustained future inflation overshoot. In short, a more passive stance with regard to one aspect of the dual mandate. A policy regime change might be underway, best understood by picturing a tango between an active government and a passive central bank.

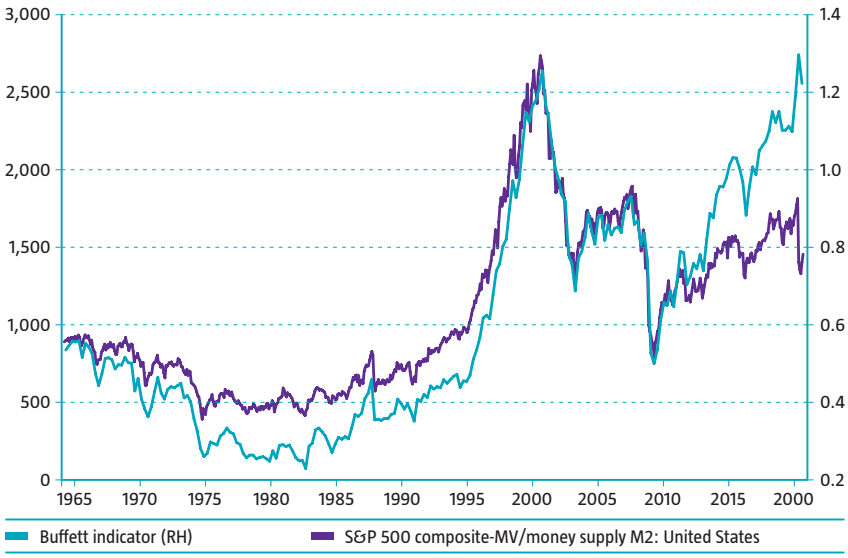
At the time of writing, we also face additional uncertainty concerning the path of fiscal stimulus in the US economy as a result of the US elections. If Trump is re-elected and the Senate remains Republican, it is likely that fiscal stimulus will be a dominant part of the policy mix. If we get a Democratic sweep with Biden as president with also a Democratic Senate, fiscal stimulus could well be even more outspoken. The third scenario sees Mitch McConnell still in charge of a Republican Senate majority and a Democratic president in the White House. This could spell trouble for effective policy stimulation, with Republicans suddenly reverting to deficit hawk behavior, given strong bipartisan sentiment.

3.4 Building block 4
Addressing policy failures

In the midst of a crisis, action is better than inaction for policymakers. Yet, as the IMF's former chief economist Olivier Blanchard said, there inevitably comes an "Oh my, what have we done" moment as the legacy of the crisis becomes visible. The Covid-19 crisis will no doubt echo history in this respect, with a debate already raging about whether extending overly generous unemployment benefits creates moral hazard risk, encouraging people to stay at home instead of looking for work. Governments being more involved in free markets could also hamper the 'survival of the fittest' element that naturally weeds out unproductive zombie companies. With production resources locked in in low-innovation companies, the long-term productive capacity of an economy suffers. Almost any solution to the negative supply side shock posed by Covid-19 could reinforce problems – supply side related or otherwise – of its own.

This issue should be paid attention to in the next five years, and is an element in our scenario thinking. The most obvious problem already present is the Fed overdoing it, creating an unsustainable divergence between financial markets and fundamentals. The market value of the S&P 500 has been rising much faster compared to GDP than compared to money growth, illustrating the phenomenon of accelerating asset price inflation unable to materialize in a proportional boost for economic activity.

Figure 3.6: Diminishing returns to QE: increasing disconnect between asset inflation and GDP growth



Source: Refinitiv Datastream, Robeco

3.5 Base case

Credible fiscal financiers

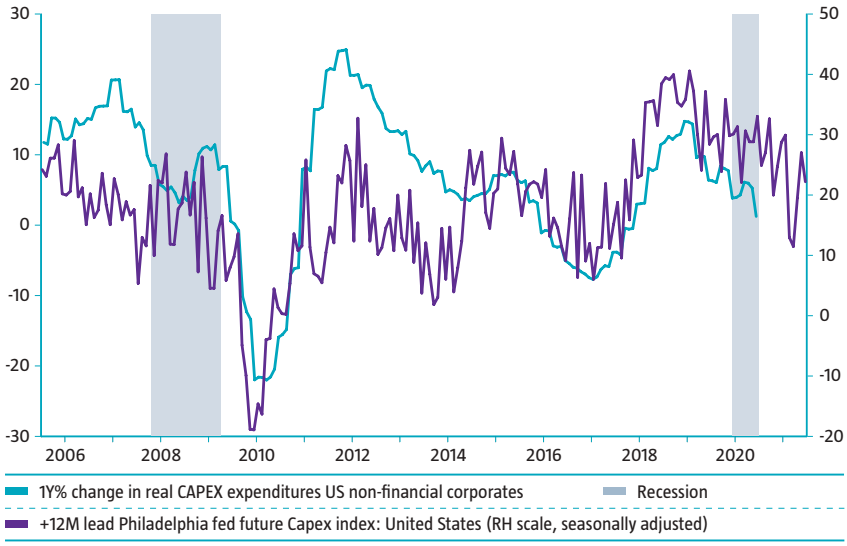
In this first possible scenario, the global economy leaves the Covid-19 recession behind. Massive stimulus aimed at crisis relief prevents another relapse into recession and outright deflation. While this supports the financial economy by freeing up liquidity and easing financial conditions, the seesaw between local lockdowns and reopening keeps the real economy struggling. Meanwhile, the frantic race for a vaccine continues.

An environment of exceptionally high macroeconomic volatility only starts to fade during the course of 2021, for two reasons. First, the policy trade-off between saving lives and keeping the economy afloat is eased as the death rate per capita diminishes, thanks to improved treatment on the one hand and politicians staying in spending mode on the other. This latter trend is caused by the rise in structural unemployment and the dislocation build-up in the labor market increasingly worrying politicians.

Secondly, an effective vaccine is ready for distribution for selected risk groups in early 2021. This news causes a big upward shift in consumer sentiment, although issues around distribution (means versus needs), efficacy, and enforcement of effective vaccination programs cause delays in the eagerly awaited return to a post-pandemic normal. The elderly in high-income cohorts are especially affected. Global economic activity rebounds above trend growth in 2021 as the consumer rediscovers the joys of shopping malls, but this conceals the cumulative damage done to the supply side when the global economy suddenly shut down in 2020.

It becomes clear that reopening is not synonymous with recovery. Steep declines in capacity utilization rates have resulted in excess capacity from the lockdown episodes and the economic recovery remains incomplete. Corporate capital expenditures bottom out only in late 2021 and the supply-side recovery really starts to take shape in 2022. In this growth-scarce environment, corporates are forced by the market to focus on balance sheet quality; corporate investment activity is lower as a result – but more effective.

Figure 3.7: Recent rebound in CapEx intentions suggests actual bottoming out of CapEx in 2021



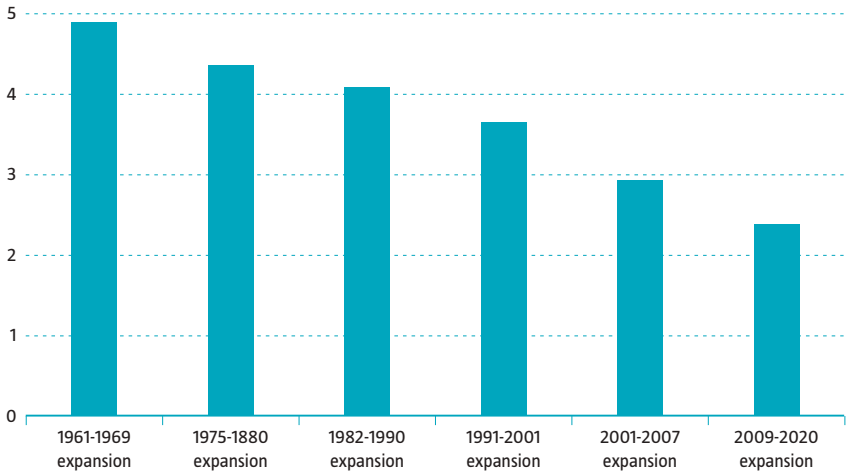
Source: Refinitiv Datastream, Robeco

In the US, official unemployment in 2021 is still nearly as high as it was during the global financial crisis. The gap between actual unemployment and the NAIRU (non-accelerating inflation rate of unemployment) remains as wide as in the second half of 2009. Global unemployment levels do not return to pre-pandemic levels in the next five years. Given that low-skilled labor was at the epicenter of the Covid-19 lay-offs, the drop in unemployment over the following five years could be smaller than in the average expansion phase – it takes time to develop new skills and years of economic recovery (see the 2009-2020 expansion) for marginally attached workers to join the workforce again. The fate of this group will be an important driver of policy in developed markets but also in China, given that the politburo is preoccupied with preventing social unrest due to structural unemployment.

An economy still running below pre-pandemic output levels two years after the 2020 recession is clearly a disinflationary one. Core inflation remains below trend in many developed and emerging economies in the first two years of our projection period, while global productivity growth remains below its long-run trend as well.

In this base case scenario, we expect US real GDP growth levels to take another secular step down the GDP staircase, averaging 1.9% in the next five years. This is consistent with the average 0.4% sequential drop in GDP growth observed during the last five NBER expansions, taking the 2.3% annualized real GDP growth rate seen during the prior expansion to 1.9% in the coming years.

Figure 3.8: US GDP during NBER expansion phases (geometric average annualized growth)



Source: Refinitiv Datastream, Robeco

Other regions follow this drop in post-pandemic expansion productivity growth. Catch-up growth rates in emerging markets drop further on the back of peaking globalization and a lower degree of external technology spillovers. Regions within the Chinese sphere of influence and supply chains benefit from a shift of the high-income Chinese consumer class towards domestic consumption. A secular US dollar bear market that boosts commodity prices and the rise of domestically induced innovation in China are positive growth factors for some emerging markets.

The post-pandemic recovery is lopsided, especially in the first few years. The existing great divide between tech-savvy sectors with a low degree of in-person services and those sectors that lack the leverage of further digitalization opens further. Small corporates, especially those in the leisure and hospitality sector, recover incompletely, with restructurings and defaults lingering for longer, as capacity utilization levels fail to return to pre-pandemic levels in the next five years. In-service sectors catch up significantly after 2022, as Covid-19 vaccines deliver herd immunity, with the global economic recovery becoming less fragmented and asynchronous.

On the aggregate demand side, the consumer recovery is lackluster. As in the expansion following the global financial crisis, precautionary savings remain high, given pervasive uncertainty about employment as the massive dislocation in the labor market lowers worker bargaining power. A declining wealth effect from a cooling housing market adds to lower spending.

Nevertheless, there are three mitigating factors that sustain consumer spending further down the road and prevent a demand-supply doom loop and outright deflation. The first is that households are much more resilient to negative income shocks this time around, especially in the US, having deleveraged substantially during the 2009-2020 expansion. Secondly, government support via wage subsidies and other sources of direct income support become a more integral part of fiscal stimulus and the post-pandemic economic structure. Thirdly, the monetary transmission through the bank lending channel is in better shape than it was following the global financial crisis, with commercial banks now better able to support the consumer recovery via consumer loans, rather than exerting a drag.

Although these factors bode well for pent-up demand in the second half of our five-year outlook, the overarching message is that the paradox of thrift will hang around, due to

Keynesian 'animal spirits' remaining restrained. In Keynes' words, this is "a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities".[3] As social distancing becomes a permanent fact of life, this very spontaneity that could create positive spillover effects for aggregate demand is inhibited. Risk aversion, especially among those in the high-income brackets – reflected in less spending on categories requiring physical proximity or in-person service – remains more pronounced.

3. Keynes (1936)

From a policy perspective, the route towards a self-sustaining recovery as laid out in the introduction plays out fairly well in the base case scenario in the first two building blocks. The health crisis is contained eventually and the crisis relief through massive stimulus proves effective in preventing an even worse situation in terms of the global economy. The third phase, aggregate demand management, will prove more challenging. Policy makers will discover that one may win the war, but that winning the peace is more difficult.

As described in last year's base case, too, the effective interplay between monetary and fiscal policy is key in determining the success of aggregate demand management. In contrast with last year, however, we now see a higher degree of coordination between policy makers in our base case, as the contribution of central banks in the role of fiscal financiers is pivotal in delaying the erosion of debt sustainability.

To paraphrase Powell, central banks won't even be thinking about thinking about raising interest rates any time soon after the worst economic shock since the Great Depression, even with inflation expectations increasing. With disinflationary pressures dominating in the first two years, the classic policy trade-off for central banks between keeping inflation in check and maintaining full employment eases. Central banks focus fully on their new role as fiscal financiers: keeping nominal rates close to the effective lower bound in order to ensure government debt service costs are low enough to facilitate government payouts and the stimulation of aggregate demand. This in turn enables governments to pursue effective fiscal stimulus, spurring real growth and inflation, thereby creating nominal growth rates that further support debt service.

In short, central banks are credible fiscal financiers, resulting eventually in real rates low enough to let governments kickstart the economy and absorb private sector distress. Maintaining debt sustainability via an improved debt service ratio instead of government budget surpluses also allows for a lower degree of government taxation to boost government revenues in the wake of a steep rise in debt to GDP. By issuing more debt, governments with negative-yielding sovereign debt even improve government finances directly.

The increased coordination we now envisage between central banks and governments implies a toned-down degree of Ricardian equivalence compared to our base case last year. Governments prioritize a self-sustaining recovery instead of focusing on debt sustainability by pursuing austerity through higher taxation. This is vastly different from the previous expansion. The policy trade-off is further eased if the policy mix of dovish central bank forward guidance aimed at an inflation overshoot and a persistent strong fiscal impulse pushes up inflation levels towards 2025.

Overall consumer tax increases are postponed beyond the five-year projection horizon. With Main Street consumers not having to worry about a steep rise in future tax bills, consumer spending is supported even as taxes do increase for the ultra-wealthy and corporates. Japan proves to be an exception.

At the end of our projection period, central banks reorient their strategy as they finally see 'the whites of inflation's eyes', with an inflation level threatening to overshoot the target range. In the US, we expect 3% inflation by 2025. Unemployment is still above pre-pandemic levels by that time, but has returned to NAIRU levels. Note that NAIRU is higher compared to pre-pandemic times due to higher structural unemployment, while developed market growth rates are back at or at least close to trend.

As we approach 2025, central banks start pondering rate hikes again as their need to signal independence from fiscal authorities reemerges. Negative effects from NIRPs have accumulated (financial repression amounts to repression of financials) and it becomes clear that excess risk taking in the markets, after years of negative real interest rates, needs to be limited. At this juncture, the asymmetric policy reaction function of central banks that led to the 'Fed put' needs to be recalibrated. This all comes back to our fourth building block: addressing the inevitable policy failures following the hasty plastering over of cracks that emerged in 2020-21. For the US, this strategic reorientation sees the Fed hike its policy rate for the first time in 2025, while other developed market central banks abandon their NIRPs.

3.6 Bull case
A reboot for growth with echoes of the 1970s

EU leaders' agreement on a European recovery fund is another example of how, in a real crisis, human solidarity and ingenuity trump fragmentation and resignation. Human ability to adapt to change has been a thread throughout history. GDP per capita for 18 developed and emerging countries since the 1900s shows many crises such as the 1918 Spanish flu pandemic or even the Great Depression look like minor deviations from the long-run upward trend in global productivity growth. Often, economic crises or, even worse, wars have been a locomotive of change that resulted in new waves of innovation. For instance, the fourth innovation wave, which started in the 1950s and ended in 1990, saw US real GDP per capita growth accelerate to 2.34%. This was as military R&D research efforts, including the development of radar using engineering skills that resulted from the Manhattan project, spilled over to other sectors.

Former ECB president Mario Draghi, like many others, considers warfare to be the most appropriate metaphor for our response to the current crisis. In an FT opinion piece from March 2020, he says, "We face a war against coronavirus and must mobilize accordingly". What if this mobilization proves to be effective? In contrast to our base case, a 'reboot for growth' bull case is one in which not only the proverbial war is won, but also the peace. In the period after WWII, it seemed natural to some that governments would continue to have a large role in meeting peacetime needs.[4] Our bull case sees not only a greater but a more effective involvement by the state in private sector affairs. For instance, the historically low percentage of R&D expenditures in the US federal budget is likely to rapidly increase. The same holds true for other developed economies and China, as the focus on domestically induced innovation rises in an age of lingering protectionism and elevated precaution.

4. https://www.nap.edu/read/5850/chapter/6#46

Digitalization unleashes its full potential

Various commentators have pointed out that the current crisis has accelerated existing trends. One of these trends is digitalization. Powerful fiscal stimulus could be the enhancer of deeper technological adaptation and cross-sector dispersion that boosts productivity. Education and healthcare, which happen to be the two most inflationary items in the US CPI basket, are sectors that could benefit the most, having not yet experienced the impact of digitalization to the extent that media, logistics and entertainment, to name a few, have.

This could change as telemedicine and online learning finally get a decisive push. The productivity effects would be significant, as broader access to affordable forms of higher education raise inclusivity and lower income inequality.

In this bull case scenario, a larger number of effective Covid-19 vaccines are brought into circulation in the course of 2021 compared to the base case. The first phase, i.e., solving the health crisis, is therefore more successful. The virus doesn't mutate its spike proteins, keeping vaccines effective for longer. Also, from a crisis-relief perspective, a fiscal cliff is avoided, with no significant delay between the expiry of liquidity provisions by government and the emergence of a self-sustaining recovery that generates cash flows. The crisis-relief phase is managed better in comparison to our base case, as the European example of targeted preventive measures to keep workers employed for longer is more widely adopted.

The degree of international coordination, too, is improved as the new US president elect, Democrat Biden, pursues a less divisive geopolitical strategy, restoring traditional international diplomacy. As a result of a Democratic sweep, US fiscal stimulus proves to be very effective with higher fiscal multipliers caused by higher technology spillovers to sectors where digitalization has so far been undershooting its potential. After the initial rebound in 2021, economic growth therefore keeps its positive momentum. In contrast to the base case, animal spirits *are* unleashed. Consumers are more inclined to spend as effective vaccines make social distancing rules obsolete; the recovery in the labor market is strong; and very low real rates encourage dissaving by households and corporates alike as the economy gets on a stronger footing.

After a steep decline to 8% in early 2021, US unemployment rates drop by more than the historical recovery average of 0.85% annually. Elsewhere, unemployment rates do not deviate strongly from NAIRU, owing to effective crisis relief. The Biden administration engages in large infrastructure projects, while in Europe the disbursement of the EUR 750 billion recovery fund creates positive multiplier effects. This encourages an extension of the fund, funded by EU bond issuance.

A wave of aggregate pent-up demand takes shape

As we said in the introduction, the ability of fiscal stimulus to induce inflation is a key parameter. The combination of a solved health crisis, a smooth crisis-relief program and even more fiscal stimulus renders the Covid-19 recession more transient and V-shaped, with output gaps closing rapidly. Though the negative supply shock induced by Covid-19 fades, aggregate demand overshoots trend as a wave of pent-up spending takes shape. Inflation in developed markets overshoots the 2% inflation target in 2022, and accelerates to 3% as feverish catch-up spending takes hold. While the technology dispersion in education and healthcare takes time to translate into disinflationary pressures in these sectors, other items in the CPI basket in wich supply constraints are acute show increasing inflationary pressures. In these sectors, there simply is too much money chasing too few goods.

An overshoot of the inflation overshoot

By 2023, the Fed starts to feel uncomfortable about the upward momentum in inflation expectations, as it is confronted with an overshoot of the inflation target. Given the strong recovery in the global labor market, and with the lagged boost effect of fiscal stimulus still present, the Fed would have started "thinking about thinking about" raising rates in late 2022 to stem inflation expectations. It is moved into concrete action when US inflation exceeds 3% in the course of 2023. The Fed raises the policy rate to 1% by 2025.

A further element that enforces a tightening cycle in 2023 is that the Fed's role as fiscal financier starts to feel like a straightjacket hindering its pursuit of a dual mandate. In this scenario, other central banks also leave NIRP territory sooner compared to the base case. In the bull case, the paradox emerges that policy coordination has worked so well in kickstarting the economy that central banks find reason to distance themselves from their role as fiscal financiers. From a government perspective, the major achievement of creating an above-trend nominal growth environment makes the contribution of low nominal interest rates less important in the second half of our projection period, as tax revenues improve. The cracks in the economy that were hastily plastered over in the immediate aftermath of the crisis start to heal, resulting in a lower degree of zombification, as the recovery is not only stronger but also more evenly distributed compared to our base case.

3.7 Bear case
The great Covid-19 stagnation

What if the cracks in the global economy do not heal but are simply plastered over? In this bear case scenario, the health crisis persists. It is difficult to get Covid-19 under control, with setbacks in vaccine research owing to unexpected mutations of the virus. As a result, the distribution of an eventual effective vaccine is delayed to 2022. Economic actors remain in crisis mode as the seesaw of lockdowns and reopenings tips towards lockdowns. The crisis-relief toolkit becomes exhausted and a fiscal cliff opens up before a self-sustaining recovery sets in. With fiscal and monetary policy space in some parts of the global economy depleted before a self-sustaining recovery takes hold, the global economy experiences another recession. The W-shaped path is followed by stagnation. The issues that have been the focus of the Expected Returns publication in recent years come to the fore: excess corporate leverage, rising income inequality, and the mismatch between labor productivity and wage growth. All of these risk factors that would typically have ushered in a classic recession in absence of the Covid-19 shock are still very much with us, only aggravated by that shock.

Low coordination between fiscal policy and monetary policy also plays a detrimental role. Central banks facilitate an uncoordinated, weak fiscal response. The fiscal stimulus has no positive multipliers. It fails to increase aggregate demand and inflation expectations but still comes at a price. Debt sustainability is eroded.

The failure to inflate the economy through effective stimulus leaves real rates too high. In short, Covid-19 exacerbates cyclical forces driving the secular stagnation thesis; with investment activity being insufficient to absorb savings.

There are two big differences with regard to our base case. The role of central banks as fiscal financiers fails, as efforts to prevent deflation disincentivize government efforts to take the lead. In addition, there is lower consumption growth due to strong disinflationary forces, forced deleveraging and a lower wealth effect. There is a high degree of Ricardian equivalence as there is higher potential for income redistribution, given civil unrest. With lower government support for weak companies compared to the base case, and more structural output losses due to a prolonged recession, capacity in the economy is severely damaged. A debt-deleveraging cycle starts.

4

Expected returns 2021-2025

Asset classes

Our forecasted returns are for the main asset classes and are calculated by connecting the dots between our valuation assessment and the macro consequences of our main scenario. In last year's publication, we penciled in a recession. Obviously, we did not envisage that the Covid-19 crisis would be the instigator of this. With the prices of risky assets crashing and partially rebounding in the first half of 2020, several asset classes are attractively valued. As we argued in Chapter 3, the macroeconomic volatility will only start to fade in 2021, but the effective cooperation between central banks and governments will lead to a successful recovery. The accompanying increase in inflation rates combined with low bond yields leads to 'A brave real world': the title of this year's publication.

We expect asset returns to remain below their long-term historical averages over a five-year horizon, mainly caused by the low interest rates. Risk taking in the current environment is likely to be rewarded. Table 4.1 gives our summary for the major asset classes, from the perspective of a euro and US dollar investor. In the remainder of this chapter, we explain how we have come to these return estimates.

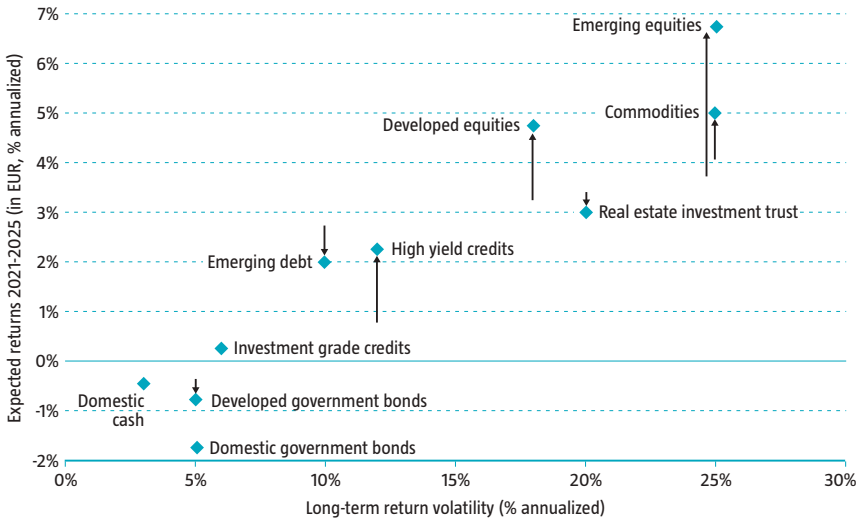
Table 4.1: Five-year return forecast for main asset classes

	Returns	Medium-term influences		Return forecast in euros		Return forecast in US dollars	
Bonds	**Long term**	**Valuation**	**Macro**	**2021-2025**	**2020-2024**	**2021-2025**	**2020-2024**
Domestic	4.00%	-/-	-/-	= -1.75%	-1.75%	↓ -0.25%	2.50%
Developed	4.25%	-/-	-/-	↓ -0.75%	-0.38%	↓ 0.00%	2.00%
Emerging	5.75%	+/+	-/-	↓ 2.00%	2.75%	↓ 3.50%	4.00%
Investment grade	5.00%	=	=	= 0.25%	0.25%	↓ 1.00%	2.75%
High yield	6.00%	+/+	=	↑ 2.25%	0.75%	↓ 3.00%	3.25%
Domestic cash	3.50%		-/-	= -0.50%	-0.50%	↓ 0.25%	1.60%
Equity-like							
Developed	7.00%	-/-	+/+	↑ 4.75%	3.25%	↑ 6.25%	4.50%
Emerging	7.50%	+/+	+/+	↑ 6.75%	3.75%	↑ 8.25%	5.00%
Real estate	6.00%	=	-/-	↓ 3.00%	3.25%	= 4.50%	4.50%
Commodities	4.00%	+/+	+/+	↑ 5.00%	4.00%	↑ 6.50%	5.25%
CPI							
Inflation	3.00%			= 1.75%	1.75%	= 2.00%	2.00%

Source: Robeco. September 2020. The medium-term influences correspond with our qualitative assessment of the valuation and macro influences described in Chapters 2 and 3. For equity-like classes, our assessment is relative against developed equities. The expected returns are geometric. Bond returns are euro hedged except for emerging market debt (local). The value of your investments may fluctuate and past performance is no guarantee of future results.

To put our expected returns into context, Figure 4.1 contains both these and also long-term volatility estimates for each asset class. Note that whereas the returns are specific to the five-year horizon, the volatility estimates are instead volatilities we have seen in long samples. Although it might be tempting to eyeball a mean-variance efficient frontier through the dots, this would not be wise because we have not included correlations in the analysis. Assets with low correlations may still be part of a mean-variance efficient portfolio, even when their expected returns are low. Figure 4.1 shows that government bonds are particularly unattractive. For most risky asset classes, the expected reward for the volatility risk is substantial, leading to attractive Sharpe ratios.

Figure 4.1: Five-year return forecast versus long-term volatility



Source: Robeco. September 2020. Vertical axis contains the geometric annualized returns for a euro investor over the period 2021-2025. The horizontal axis is a proxy for the long-term return volatility of each asset class.

Whereas last year our returns for the US dollar investor were substantially above those for the euro investor, the interest rate decline in 2020 has changed this picture substantially. Although returns are still higher for the US dollar investor, they are closer to zero for the safer asset classes such as government bonds.

In the following sections, we present our analysis per asset class.

4.1 Cash

Is cash a store of wealth? Historically, the return on cash has quite often been negative in real terms. Yet, in developed markets, it has managed to beat inflation by an average of 0.7% since 1900. As Ang (2014) notes, T-bills have had the highest correlation with inflation: better than inflation-linked bonds, real estate and commodities. Cash seems to be the ultimate real asset.

Not so in the next five years. It won't surprise anyone that in our base case, cash will not be a store of wealth. Central banks will not even be thinking about raising rates from the zero lower bound in the medium term. Our nominal cash return has been adjusted downward from last year's publication to 0.25% for the US, and has remained -0.5% for Europe. More striking is that real cash returns will remain very much below the historically observed 0.7% for developed markets – we expect -1.8% in the US and -2.2% in Europe. This echoes the period from 1971 to 1977, in which 23 developed countries in the DMS database had a negative real cash return of -2.4%. Other similar, more distant moments would be the First World War and the subsequent Spanish flu pandemic (real cash returns dropped to -11% from 1915 to 1920) and the long streak from 1937 to 1952 that saw consistent negative real rates. These episodes of negative real cash returns have two common threads: an economy confronted by a negative supply shock, and subsequent monetary debasement as fiscal expenditures require debt monetization.

By looking at the neutral rate of interest, it is easy to see why policy rates have to stay at the zero lower bound for a while longer. This rate is the short-run real interest rate expected to prevail when an economy is at full strength and inflation is stable. In other words, it is the rate at which the economy neither accelerates nor slows down. Central banks consider it

their responsibility to move their policy rates towards the neutral rate of interest. Looking at the latest Holston Laubach Williams (HLW) model estimates available for the US and Europe in March 2020, the US neutral rate of interest was just 0.5%, while Europe had a neutral rate of 0.2%. These historically low values reflect that we are in a world of low productivity growth, in which investment activity is insufficient to absorb global savings.

As actual policy rates are somewhat below the HLW estimates, one could say that monetary policy is accommodative. A glance at the Yellen version of the Taylor rule,[1] however, shows clearly that the degree of monetary accommodation zero lower bound policy rates provide is far from adequate at this time. The Yellen Taylor rule assumes that the Fed needs to change monetary policy in response to two types of deviation:

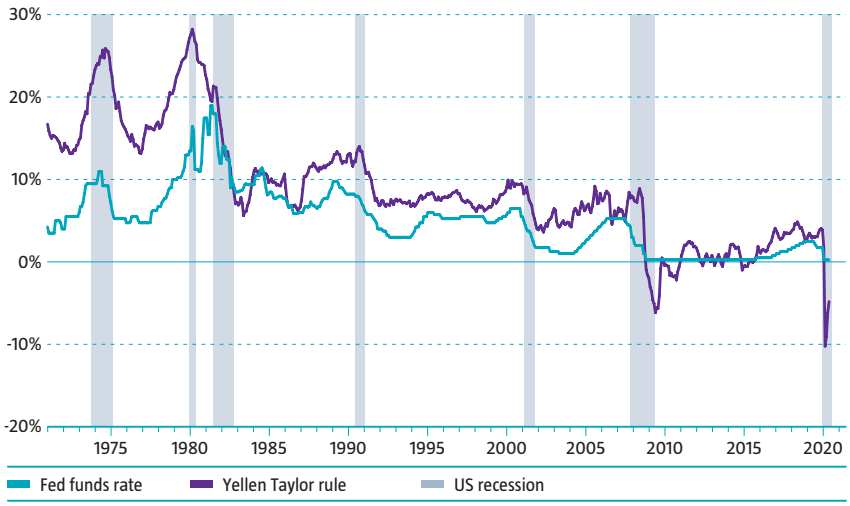
1. https://voxeu.org/article/r-star-and-yellen-rules

– between actual inflation and the Fed's inflation target; and
– between actual unemployment and the estimated non-accelerating inflation rate of unemployment (NAIRU).

Given the massive spike in US unemployment, which reached an all-time high of 14.7% in April 2020, the nominal policy rate should have dropped to as low as -10% to fully accommodate this shock. As we explain in our special topic 'Don't be so negative', we do not think central banks and the Fed in particular will venture deeply into negative policy rate territory. Instead, they will further exploit the unconventional toolkit (which, as we stated last year in our five-year outlook, has already become more conventional in an effective lower bound environment).

The Fed's massive buying of assets in 2020 is an effort to replicate the effect of another 10% conventional interest rate cut. Previous QE programs (Q1, 2 and 3 in the expansion following the global financial crisis) also took place when the Yellen Taylor rule suggested the Fed needed negative nominal policy rates. Given we expect a sluggish labor market recovery, the Taylor rule will stay in negative territory for longer, with central bank balance sheet expansion remaining a common feature of monetary policy. Only the achievement of a sustained inflation overshoot after 2023 will see the Yellen Taylor rule generating positive values again. In response, we expect a first rate hike in our base case to come from the Fed, in 2025.

Figure 4.2: The Yellen Taylor rule shows nominal policy rates should be negative for a long time



Source: Refinitiv Datastream, Robeco

In our bull case scenario, we expect the Yellen Taylor rule to give the all-clear signal sooner for the Fed (and other central banks) as inflation emerges earlier on the scene. The convergence of the unemployment rate towards the NAIRU is also stronger compared to our base case. This re-introduces the classic policy trade-off between maintaining full employment and keeping price stability at an earlier stage. We expect the Fed to start hiking the policy rate in 2023 (rather than 2025) as it is confronted with an overshoot in the aimed inflation overshoot.

In our bear case, a double-dip recession is followed by an episode of disinflation and stagnation. Central banks keep expanding their balance sheets to smoothen a debt-deleveraging cycle and experiment with the effective lower bound in conventional policy rates, which could be below zero, also for the Fed. The ECB moves its deposit rate to -60 bps. This is the scenario in which Powell's statement – that the Fed is not "even thinking about thinking about raising rates" – remains relevant for the full projection period.

4.2 Government bonds

Traditionally, high-rated government bonds have offered investors the guarantee of full capital protection when held to maturity. However, these days, hold-to-maturity investors in many countries are guaranteed a loss due to negative interest rates. In theory, long-dated nominal government bonds are considered riskier than cash because of their exposure to real productivity growth risk and inflation risk. Investors would therefore typically demand a term premium as a reward for holding these long-term assets instead of cash. Indeed, the premium for holding long-dated government bonds has historically been 1.0% over cash.

As we explained in the valuation section, with government bond term premiums in many markets now having turned negative, investors potentially are undercompensated for the macroeconomic risk they are taking. The term premium seems artificially low due to the high demand from central banks and solvency-based investors such as insurance companies and pension funds.

In our main economic scenario, policy rates are kept low and central banks continue purchasing government bonds in the secondary market for the foreseeable future. As long as growth edges higher and exceeds interest rate levels, the rise in debt ratios is sustainable. With near-zero policy rates in the US and below-zero rates in the Eurozone, government bond yields have only limited room to increase. We believe that, for the next five years, 10-year US Treasury bond yields are capped at 1.5% and, in Germany and Japan, as low as 0.5%. Our forecast includes a slight increase in interest rates towards the end of the five-year period, as growth starts to accelerate. This means that investors in government bonds will experience negative nominal returns in all main markets. Our main scenario suggests that a global government bond portfolio could yield an average euro-based return of -0.75%. For a US dollar investor, our forecast is 0.00%. The difference is due to currency hedging costs. We predict US dollar short rates to be 0.75% higher than euro short rates, which equals the hedging costs.

For the 'Reboot for growth' scenario, we expect US inflation to increase substantially above the Fed's target in 2023, to 3.5%, prompting the Fed to raise the policy rate above the zero lower bound. Inflation in the Eurozone also increases, but less so than in the US, resulting in the policy rate no longer being negative towards the end of our five-year horizon. While government bond yields increase in the first couple of years, they will again decline afterwards for some time from this higher level. Our forecast implies that a domestic risk-free government bond will yield -0.25% for a Eurozone investor and 1.00% for a US investor.

For the global government bond portfolio, the average returns are expected to be -0.25% and 0.50% from a euro and US dollar perspective, respectively. The difference is again the currency hedging costs, which we forecast to be 0.75% over this period.

Central bank policy rates and government bond yields remain low over the entire five-year horizon, owing to pandemic-related stagnation. This results in steady but low returns. The return on German Bunds is expected to remain close to the current yield of -0.50% and the US Treasury return is 0.25%. In this scenario, a global government bond portfolio returns -0.25% in euro terms and 0.25% in US dollar terms, implying estimated currency hedging costs of 0.50%.

4.3 Corporate bonds

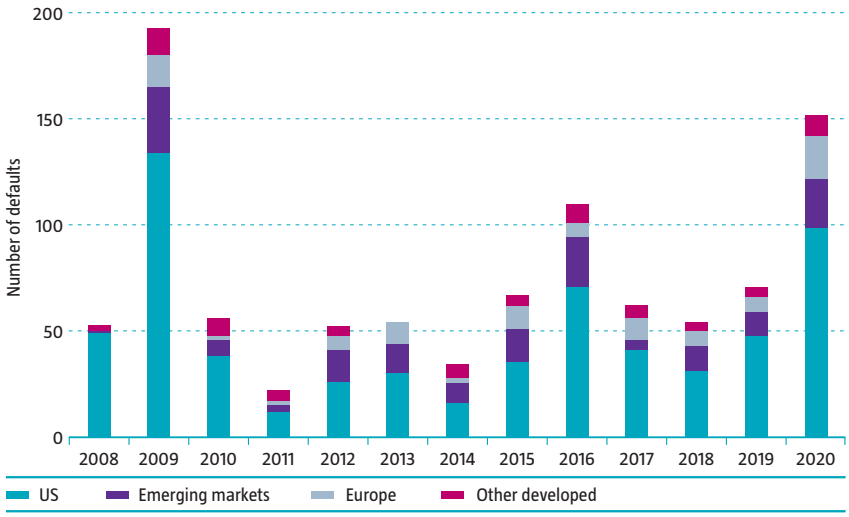
Corporate bonds pay investors a premium over government bonds to compensate them for credit and liquidity risk. The outlook for investment grade credits in our main scenario is neutral, as is valuation. Spreads have widened and are now close to the historical median. This would not usually be a positive sign during a recession, but the current recession may be somewhat different. Central banks are buying investment grade corporate bonds on a large scale, reducing the downside risk for investors. We therefore believe that investors in the investment grade segment of the market may gain an above-average credit premium of 1% over the next five years. We assume, in line with common practice, that these investments are hedged to the investor's home currency. This then implies a 0.75% lower return for euro investors, which is the difference in expected short rates and equals the currency hedging costs.

By comparison, the valuation of the high yield segment is more favorable, and we have a neutral stance on this asset class in our main macro scenario. This leads to a premium of 3% relative to a global government bond portfolio. Note, however, that this is not a pure credit and liquidity premium. Since high yield investments have about half the interest rate sensitivity (or duration) of government bonds, part of the excess return for high yield credit is owing to a not-so-negative interest rate effect.

In the 'Reboot for growth' scenario, the credit premium for investment grade over a global government bond portfolio remains unchanged at 1%. For high yield credit, the central bank hikes towards the end of the five-year period hurt a little more than in the main economic scenario.

In the 'Great Covid-19 stagnation' scenario, the credit premium for investment grade is somewhat reduced but, given the central bank's continued purchasing activities, still positive and a reasonable deal in this scenario. For high yield, this scenario is definitely unfavorable. Even though central banks help out where they can, they cannot prevent a substantial uptick in defaults in this segment. Until 5 August, S&P had already counted over 150 corporate bond defaults (see Figure 4.3), only slightly less than in the same period in 2009 during the global financial crisis. In our main scenario, defaults increase but the wide spread is sufficient to compensate for that. In the Covid-19 stagnation scenario, this is no longer the case. Defaults will increase and will eat up most of the credit spread, leading to a close-to-zero excess return over government bonds for the category. Perhaps even more surprisingly, the excess returns over investment grade credits are negative, suggesting that investments in safer corporate assets will result in higher returns.

Figure 4.3: Year-to-date defaults by region



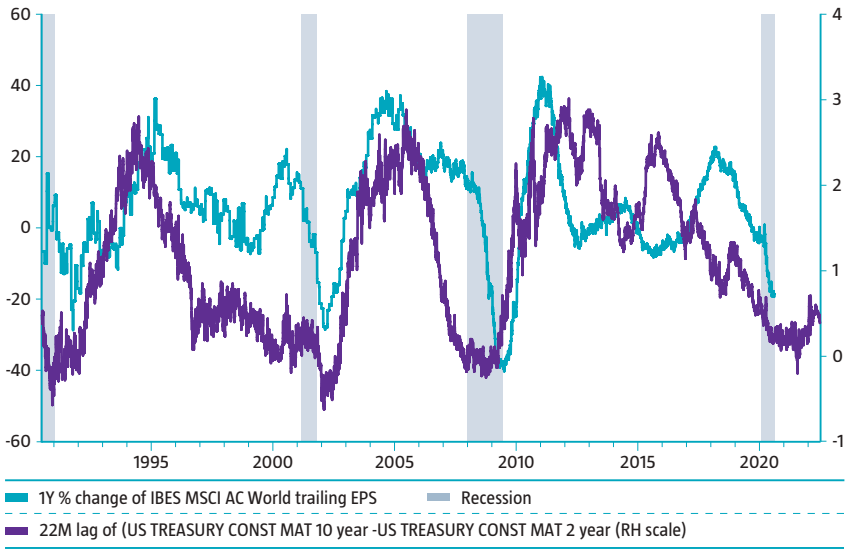
Source: S&P Global Ratings Research, S&P Global Market Intelligence's CreditPro and Robeco. Other developed regions include Australia, Canada, Japan and New Zealand. Data as of 5 August 2020.

4.4 Equities

What is in store for equity investors in our base case? As we observed in the valuation section, global equities are slightly overvalued, mainly because of stretched US equity valuations. We therefore think their valuation remains negative, relative to the steady state. For instance, based upon our long-time favorite predictor, the US CAPE, US equities would generate only a meagre 2% on an annualized basis.

However, historically speaking, prior CAPE levels cannot explain around 75% of the subsequent annualized return variation in equities in a five-year window. The bulk of the pricing action is therefore typically generated by the unfolding macroeconomic environment. Our macroeconomic factor is positive on a five-year horizon. Despite record levels of geopolitical uncertainty and an expected increase in macroeconomic volatility, based on our projections the recovery of the Covid-19 recession in corporate earnings will gradually take shape. The earnings path will be volatile and dispersed on a sectoral basis, but we believe the cumulative earnings growth outcome on a five-year horizon will still be largely equal to the median cumulative earnings generated in the previous expansions. This is because despite this recession being the deepest since the Great Depression, massive crisis relief early on is mitigating the damaging second-round effects in the recovery phase. This will leave us with annual earnings-per-share growth rates just above 4% in developed markets. After bottoming out in 2021-2022, earnings growth will outpace price appreciation, compressing elevated multiples.

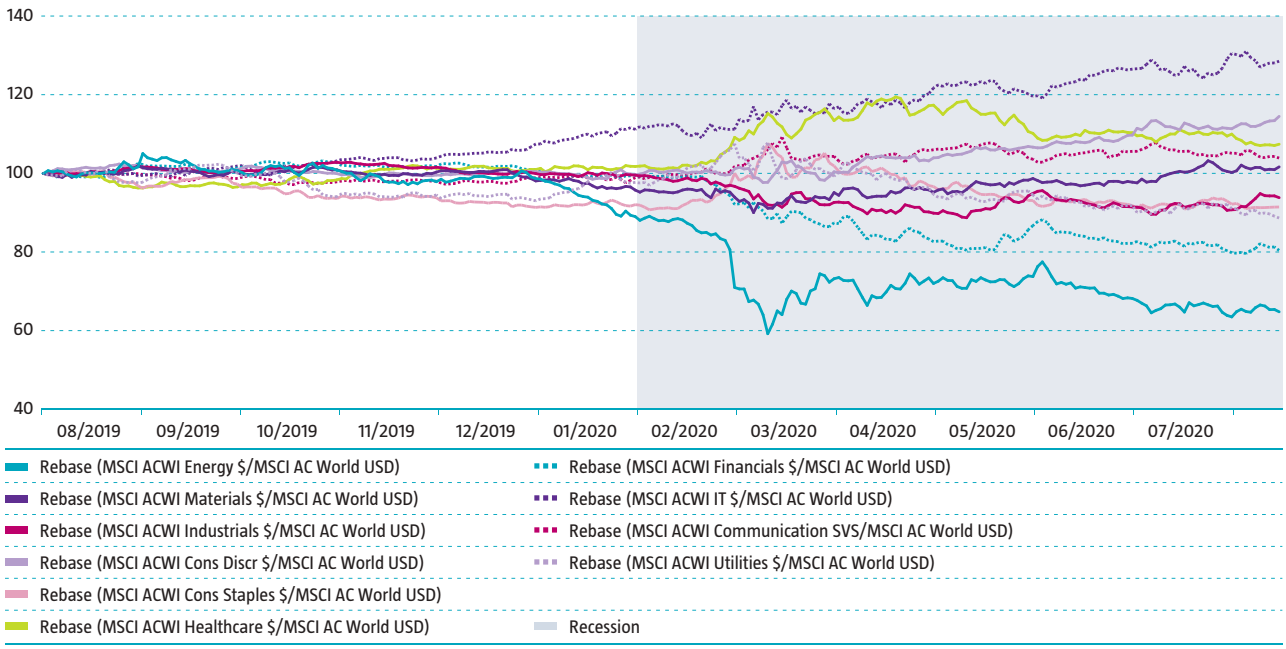
Figure 4.4: US yield curve signals earnings to bottom out around 2021



Source: Refinitiv Datastream, Robeco

Though this top-down earnings forecast looks unspectacular, the large underlying dispersion in earnings recovery trajectories will create attractive tactical alpha opportunities. So far, we've witnessed a very lopsided rally buoyed by technology. Being the clear winner in a deflationary setting, this sector will face headwinds once the interplay between governments and central banks effectively generates inflation. A working vaccine in 2021-22 could broaden the recovery and create tailwinds for sectors that require in-person contact. A secular dollar bear market as a result of US debt monetization could also improve the external competitiveness for US export sectors that can't compete with technology on an internal competitiveness basis.

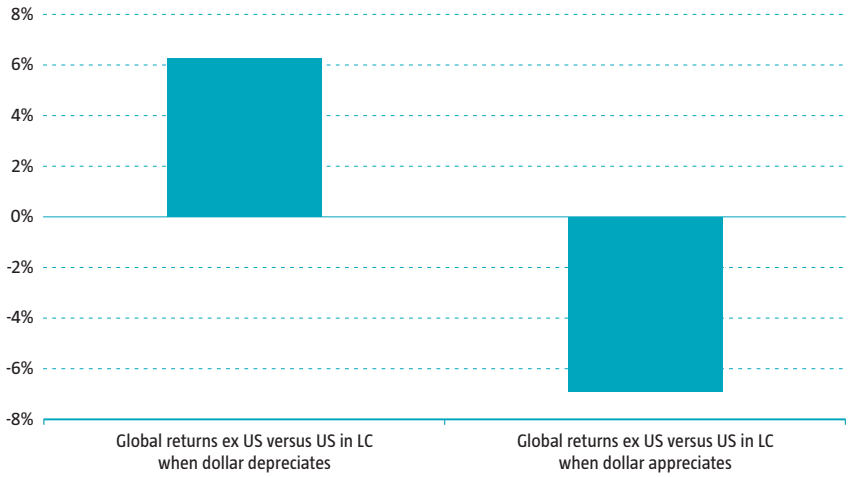
Figure 4.5: The great lockdown equity dispersion



Source: Refinitiv Datastream, Robeco

Reflation stemming from a 'credible fiscal financier' experiment as laid out in Chapter 3 is key to gauging where equity markets are heading in the next five years. The mild inflation overshoot we expect in our base case would keep real interest rates low for longer and broadly sustain equity valuations without immediately threatening the pricing power of corporates. Equity returns would be negatively impacted eventually as the Fed started a tightening cycle at the very end of our projection period, with inflation hovering around 3%. An environment of real growth close to trend and inflation largely in the 2-3% bracket, such as we expect for the next five years, has traditionally been supportive for equity markets. Annual dollar depreciation has historically coincided with an average outperformance of 6% for global equities ex US versus their US counterparts.

Figure 4.6: Dollar bear markets matter for global equity markets

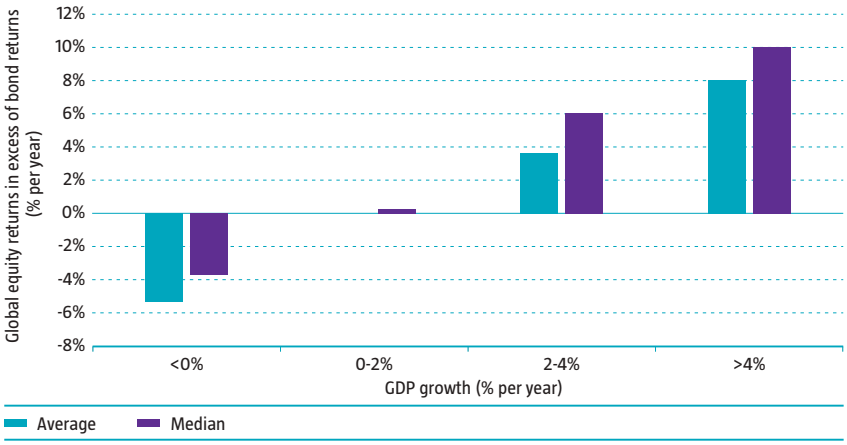


Source: Refinitiv Datastream, Dimson, Marsh and Staunton Database (2017). Time period 1958-2020.

We have upgraded our return forecast for emerging markets. Stronger inflation surprises in developed markets have often coincided with emerging markets catching up on an earnings-per-share basis versus developed markets. In addition, a discount of 32% on a conventional price earnings metric for emerging markets versus developed markets, our view of a weaker dollar, and stronger commodity prices could bring emerging markets back in focus for global investors. Despite these tailwinds, we do not expect emerging market returns to exceed our steady-state estimate of 7.5% as a lower trade intensity of global growth due to re-localization dents technology spillovers and productivity gains. Also, Covid-19 could prove to be especially tough to beat in emerging countries, given weaker health care infrastructure pressuring producer and consumer confidence.

On balance, we expect equity returns to be below their long-term estimates, but risk premiums relative to safer assets such as government bonds remain very attractive. Will equity investors be able to earn a decent real premium (i.e. corrected for inflation) versus safer assets in the next five years? Based on history, it's hard to tell, as real excess equity returns versus bonds can deviate substantially depending on the specific inflation environment (and even within the inflation buckets in Figure 4.7 there is substantial return variation).

Figure 4.7: Return to trend growth levels should reward equity investors with decent premium



Source: Dimson, Marsh and Staunton Database (2015), Angus Madisson Database. Time period 1900-2014.

We believe equities can outperform sovereign bonds in real terms. In historical terms, they have generally done so with inflation averaging between 2-3%, and especially as negative yielding global bonds have become more a source of return-free risk instead of risk-free return. Sovereign bonds are less able to hedge against economic downturns than before while still being vulnerable for reflation. We expect developed equities to give a real excess return of 3.5% in euro terms over government bonds in our base case with a nominal absolute return of 4.75% in euro terms.

The bull case is a paradoxical one for equities. As the interplay between monetary and fiscal authorities proves to be very successful in 'unleashing animal spirits' earnings growth accelerates above trend, creating a full recovery sooner than in our base case. High beta plays such as Europe and emerging markets enjoy returns close to our equilibrium estimates. Higher global trade volumes compared to our base case help emerging market exporters, while the early distribution of an effective vaccine within emerging markets also strengthens their consumer confidence.

However, by 2023, the Fed embarks on a tightening cycle to tame the inflation overshoot caused by a mix of cost-push and demand-pull inflation elements. The US equity market suffers as a result, because US equity valuation levels have continued to creep up from already stretched levels in 2021 and 2022. With US equity markets in a tailspin in the second half of our projection period, developed equity markets end up below our base case return, generating 3.25% in euro terms.

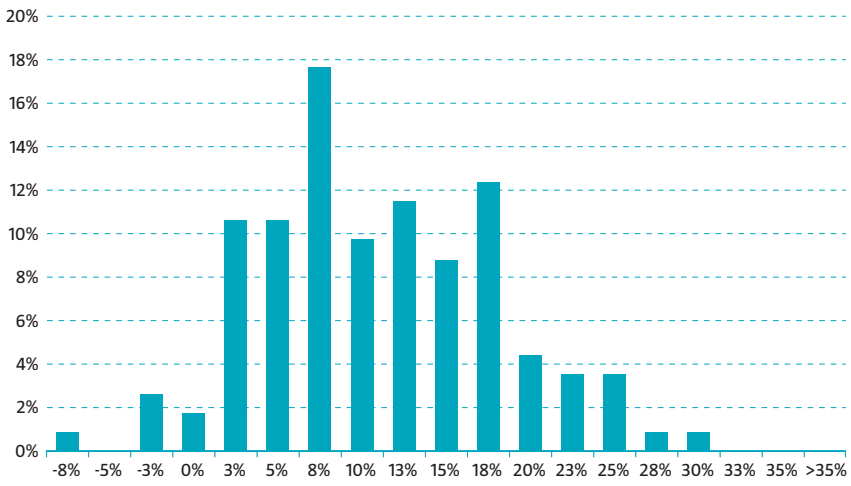
Our bear case sees the health crisis largely unsolved and the crisis relief inadequate. Liquidity issues from weak corporates become even more pressing and morph into solvency issues. Excess corporate leverage, a theme that has been the focus of our five-year outlook in recent years and would have ushered in a classic recession anyway, now starts to weigh in. Rising income inequality, trade tensions and an unemployment rate remaining close to the peak levels seen in 2008-2009 lead to increasing social unrest. Geopolitical uncertainty abounds. With producer and consumer confidence plunging again into a W-shaped recession, equities enter another bear market. Central banks start to buy equities to sustain the wealth effect but the emerging asset inflation does not feed through to the real economy and only increases zombification. An episode of low growth and very low inflation follows as corporates and households undergo a cleansing of their balance sheets. In this environment, we see equities return only 2% for developed markets.

Table 4.2: Different inflation regime, different excess equity returns

	CPI US	Equity premium vs bonds	Equity premium vs bills	Bond maturity premium
Deflation	<0	2.17%	2.70%	0.84%
Low inflation	1-0	-3.75%	7.25%	11.16%
Subdued inflation	2-1	3.88%	5.23%	1.50%
Mild inflation overshoot	3-2	4.43%	3.34%	-0.23%
Medium inflation overshoot	4-3	5.03%	6.99%	1.81%
Severe inflation overshoot	5-4	8.74%	11.32%	2.99%
High inflation territory	>5	3.49%	-0.28%	-2.97%

Source: Dimson, Marsh and Staunton database (2017). Global equities ex US 1900-2017.

Figure 4.8: Frequency distribution of five-year average rolling global equity returns since 1900



Source: Dimson, Marsh and Staunton database (2015), Robeco

4.5 Real estate

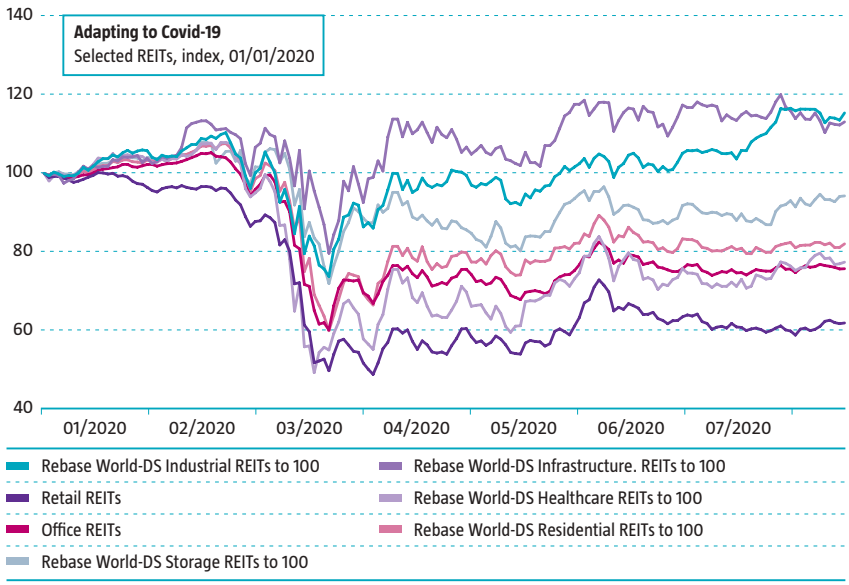
We have lowered our real estate return forecast compared to last year and now see indirect real estate underperforming developed equities in the next five years, generating a return more significantly below what is warranted by our equilibrium returns. Taking a relatively higher leverage level into account compared to equities, real estate should have relative upside in a world in which central banks are not moving at all and only start to think about raising interest rates at the very end of our projection period. Nonetheless, the ability to put that leverage to work to generate rental income will become more difficult.

Now more than ever, real estate is about healthy spaces to live, work and play. Even after an effective vaccine is widely introduced, the behavioral shift to online shopping and working from home that was already underway will have become ingrained. Reports of the death of the office are exaggerated but an incomplete recovery in occupancy rates for shopping malls, office space and residential urban real estate means a low discount rate will remain for longer.

From an urban economics point of view, there's a further underlying theme as to why the recovery in occupancy rates will remain incomplete in the next five years. If productivity from working virtually is maintained for office workers, the traditional enhancing link

between high-wage workers and urban office space is partially transferred to the virtual office. This process could also be facilitated (and has effectively already been done by several Silicon Valley firms) from an environmental and cost-cutting point of view. This clearly has a cascade effect on other REITs sectors such as urban residential real estate. In addition, adapting real estate to the increased demands of a post-pandemic world will bring additional costs, lowering rental yields. Lastly, the valuation of real estate relative to equities remains slightly worrying. Dividend yields are only marginally above those of global equities at this point and do not fully compensate for future risks.

Figure 4.9: REITs: Out of office



Source: Refinitiv Datastream, Robeco

In our bull case, we expect the same return (3.0%) as in our base case for real estate, but with a completely different return evolution. A vaccine is found earlier and distributed more effectively, thus reinvigorating the urban economy. Also, the sharper rise in inflation compared to the base case makes real estate's inflation hedge characteristics more attractive compared to equities (but only marginally so).[2]

2. See for instance Huang and Hudson-Wilson (2007)

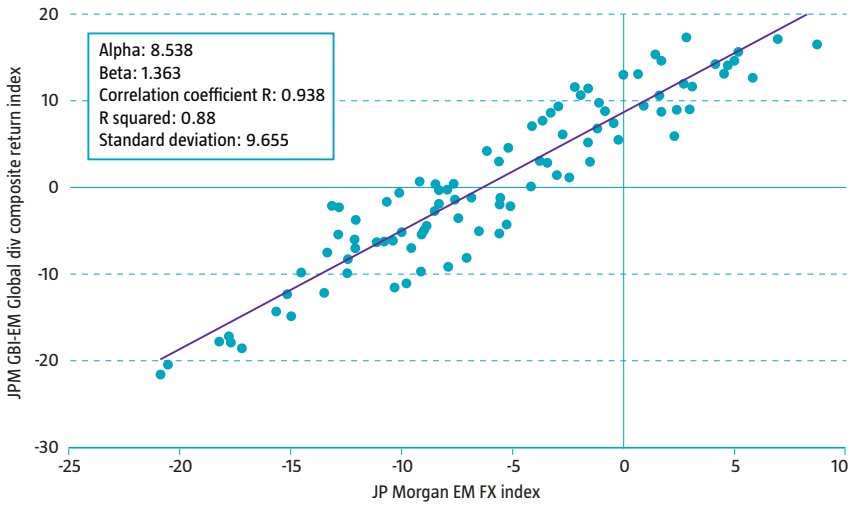
The bear case is a sobering one for real estate investors as it shows Covid-19 to have fundamentally changed economic structures and urban city dynamics for good. It proves to be hard to get the virus under control and fear of the urban office and public spaces reaches a nadir. Real estate tumbles into a secular bear market that generates a negative return of -1% in the next five years.

4.6 Emerging market debt

Emerging market debt (EMD) in local currency, an asset class that is still a sliver of the fixed income universe, has been gaining popularity. In recent years, yields have been trending down and are now at record lows of 4.3% for the JP Morgan GBI-EM benchmark. This is not surprising, given that the search for real carry is well underway. As Table 2.13 shows, despite the decline, EMD in local currency still offers well in excess of 2% real carry differential versus developed sovereign markets, reflecting the greater risks that these investors face.

With just under 40% of EMD rated below investment grade, the credit risk profile is in between high yield and investment grade. The performance in euro terms (unhedged) over the past five years has been close to global high yield (3.7% versus 3.6%, hedged in euro terms). The country-specific credit risk and the expected rating migration of countries in the local currency debt universe is an important return driver, but the overarching performance driver is the currency risk.

Figure 4.10: High correlation: Emerging market currency return outlook pivotal for EMD in local currency



Source: Refinitiv Datastream, Robeco. Time period 31/12/2002-31/07/2019.

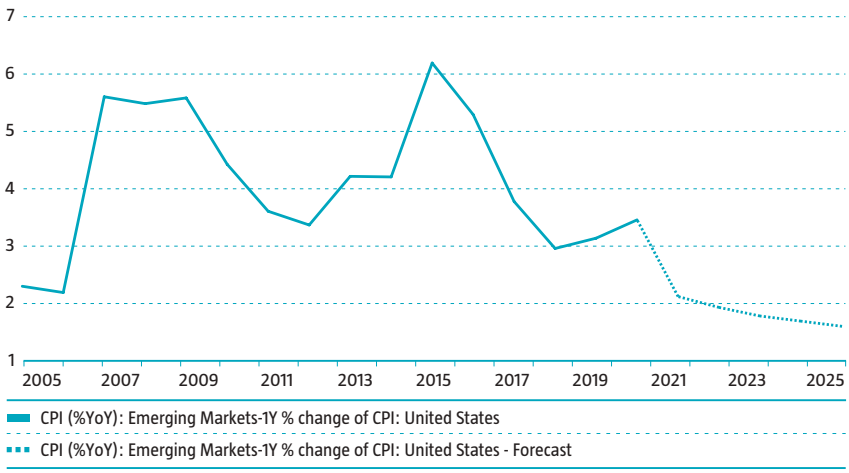
Currency risk remains pivotal for EMD in local currency as total returns are highly correlated with emerging market currency (volatility). A basket of emerging currencies (the JP Morgan EM FX Index) indicates a correlation of 0.93 with monthly EMD unhedged in local currency returns. How will EMD issuers' currencies fare under our base case? The long-term trend in emerging currencies' real appreciation is closely tied to productivity growth catch-up versus developed counterparts. For instance, currencies with a consistent productivity improvement versus the US tend to show a real appreciation of their currency against the US dollar over time.

Last year we were skeptical about the catch-up potential due to the medium-term view of a declining trade intensity of global growth, leading to lower technology spillovers from developed markets to emerging economies. This in turn slowed the productivity growth catch-up. In other words: less upside for a real emerging market currency appreciation, despite relative attractive valuation levels as discussed in 2.3.2. Even with a Phase 1 trade deal between US and China now in place, we believe that the trade tensions between these superpowers remain fundamentally unresolved. Covid-19 has accelerated the move towards re-localization, leaving the outlook for global trade still lackluster in our base case. The argument for a moderating productivity growth catch-up of emerging markets still holds.

Nonetheless, we see upside for nominal currency appreciation, notably versus the US dollar (and only to a lesser extent the euro). The relative law of one price dictates that currencies reflect price differentials between countries. We expect that the gap between inflation levels of developed countries versus emerging economies will decline. In our base case, US inflation will increase to 3% in the next five years as a result of a stronger fiscal and monetary impulse compared to emerging economies.

Declining inflation differentials could see a nominal emerging market currency appreciation versus the US dollar and to a lesser extent the euro. Given record-low starting yields, elevated idiosyncratic and systemic risk, and limited upside for productivity growth, we expect EMD returns well below our steady-state return, even though they offer an attractive excess return versus cash (3.25% in euro terms).

Figure 4.11: Fiscal stimulus closing the gap? Declining inflation differentials



Source: Refinitiv Datastream, Robeco

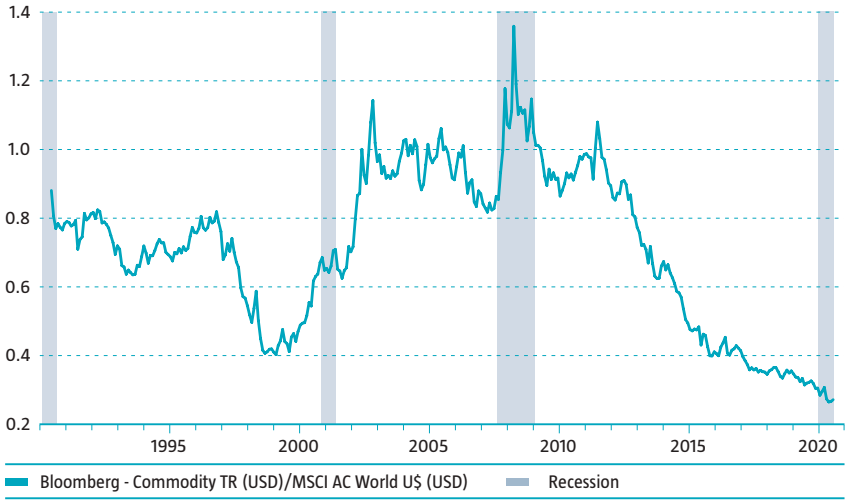
In our bull case, the initial phase of a synchronized recovery, with the global consumer regaining confidence on the back of an effective vaccine, is beneficial for EMD in local currency. In this scenario, the potential to improve productivity in emerging economies is realized and the valuation discount on a relative purchasing power parity basis vanishes as real appreciation takes shape. The macro momentum in emerging economies experiences a setback once the Fed starts to address the US inflation overshoot. As Subramanian and Kessler (2013) showed, developing countries need policy space to restructure their economies and this is exactly where the shoe starts to pinch as the Fed tightens monetary policy in 2023. Central banks in emerging markets have to follow the Fed's path to some degree. Nonetheless, EMD weathers this decline in excess global liquidity as FX reserve buffers were rebuilt in 2021-2023. Overall returns over the projection period are higher compared to our base case scenario.

Our stagnation scenario sees large spikes in idiosyncratic risks as a global debt-deleveraging cycle unfolds due to depleted policy space and ineffective coordination of fiscal and monetary policy. With global activity stagnating and global liquidity drying up, the currency return contribution to total EMD returns becomes strongly negative. The market demands a steep discount to allocate towards emerging market assets which are the most vulnerable to an upshift in protectionism, social unrest, persisting high unemployment and the move to the autarkic economic models in this scenario. We expect negative returns for EMD in local currency in this scenario for both US and European investors.

4.7 Commodities

Gold has been dethroning cash as king in the popular financial press, skyrocketing above USD 2,000 per ounce. Within the risky asset universe, it is striking how steep the relative underperformance of commodities versus global equities has been in the past decade. Are commodities ready for a broader comeback?

Figure 4.12: Commodities versus equities: time to catch up?



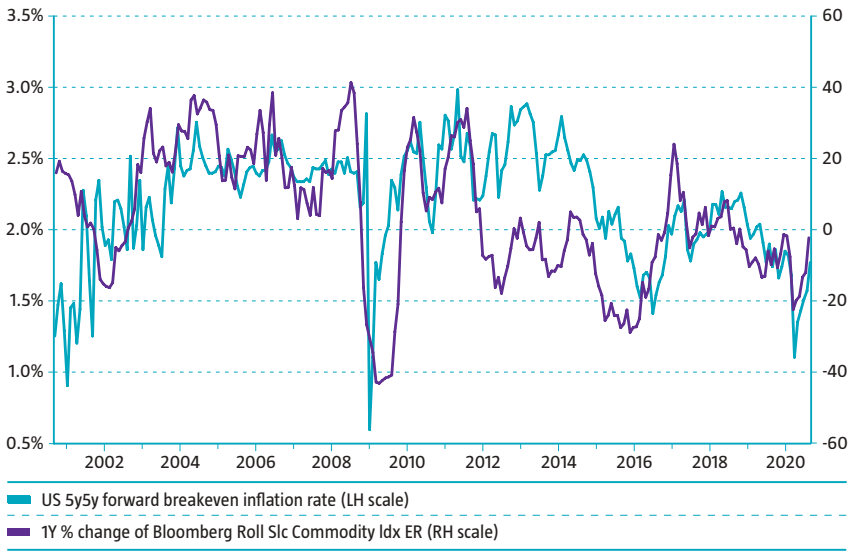
Source: Refinitiv Datastream, Robeco

Commodity returns are determined by spot returns, roll returns and cost of carry. The roll return is the most important contributor to total returns and is determined as the return obtained from rolling a shorter-dated position in a futures contract into a longer-dated contract. Research (Rouwenhorst et al., 2013) shows that the highest expected returns for commodities are generated in an environment in which the spot price is above the futures price, which often happens in a macroeconomic environment of declining inventory levels.

We are currently in an environment where miners and development and exploration assets have scaled back production as a result of Covid-19. With less supply, restocking commodities for industrial use is more expensive. In our base case, we judge fiscal stimulus to be effective in stimulating aggregate demand. As the economic recovery broadens, there is a growing imbalance between commodity supply and demand, with commodity curves moving towards backwardation, thereby generating a positive roll return.

Furthermore, rising protectionism and precautionary stocking raise future supply risks, thereby also contributing to a tilting of the futures curve towards backwardation. Erb and Harvey (2006) warn against a naive extrapolation of historical roll returns; the negative roll returns of the recent past might not be indicative of roll returns over the next five years. It is certainly likely that, in the next five years, a supply boost will follow improved commodity demand again with a lag, resulting in a rebalancing of supply shortages and lower roll returns in the second half of our projection period. However, Erb and Harvey also note another relevant aspect of commodity roll returns: their co-movement with unexpected inflation. They find a positive correlation between roll returns and unexpected inflation beta, where this beta refers to the sensitivity of a specific commodity future to changes in unexpected inflation. In line with the findings of Erb and Harvey, we find that year-on-year changes in the Bloomberg roll return index are positively correlated with changes in US five-year breakeven inflation rates (reflecting market adjustments of expected inflation). Given our view that US inflation will eventually reach 3% on a five-year horizon, this co-movement is a very interesting feature.

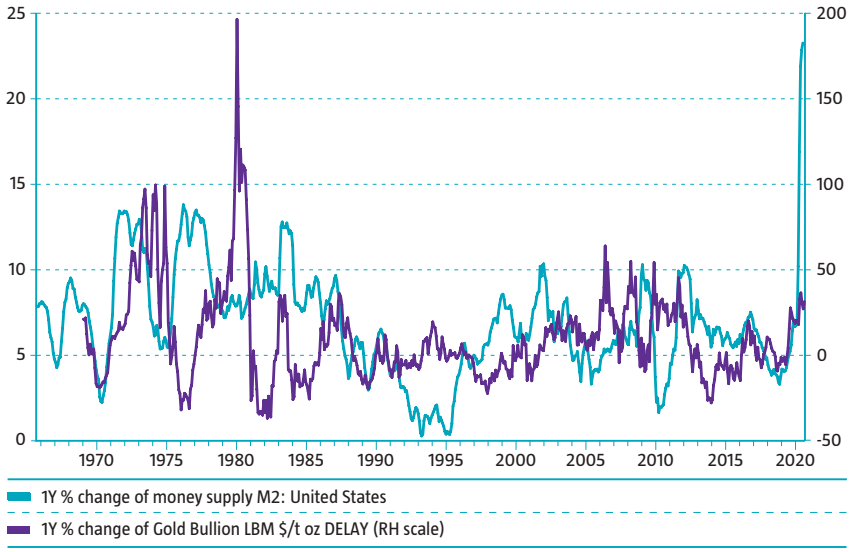
Figure 4.13: Ready to roll? Roll returns correlate positively with higher inflation expectations



Source: Refinitiv Datastream, Robeco

In a world in which real rates remain persistently negative, gold in particular shines brightly. As we observed in the expansion following the global financial crisis, expanding the money supply does not result in an increase in inflation. Nonetheless, the massive rise in the rate of change of US broad money supply, M2, does raise the odds. We expect above-average historical returns for commodities in this scenario.

Figure 4.14: An unprecedented money growth boost keeps gold shining



Source: Refinitiv Datastream, Robeco

In our bull case scenario, output gaps close earlier and the overshoot in inflation sees commodity prices even higher across the spectrum. Precious metals could come under pressure in the second half of our projection period, though, as central banks start a tightening cycle earlier than in our base case.

In our bear case, commodities falter and deliver below steady-state returns. Output gaps remain large as aggregate demand stagnates. There is excess capacity that needs to be worked off after a double-dip recession, which has resulted in low demand for industrial metals. The only bright spot in the commodity spectrum is gold, as it is perceived as a store of wealth. Gold outperforms silver in this scenario, as industrial use for the latter is in decline.

4.8 Summary

This chapter contains our forecasted returns based on our blend of long-term asset class returns, current valuation, and three macroeconomic scenarios. The introduction to this chapter contains the full overview for the main asset classes in the base scenario. These forecasted returns are displayed in the middle column of Table 4.3 labeled 'Base'. For the two other scenarios, we have also summarized the forecasted returns in this table, both for a euro and US dollar investor. This summary shows clearly that pandemic-induced economic stagnation will be bad for asset owners and will lead to loss of purchasing power for a balanced portfolio. The scenario with a 'reboot for growth' is a substantially more positive alternative scenario, with returns coming close to or even exceeding our long-term assumptions.

Table 4.3: Five-year return forecast for three macroeconomic scenarios

	Expected returns 2021-2025 (EUR)			Expected returns 2021-2025 (USD)		
Bonds	**Bull**	**Base**	**Bear**	**Bull**	**Base**	**Bear**
Domestic	-0.25%	-1.75%	-0.50%	1.00%	-0.25%	0.25%
Developed	-0.25%	-0.75%	-0.25%	0.50%	0.00%	0.25%
Emerging	3.00%	2.00%	-0.25%	5.25%	3.50%	-0.50%
Investment grade	0.75%	0.25%	0.50%	1.50%	1.00%	1.50%
High yield	2.50%	2.25%	0.00%	3.25%	3.00%	0.50%
Domestic cash	-0.25%	-0.50%	-0.50%	0.50%	0.25%	0.00%
Equity						
Developed	3.25%	4.75%	2.00%	4.75%	6.25%	2.00%
Emerging	7.25%	6.75%	0.00%	8.75%	8.25%	0.00%
Real estate	3.00%	3.00%	-1.00%	4.50%	4.50%	-1.00%
Commodities	6.00%	5.00%	2.50%	7.50%	6.50%	2.50%
CPI						
Inflation	2.25%	1.75%	1.00%	2.50%	2.00%	1.00%

Source: Robeco. September 2020.

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