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PRIVATE EQUITY

Look out below: Why returns are headed lower, and what to do about it

Investment professionals may have been spoiled by a long run of exceptional returns. We will find out soon.

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The past 30 years of investing were marked by extraordinary highs and lows. But one thing was consistent: exceptionally strong returns. Since the mid-1980s, US and Western European equity and fixed-income returns have easily outperformed the long-term average of the past 50 and 100 years. Despite repeated market turbulence, real total returns for equities investors for the 30 years between 1985 and 2014 averaged 7.9 percent in both the United States and Western Europe. These were 1.4 and 3.0 percentage points, respectively, above these regions' 100-year averages. Real bond returns in the same period averaged 5 percent in the United States, 3.3 percentage points above the average, and 5.9 percent in Europe, more than 3 times the 100-year average (Exhibit 1).

In recent years, the exceptional economic and business conditions that propelled these returns

have weakened or changed course. Our new research finds that the next two decades could see lower US and European equity and bond returns. As part of our investigation, we noted that some professional investors, including large US pension funds, may not have significantly altered their underlying assumptions about returns, and continue to expect them to perform in line with the recent past. This article explains our analytical framework, and then focuses on three insights from our research that could guide investors in this transition.

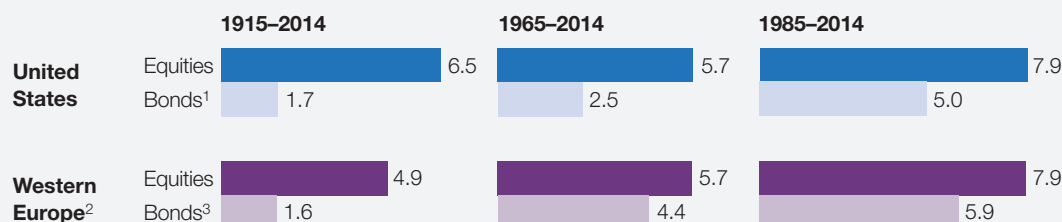
Investment returns and the link to the real economy: An analytical framework

Our recent research at the McKinsey Global Institute (MGI) into historic and future drivers of corporate profitability¹ has prompted us to take a closer look at investment returns. While we do not seek to predict short- or medium-term market

Exhibit 1

Returns on equities and bonds have been high over the past 30 years relative to the long-term average.

Total real returns, based on 3-year average index at start and end years, annualized, %



¹ Time frame between 1914 and 1927 calculated using Dimson-Marsh-Staunton data. Bond duration for 1928 and later is 10 years.

² European returns are weighted average real returns based on each year's Geary-Khamis purchasing-power parity GDP for 14 countries in Western Europe: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, and United Kingdom. Austria, Germany, and Italy are excluded from 100-year calculations. Each country's consumer price index is used to calculate its real returns.

³ For Europe, bond duration varies by country, but Dimson-Marsh-Staunton database targets bonds having a 20-year duration.

Source: McKinsey Global Institute analysis

trends, we have developed an analytical framework that links equity and bond returns to underlying business and economic fundamentals. Institutional investors have long sought to identify factors that drive returns in equities and fixed income. Some calculate a long-run average equity return and use this to estimate a historical equity-risk premium. Others use a discounted cash-flow model, with equity returns calculated based on assumptions for GDP growth, inflation, dividend yields, and price-to-earnings (PE) ratios. This approach typically requires assumptions for variables such as dividend yields or PE ratios that are not directly economic and business variables.

Our approach builds on these, but we seek to link equity and fixed-income returns directly to the real economy and to business fundamentals. We base our

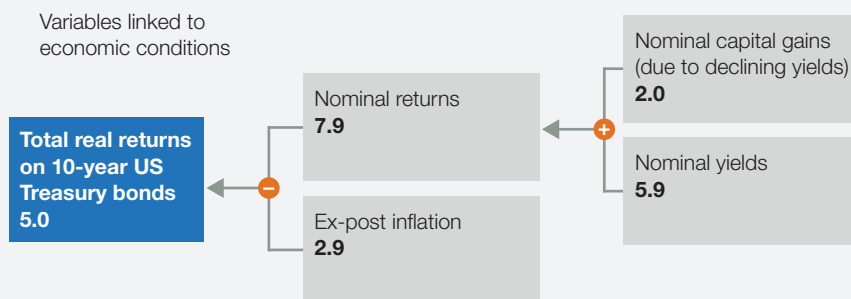
analysis on four principal factors: inflation, interest rates, real GDP growth, and corporate profit margins.

For bonds, the essential elements of total returns are yield to maturity and capital gains or losses driven by changes in the yield to maturity (Exhibit 2). Interest rates are the critical determinant of a bond's price after issuance: it rises as prevailing interest rates fall and vice versa, resulting in capital gains or losses for the bondholder. Higher inflation has an impact on fixed-income returns by raising nominal interest rates, but it also has an impact on the real yields on bonds. This is because investors demand a risk premium to compensate for expectations of inflation in the future, but realized inflation may be lower or higher than expected. As investors replace maturing bonds in their portfolio, the nominal yield of the new bond may be higher or lower than that of the bond it replaces.

Exhibit 2

There have been two main drivers of fixed-income returns in the past 30 years.

Contribution to fixed-income returns, United States, 1985–2014, annualized,¹
%



¹ Based on 3-year average index at start and end years. Figures may not sum, because of rounding.
Source: McKinsey Global Institute analysis

For total equity returns, two direct components are similar to those of bonds: price appreciation and cash returned to investors in the form of dividends and share repurchases.² A third element is ex-post inflation.³ Exhibit 3 lays out the “tree” of factors, of which the first two are by far the most important.

Consider price appreciation first. This element is determined by a company’s earnings growth (which is in turn driven by growth in revenue and change in margins), and changes in the price-to-earnings ratio.⁴ Revenue growth, in its turn, is driven by GDP growth and the firm’s sales growth in excess of GDP growth. Changes in the PE ratio reflect investors’ expectations of future earnings growth, return on equity, inflation, and the cost of equity.

The second element, cash returned to shareholders, is determined by earnings after reinvestment into the business to drive future growth. The payout

ratio measures the share of total earnings available to return to shareholders and is a function of nominal income growth and the marginal return on equity.⁵

The past 30 years were a golden age for returns

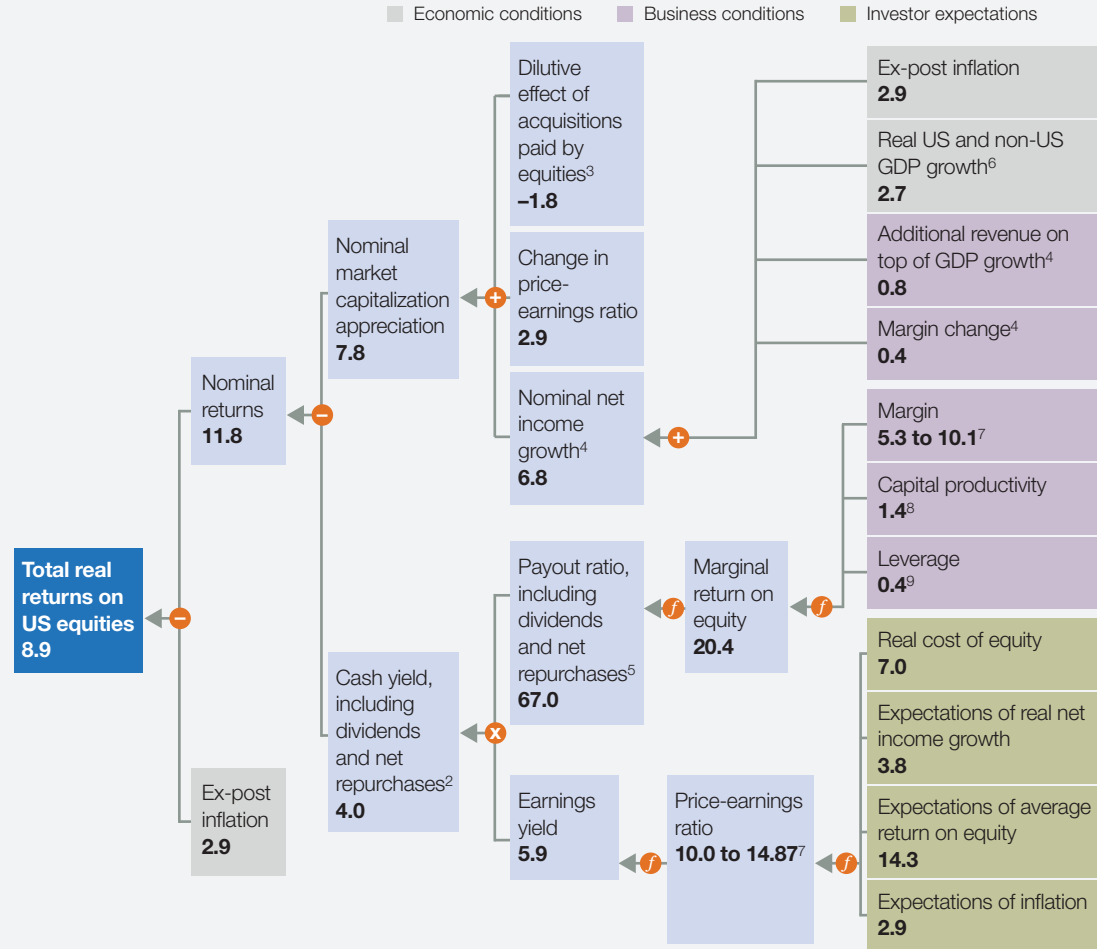
Three of the four economic and business fundamentals we use for our analytical framework produced exceptional results during these three decades, relative to the past 50 years. And the fourth was also strong during this time frame.

- **Inflation declined sharply.** The three-decade decline in US and European inflation, led by the drop that followed the oil shocks and erratic monetary policy of the 1970s, has significantly benefited investment returns. In the United States, consumer price inflation averaged 2.9 percent over the 30-year period, considerably less than the 50-year average of 4.3 percent.

Exhibit 3

A ‘tree’ of factors illustrates the drivers of equity returns for the past 30 years.

Contribution to equity returns, United States, 1985–2014, annualized,¹
%



¹ Letter “f” denotes “function.” Figures may not sum, because of rounding.
² Calculated as product of payout ratio and earnings yield.
³ Acquisitions paid for by shares rather than cash.
⁴ Includes cross terms.
⁵ Calculated as 1 – (nominal net income growth ÷ marginal return on equity).
⁶ Based on weighted average US + non-US GDP growth.
⁷ Refers to 3-year average at start of period and 3-year average at end of period.
⁸ Average capital productivity over past 30 years.
⁹ 30-year average of total debt divided by sum of total debt and book value of equity.

Source: McKinsey Corporate Performance Analytics; McKinsey Global Institute analysis

The high inflation of the 1970s led to unusually low PE ratios (between roughly seven and nine). Typically PE ratios fall because investors reduce their cash-flow expectations, since companies have to invest more of their profits to achieve the same real profit growth. Investors also demand higher nominal returns to offset their concerns about declining purchasing power of future dividends, increasing nominal discount rates. The low PE ratios of the 1970s and 1980s were a direct consequence of the high inflation investors had come to expect, and the subsequent rise in PE ratios as inflationary fears subsided was the biggest contributing factor to the high equity returns of the past 30 years, as we discuss below.

Inflation also affects real equity returns through the payout ratio, which was 67 percent over the past 30 years, compared with 57 percent in the past 50 years when inflation was higher.

For fixed-income returns, capital gains from declining nominal interest rates were a key contributor to higher returns in the past 30 years. Falling inflation explains part of this decline in nominal rates, but it also contributed to a decline in real interest rates, after central banks brought inflation under control in the 1980s and helped reduce investors' inflation risk premium.

- *Real interest rates fell.* The propensity to save rose while the global investment rate fell. Some researchers have estimated that, in real terms, global interest rates declined by 4.5 percentage points between 1980 and 2015.⁶ For mature economies, the drop was even larger: prior MGI research has shown that real interest rates on ten-year government bonds declined from 8.6 percent in 1981 to 1.7 percent in 2009.⁷

A critical factor driving the propensity to save is favorable demographics, which increased

the share of the working-age population and reduced the dependency ratio, especially in China.⁸ This resulted in a massive inflow of savings from emerging markets into the US and other advanced-economy financial markets, the so-called global savings glut.

Interest rates directly impact fixed-income returns, as discussed above. Changes in real interest rates can have an impact on share prices and equity returns as well, through portfolio rebalancing, where low yields on fixed-income securities result in an increased demand for equities, thus driving up prices. Other ways that rates can affect equity returns include changes in the cost of equity and in companies' interest payments. Our research found that interest expense has had a small effect, as corporate margins rose with lower interest expenses. But the other two avenues have not had an effect.

- *Favorable demographics and productivity gains fueled global GDP.* Between 1985 and 2014, global GDP growth averaged 3.3 percent per year globally, compared with 3.6 percent between 1965 and 2014.⁹ The past 30 years have not been exceptional, compared to the past 50 years. However, GDP growth in both time frames has been strong. Two components of historical GDP growth are notable, particularly with a view to prospects for future growth. The first was brisk growth in the working-age population. MGI research has found that in the G-19 and Nigeria (our proxy for global growth) the share of the population of working age climbed from 58 percent in 1964 to 68 percent in 2014. As a result, employment in this group of 20 economies grew at an annual rate of 1.7 percent during this period, contributing about 48 percent of their GDP growth.

Rising productivity, the second factor, generated the other 1.8 percent of global GDP growth,

contributing 52 percent to growth between 1964 and 2014.¹⁰ A number of factors propelled productivity growth, including a shift of employment from low-productivity agriculture to more productive manufacturing and service sectors, growing automation and efficiency in operations, and increasing integration of the world economy that led to more productive modern businesses gaining share from less productive ones. China is the leading exemplar of these trends; it alone contributed about 30 percent of the GDP growth of the past 50 years within the G-19 and Nigeria.

- *Corporate profit margins were exceptionally healthy.* The past three decades have been exceptional times for North American and Western European multinational companies, whose profits grew much faster than global GDP. In the United States, an increase in net income margins directly contributed one-third, or 1.1 percentage points, of the higher real equity returns of the past 30 years compared with the past 50 years. Overall, global corporate after-tax operating profits rose to 9.8 percent of global GDP in 2013 from 7.6 percent in 1980, an increase of about 30 percent.¹¹

Companies were able to grow revenue by accessing the growing global consumer class in emerging markets. Corporate revenue more than doubled from \$56 trillion in 1980 to more than \$130 trillion in 2013, driven by the growth in consumption and investment. Today, nearly one-third of all US firms' profit comes from overseas compared with about 15 percent in 1980. As companies increased their revenue, they also benefited from declines in their cost base. More than one billion people joined the global labor pool during this period, allowing firms in labor-intensive industries to benefit from lower labor costs.¹²

The effect on returns

These four fundamentals had a profound impact on bond and equity returns. Start with the simpler story. The most important factor for bonds was the large capital gains driven by declining interest rates, which accounted for 1.8 percentage points of the 2.5 percentage point difference between 30-year and 50-year returns (Exhibit 4). Lower-than-expected inflation contributed an additional 1.3 percentage points. These factors were partially offset by the change in nominal yields over the two periods. The same factors affected Western European fixed-income returns.

For equities, changes in PE ratios played a decisive role in lifting returns; together with other factors, they lifted returns by 3.3 percentage points over the past 30 years (Exhibit 5). A higher PE ratio accounted for 2.5 points of that difference. As discussed, PE ratios moved higher because of declining inflation and increasing margins. Growth in profit margins in the past three decades accounted for 1.1 points. On the other hand, slightly higher real GDP growth in the 50-year period trimmed 30-year returns by 0.3 percentage points.

The next 20 years will likely be more challenging

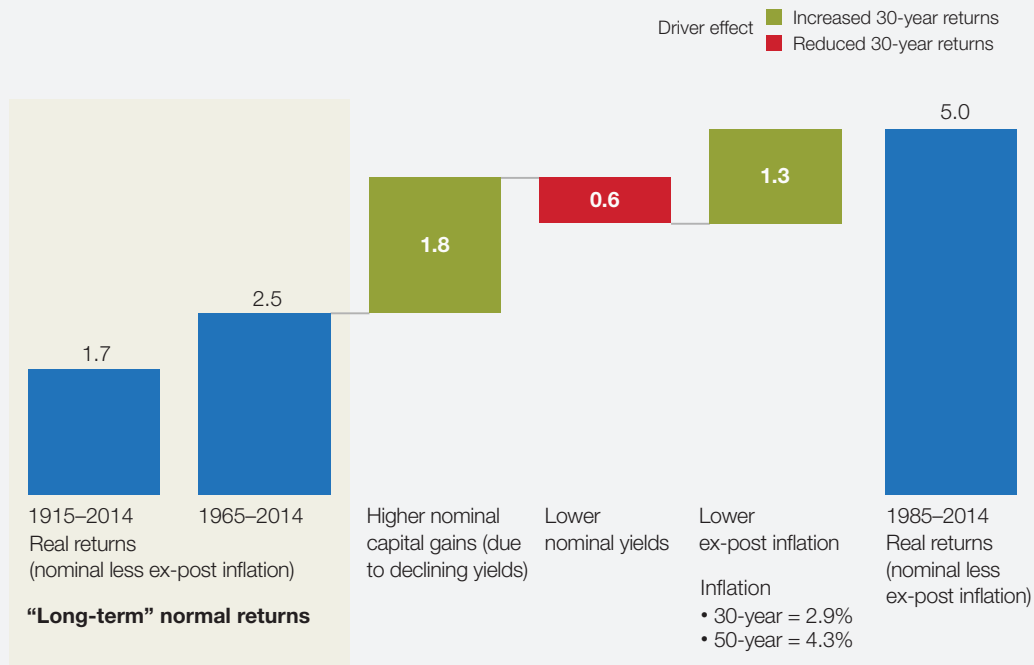
The fundamental economic and business conditions that contributed to the above-average returns of the past 30 years are weakening, and in some cases are in the process of reversing. As a result, investment returns over the next 20 years are likely to fall short of the returns of the 1985–2014 period.

- *The steep drop in inflation and interest rates is unlikely to continue.* Inflation is at about 1 percent in the United States and at zero or just below in the eurozone, far below historic average rates. Interest rates, too, are unlikely to fall much further. As we have seen, steep declines in both inflation and interest rates in

Exhibit 4

Declining yields and lower inflation drove higher bond returns in the United States in the past 30 years.

Fixed-income returns, 10-year US Treasury bonds, annualized,¹
%



¹ Based on 3-year average index at start and end years. Figures may not sum, because of rounding.

Source: Damodaran database, Stern School of Business, New York University; Dimson-Marsh-Staunton Global Returns database; McKinsey Global Institute analysis

the past three decades were primary drivers of the exceptional returns, but are unlikely to provide a similar boost in the future.

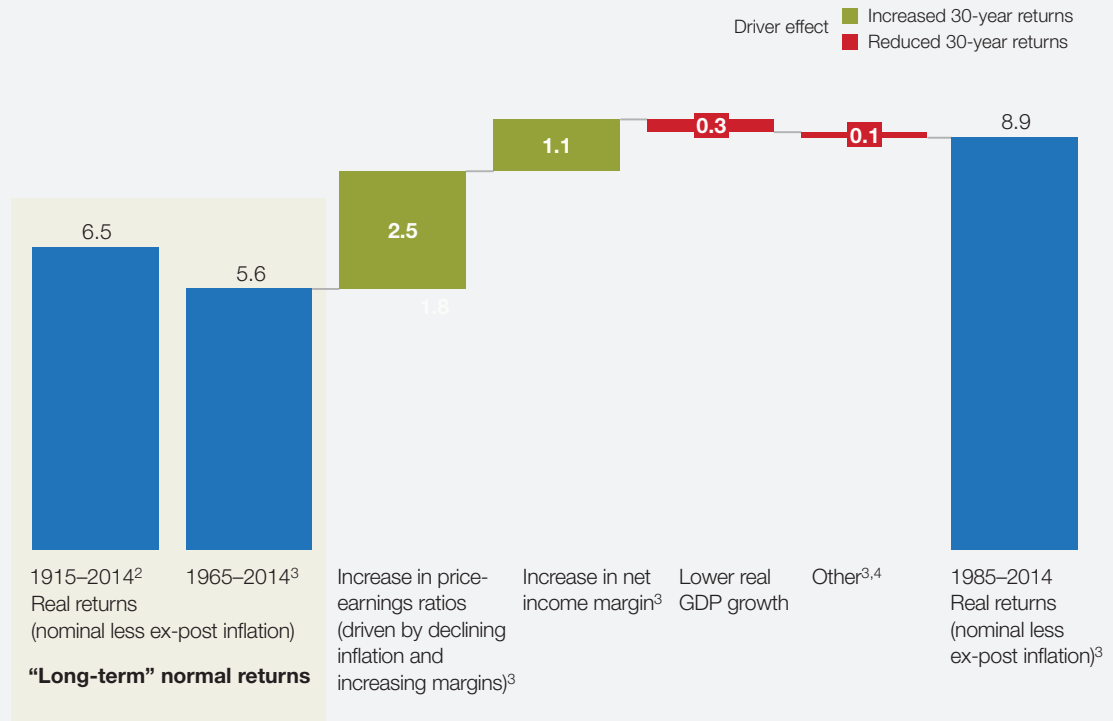
- **Stalled employment growth could weigh on GDP growth.** An aging world population means that one of the twin engines that powered growth over the past half century—a growing pool of working-age adults—has stalled. Employment growth of 1.7 percent a year

between 1964 and 2014 is set to drop to just 0.3 percent a year over the next 50 years in the G-19 countries and Nigeria. This leaves the onus on productivity growth to power long-term GDP growth. But even if productivity were to grow in real terms at the rapid 1.8 percent annual rate of the past 50 years, the rate of global GDP growth would still decline by 40 percent over the next 50 years, so great is the decline in employment growth.

Exhibit 5

Declining inflation and increasing margins drove higher equity returns in the United States in the past 30 years.

Equity returns, United States, annualized,¹
%



¹ Figures may not sum, because of rounding.

² Based on Dimson-Marsh-Staunton Global Returns database and includes both financial and nonfinancial institutions.

³ Based on data from McKinsey's Corporate Performance Analytics and only includes nonfinancial S&P 500 companies.

⁴ Includes impact of revenue growth incremental to GDP growth.

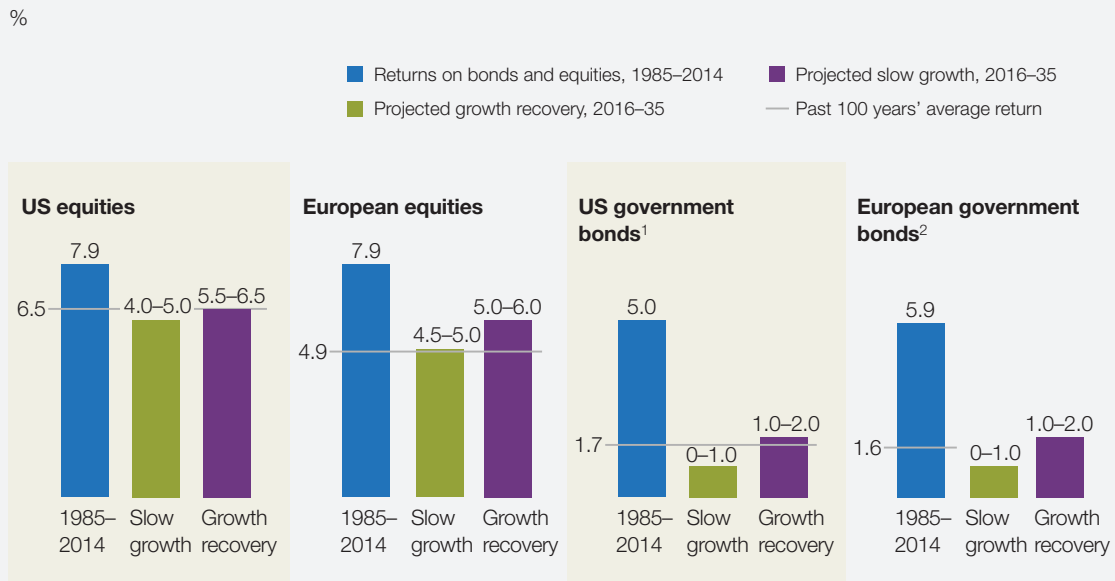
Source: Dimson-Marsh-Staunton Global Returns database; McKinsey Corporate Performance Analytics; McKinsey Global Institute analysis

- Businesses face a more competitive environment that could reduce margins.** The North American and Western European companies that benefited the most from growth of the global profit pool between 1980 and 2013 are facing tougher competition that could reduce their margins and profits. This heightened competition is coming from

newcomers in emerging markets, many of which are more agile and play by different rules. But it is also coming from tech-enabled giants that are disrupting long-standing business models by converting huge amounts of industry value to consumer surplus at the expense of incumbents' profits. And it is coming from small- and medium-size enterprises, which are

Exhibit 6

In two growth scenarios, returns over the next 20 years would be substantially lower than in the 1985–2014 period.



¹ Time frame between 1914 and 1927, calculated using Dimson-Marsh-Staunton database, which targets a bond duration of 20 years. Bond duration for 1928 and later is 10 years.

² Historical returns for Western European fixed-income are based on Treasury bonds using data from Dimson-Marsh-Staunton Global Returns database, which targets a bond duration of 20 years. Future returns show ranges across a set of countries and are based on 10-year bonds.

Source: McKinsey Global Institute analysis

gaining scale that enables them to compete with large enterprises, through online platforms such as Alibaba, Amazon, and eBay. This changing competitive landscape is likely to have an impact on profit margins. MGI research suggests that after-tax profits could fall from 9.8 percent of global GDP to 7.9 percent, reversing in a single decade the corporate gains of the past 30 years.¹³

We used our analytical framework to develop two scenarios for future returns. In the first, the slow-growth environment of today continues, while, in the

second, a growth recovery kicks in. In both scenarios, US and European equity and fixed-income returns over the next 20 years would be substantially lower than in the 1985–2014 period (Exhibit 6).

Under the slow-growth scenario, we assume average real GDP growth would be 1.9 percent over the next 20 years in the United States.¹⁴ Employment would grow at 0.5 percent per year and productivity at 1.5 percent per year in the United States. In this scenario our model suggests that nominal interest rates on 10-year US government bonds would rise, but only slowly,

reaching 2 to 3.5 percent. Inflation would remain benign, averaging 1.6 percent over the next 20 years, reflecting weak demand. Under this scenario, real equity returns for investors could fall to between 4 and 5 percent over the 20-year period. This would be around 3 to 4 percentage points below US real equity returns of 7.9 percent from 1985 to 2014. PE ratios would fall from an average of 17 today to 14.5 to 15 over the 20-year period, as investors adjust their expectations downward. Total returns on fixed-income investments could be between 0 and 1 percent over the next 20 years. This is 400 to 500 basis points below total returns in the past 30 years, and 150 basis points lower than the 50-year average of 2.5 percent, also below the 100-year average of 1.7 percent.

Under the growth-recovery scenario, productivity growth accelerates thanks to technical advances, and leads to real US GDP growth of 2.9 percent per year. At the same time, if US companies could match the performance of their best-performing industry or global peers, companies could maintain their post-tax margins at roughly today's levels, ranging from 9.6 to 10.1 percent. Even under this scenario, however, we find that investment returns would not live up to past expectations. Total real returns on US equities could be about 5.5 to 6.5 percent—about 140 to 240 basis points below the 1985–2014 average. Real fixed-income returns over the next two decades could be about 1 to 2 percent, or 300 to 400 basis points below the returns of the past 30 years.

The main drags on returns in this scenario are flat profit margins and PE ratios. PE ratios today are at 17 and are consistent with investors expecting about 2 percent inflation and 3 percent real earnings growth in future. Average PE ratios in this scenario would remain at about 2015 values, ranging from about 16 to 17.5.

Investors in Western Europe should expect trends similar to those in the United States, though the

magnitude of the potential fall in future returns is larger. In a slow-growth scenario, we estimate real equity returns could be about 4.5 to 5 percent over the next 20 years, more than 250 basis points below the average returns of the past 30 years, while in a growth-recovery scenario, they would be about 5 to 6 percent, close to their 50- and 100-year average but still well below the 1985–2014 level. Fixed-income returns would also decline, especially under a slow-growth scenario, when they would be more than 300 basis points below the returns of the past 30 years.

Lower your sights, tighten your belts

Lower returns could have a severe impact on asset owners and managers. Here, we highlight some of the potential consequences for four groups: defined-benefit public-employee pension funds, private-pension funds, traditional-asset managers, and alternative-asset managers.

Public pension funds will face larger funding gaps

US public-employee pension plans are increasingly invested in equities. Over the past 30 years, their allocation to fixed income has fallen from 75 percent to 27 percent.¹⁵ And yet many defined-benefit plans face funding shortfalls. In an era of lower returns, these funding gaps would be even larger. In the United States, 90 percent of state and local employee defined-benefit retirement funds are underfunded, by an estimated total of \$1.2 trillion.¹⁶ Ten large public-pension funds, including the California Public Employees Retirement System, the California State Teachers' Retirement System, and the Illinois Teachers' Retirement System, account for nearly 40 percent of this total funding gap.

Worryingly, most pension funds are still assuming high future returns. An analysis of more than 130 state retirement funds showed that the median expected future nominal return (based on the discount rate used) was 7.65 percent in 2014. While

this marked a decline from 8 percent in 2012, it is still above the returns in our growth-recovery scenario. To deliver this 7.65 percent nominal return would require a real equity return of 6.5 percent, if real fixed-income returns are 2 percent, and inflation is 2.4 percent. If fixed-income returns were lower at 1 percent in real terms, real equity returns would need to be as high as 7 percent.¹⁷

If returns match our slow-growth scenario, the funding gap for state and local funds could grow by \$1 trillion to \$2 trillion, assuming a portfolio mix of 30 percent bonds and 70 percent equities. In our growth-recovery scenario, the gap would still grow by as much as \$0.5 trillion.

Many European public-employee defined-benefit pensions are “pay as you go,” funded mainly by tax revenue rather than investment returns, and thus the pension funds themselves are not as directly exposed to equity and fixed-income markets as defined-benefit US public-pension funds. These unfunded pensions do face problems from changing dependency ratios. More pensioners and fewer workers will likely impact tax revenues.

[Private pension funds will also face funding gaps](#)

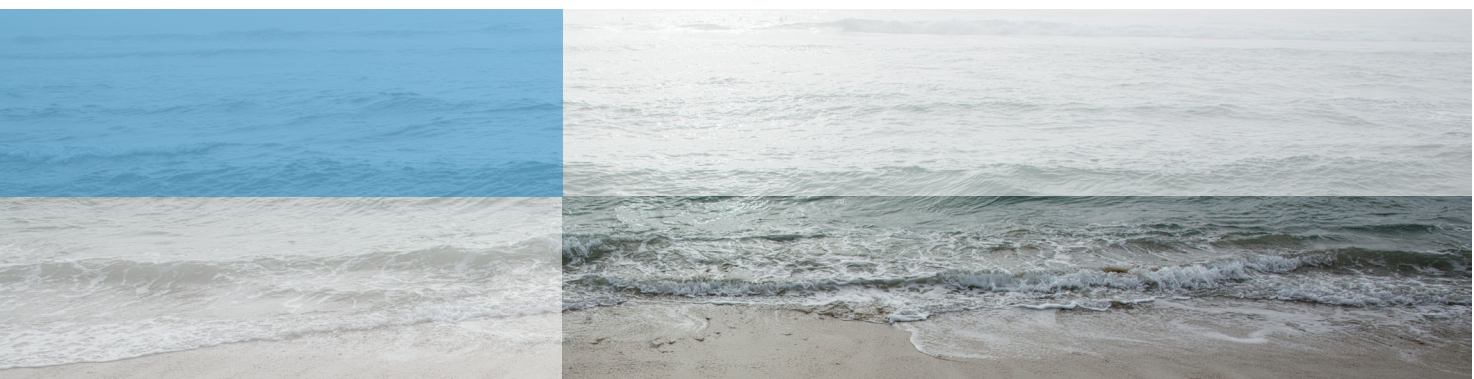
Defined-benefit corporate-pension funds in the past few years have already experienced the impact of ultra-low interest rates through the increase in

the present value of liabilities, as the liabilities of these plans are discounted based on corporate-bond yields. An analysis of the top 100 corporate plans found that liabilities increased by about 44 percent between 2007 and 2014.¹⁸ This compares with an increase in assets of 12 percent over the same period.¹⁹ While funding ratios have improved since the financial crisis, these companies still have a funding gap of about \$300 billion.

A Willis Towers Watson survey of private defined-benefit pension funds found that expected rates of return for US private-pension funds averaged about 7 percent in nominal terms or 4.5 percent in real terms, lower than the rates assumed by public-pension funds.²⁰ For the United Kingdom, the average expected return was 5.7 percent in nominal terms or about 2.5 percent in real terms. These expected rates of return are roughly on par with our growth-recovery scenario, and hence higher than in our slow-growth scenario.

[Traditional-asset managers may have to review investment strategies](#)

Investment flows are increasingly moving away from active investment in equities, and toward either passive low-cost products or alternatives and multi-asset classes. €2.36 trillion (\$2.66 trillion) flowed out of active equities between 2009 and 2014, compared with a net inflow of €1.43 trillion



(\$1.61 trillion) and €1.06 trillion (\$1.19 trillion) into multi-asset and alternatives respectively.²¹ This trend could be accelerated by low returns. Investors may seek to bolster returns or invest in products with much lower charges.

To confront this, asset managers may have to rethink their asset-gathering and investment strategies. One option would be for them to include more alternative assets such as infrastructure and hedge funds in the portfolios they manage. Another approach, paradoxically, could be to enhance capabilities for active management. As is well known, only a few active managers are able to produce consistently superior returns to passively managed funds. But such managers will be in even greater demand in the next 20 years. It's old news, but it's now even more important: active managers that can demonstrate a track record of success will likely take advantage of the new investing dynamics. For example, while average returns in the next 20 years could be lower, our prior research reveals that corporate profits are increasingly shifting from asset-heavy sectors to idea-intensive ones such as pharmaceuticals, media, and information technology, which have among the highest margins. Within these sectors, a winner-takes-all dynamic is taking shape, with a wide gap between the most profitable firms and others.²² In such a world, active managers who can successfully identify the winners could realize outsize returns.

Alternative-asset managers

The questions for private-equity firms and other alternatives managers are substantial. If equities and fixed income are entering a period of substantially lower returns, will alternatives be able to maintain their outperformance? Which firms will do best in the new environment? Will new models of alternative-asset management emerge? If performance drops below hurdle rates (8 percent, in many cases), what will the implications be for firms' ability to attract talent?

At this juncture, there are fewer answers than questions. For more, see "How private equity adapts: A discussion with Don Gogel" available on McKinsey.com.



The experience of the past 30 years suggests that stock and bond returns are directly linked to underlying business and economic fundamentals. A sustained period of lower returns would have implications not just for professional investors but also households, governments, endowments, nonprofits, and foundations. The National Center for Education Statistics estimates the total endowment for US colleges at about \$425 billion at the end of 2012.²³ A 3 percentage-point lower return could mean about \$13 billion less for US colleges, putting pressure on these institutions, and on government for greater subsidies. Resetting expectations for less bountiful times, with less stellar returns than the past three decades, is an essential starting point for all investors. ■

¹ *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015, McKinsey.com.

² Price appreciation is shown on Exhibit 3 as "Nominal market capitalization appreciation." Cash returned to investors is shown as "Cash yield, including dividends and net repurchases."

³ Inflation has an important but underappreciated effect on equity returns, affecting both payout ratios and price-to-earnings ratios. Higher inflation increases nominal net income growth, which in turn reduces the payout ratio and the cash returned to shareholders, unless companies are able to increase their return on equity sufficiently to offset the effect of higher nominal growth on required investment. For more, see Marc Goedhart, Timothy M. Koller, and David Wessels, "How inflation can destroy shareholder value," *McKinsey on Finance*, February 2010, McKinsey.com.

⁴ We have calculated price-to-earnings ratios by modeling the four factors shown in the exhibit. For more, please see the technical appendix in "Diminishing returns: Why investors may need to lower their expectations," McKinsey Global Institute, May 2016, McKinsey.com.

⁵ Real returns in this exhibit are based on nonfinancial institutions in the S&P 500 and were used for the sole purpose of understanding the drivers behind 30- and 50-year returns.

Given the different coverage of companies here, values for returns may vary from those of US equities shared elsewhere in this report. GDP growth was based on a weighted average of US and non-US GDP growth, based on share of domestic versus overseas corporate profits.

- ⁶ Mervyn King and David Low, *Measuring the “world” real interest rate*, National Bureau of Economic Research working paper, number 19887, February 2014, nber.org; Lukasz Rachel and Thomas D. Smith, *Secular drivers of the global real interest rate*, Bank of England staff working paper, number 571, December 2015, bankofengland.co.uk.
- ⁷ *Farewell to cheap capital? The implications of long-term shifts in global investment and saving*, McKinsey Global Institute, December 2010, McKinsey.com.
- ⁸ Lukasz Rachel and Thomas D. Smith, *Secular drivers of the global real interest rate*, Bank of England staff working paper, number 571, December 2015, bankofengland.co.uk.
- ⁹ Based on an analysis of G-19 countries (G-20 minus the European Union) and Nigeria. These countries generate about 80 percent of global GDP. For more details, see *Global growth: Can productivity save the day in an aging world?*, McKinsey Global Institute, January 2015, McKinsey.com.
- ¹⁰ *Global growth: Can productivity save the day in an aging world?*, McKinsey Global Institute, January 2015, McKinsey.com.
- ¹¹ *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015, McKinsey.com.
- ¹² Rapid technological innovation has helped companies improve productivity and further reduce costs; in the past 30 years, the cost of automation (relative to labor) has fallen by more than half in advanced economies.
- ¹³ *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015, McKinsey.com.
- ¹⁴ Many US companies have overseas operations. We also therefore consider GDP growth in the rest of the world. In this scenario, this would be 2.1 percent. In the growth-recovery scenario, we assumed 3.4 percent.
- ¹⁵ Sacha Ghai, Bryce Klempner, and Josh Zoffer, “Bending the third rail: Better investment performance for US pensions,” *McKinsey on Investing*, Number 2, July 2015, McKinsey.com.
- ¹⁶ Estimated by triangulating across multiple sources, including Alicia Munnell and Jean-Pierre Aubry, “The Funding of State and Local Pensions: 2013-2017,” Center for Retirement Research at Boston College, June 2014, crr.bc.edu; US Board of Governors of the Federal Reserve System. “Financial Accounts of the United States,” December 2015, federalreserve.gov; *2015 report on state retirement systems: Funding levels and asset allocation*, Wilshire Consulting, February 2015, wilshire.com; and *2015 report on city and county retirement systems: Funding levels and asset allocation*, Wilshire Consulting, September 2015, wilshire.com. Wilshire data show that state pension funds had an average funding ratio of 77 percent, compared with 95 percent in 2007, a decline that reflected the impact of the recession.

- ¹⁷ For more details, see *2015 report on state retirement systems: Funding levels and asset allocation*, Wilshire Consulting, February 2015, wilshire.com; and *2015 report on city and county retirement systems: Funding levels and asset allocation*, Wilshire Consulting, September 2015, wilshire.com. Our analysis of 70 public pension plans from data in the Pension and Investments database for 2014 also revealed median and average assumed rates of return of 7.7 percent.
- ¹⁸ John Ehrhardt, Zorast Wadia, and Alan Perry, *Milliman 2015 pension funding study*, Milliman, April 2015.
- ¹⁹ This could in part be due to companies continuing the shift to defined-contribution plans as well as removing workers from defined-benefit plans through one-time lump-sum buyouts.
- ²⁰ *2015 Global survey of accounting assumptions for defined benefit plans*, Willis Towers Watson, August 2015, willistowerswatson.com.
- ²¹ McKinsey Global Performance Lens Growth Cube analysis. See also *New heights demand increasing agility: Global asset management overview*, June 2015, McKinsey.com.
- ²² *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015, McKinsey.com.
- ²³ US Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 2013 (NCES 2015-011)*, 2015.

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