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WISO DISKURS

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EXCESSIVE EXPECTATIONS

OECD and EU Commission Should Revise their Return Assumptions

FOREWORD

In 2001, Germany – a country whose pension system used to be organized as a pay-as-you-go scheme – introduced reforms that aimed at establishing private pensions as an important pillar of old age provisions. Private savings in funded pension plans were incentivised through public subsidies in order to compensate for the cuts to the public pay-as-you-go system and to ensure that pensioners were able to maintain their living standard after retirement.

Germany had finally joined the club of European countries that put their hopes in the capital markets to solve their demographic problems. Hopes were high and many expected that funded pensions would actually outperform the pay-as-you-go scheme. Even the last years of notoriously low interest rates did little to change that.

This line of argument relies on the assumption that capital markets deliver reasonably high returns in the long run, higher than the virtual return on any pay-as-you-go plan. To proof this point, return simulations for funded pension calculated by the Organization for Economic Cooperation and Development (OECD) are often cited as a credible source.

The evidence presented here sheds a critical light on the results of these simulations. The authors argue that the expected capital market returns that are based in historical data are much lower than reported by the OECD if one uses a longer observation period for the simulations. It is therefore necessary to reassess the long-term return expectations for funded pensions.

As an immediate result, the role of funded pensions in old-age provision is once more a question open to debate. Whether they can or cannot be a reliable source of income to maintain the living standard of pensioners requires a critical assessment – not only in Germany. Besides, the authors' results do not even take into account additional benefits of most pay-as-you-go schemes, e.g. survivor pensions or pensions in case of the reduction in earnings capacity.

This publication is a critical contribution to the debate on the future of pension systems in the OECD world. We hope that it will help to open up the discussion about the expectations related to funded pension schemes.

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EXECUTIVE SUMMARY

The OECD return simulations published in 2009 (D'Addio et al. 2009; Whitehouse et al. 2009) are used to bolster its long-term OECD projections for funded pensions. Data from the 1980s to 2006 were used to estimate future returns for various scenarios for a period of forty-five years. The analysed period does not, however, correspond to the historic developments, and thus leads to a clear overestimation of returns.

When historical data for a long period of time is used, rather than relatively short and non-representative periods, it becomes apparent that a considerably more sober estimate of future return expectations is necessary. Not only does the supposed return advantage to funded schemes lose its foundation, it also becomes clear that the return assumptions backing long-term pension projections are usually excessive and need to be lowered substantially.

In this paper we show that on the basis of historical US data from 1927 onwards the average total gross return on a "balanced portfolio" over forty-year investment periods is 3.6 percentage points below the value used as the basis for OECD return simulations. The empirical gap of 0.6 percentage points between average real gross return and average real GDP growth is therefore so small that the average effective return – after deduction of costs – that can be realistically assumed for funded pension schemes should be (considerably) less than average GDP growth.

In any case, the basic assumption of a future real effective return of 3.5 percent used in the OECD's long-term projections (OECD 2013: 144), as well as that of 3.0 percent made now by both the OECD (2015a: 113) and the EU Commission (2014: 106, The 2015 Ageing Report) proves to be substantially exaggerated.

This is all the more true when one considers that long-term attainable returns are heavily influenced by macroeconomic developments, and thus plausible future return assumptions cannot be made untethered from assumptions on future GDP growth.

The same long-term projections on which assumptions for long-term attainable effective real returns of 3.0 percent are based forecast considerably lower real GDP growth rates, and presumably rightly so.

The basic assumptions on future real effective returns thus require a substantial downward correction, which would have considerable implications for anticipated funded pensions. As a rough approximation, a return reduction of 1 percentage point would cause the replacement rate to fall by 20 percent (OECD 2013: 144). Realistic expected rates of return lead thus to substantially lower funded pensions, and depending on the weighting of the funded part, would lead to accordingly lower total pensions. This is of great importance assessing the long-term adequacy of pension schemes and their financial sustainability.

The expected pension levels assumed for funded pension schemes in OECD calculations and in long-term projections by the EU Commission will, as a rule, only be achieved through significantly higher contributions and thus substantially higher costs, or will not be achieved at all.

1

INTRODUCTION

In pay-as-you-go (PAYG) systems claims are tied to the development of GDP, as well as wages and salaries. This not only makes economic sense, because pensions are tied to the volume of goods and services available, but also provides considerably greater dependability. While rates of return on financial markets fluctuate drastically and unpredictably, GDP and wages develop comparatively steadily. PAYG systems therefore offer much better reliability regarding the expected absolute and relative income position of pensioners.

The issue of the reliability of the PAYG system is less controversial than the issue of the alleged higher returns of funded systems. Of course, other asserted and contested advantages of funded pension schemes are often argued in the pension debate, such as funded systems being less influenced by demographic shifts or improving risk diversification. We argue that these assessments fail to stand up to critical analysis (Türk et al. 2015: 51 – 62). Here we focus our analysis on empirical verification of questionable higher rates of return of funded systems and of the plausibility of assumptions for returns on pension funds made by the OECD and the EU Commission, as institutions that wield great influence in the pension debate. The data very clearly shows enormous fluctuations in rates of return too.

Significantly higher rates of return are often cited as a supposed advantage of fully-funded pension schemes as opposed PAYG pensions.

While PAYG claims develop in conjunction with wage growth, financial investments supposedly generate higher benefits due to higher capital market returns. Therefore, future pensioners participating in a PAYG system would forgo significant future income.

Particularly towards the end of the 1990s – spurred by a lengthy phase of excessive equity performance – exaggerated return expectations were common and capital market risks significantly underestimated. Although a certain sobering set in following the stock market crash of the early 2000s and the financial crisis of 2008, inflated return expectations continue to prevail.

So the latest return simulations by the OECD are based on unrealistically high return assumptions made on the basis of non-representative observation periods.

Based on historical data from the United States beginning with 1927, average equity and bond returns are calculated to lie 3.5 and 3.9 percentage points below the values used by the OECD. The required corrections have far-reaching consequences.

Although the current – and probably longer-lasting – low-interest-rate environment clearly underlines the need for a considerably more sober estimate of future returns, this paper focuses not on short and medium term prospects, but on realistic long-term expectations.

2

WHAT RETURNS ARE REALISTIC IN THE LONG RUN?

For an estimate of plausible return assumptions for funded pension schemes it is necessary to establish a representative investment portfolio. This should include equities, less volatile assets like bonds, and also, in particular, cash.

As a rule, a simplified mixed portfolio of (government) bonds and stocks is used. In the case of equities, both the change in value and the dividend payments need to be taken into account.[1] This is done using total return indices, assuming an ongoing reinvestment of dividends. Next, costs that reduce the effective returns need to be quantified. Lastly, the calculated (theoretical) market returns have to be corrected for these effects in order to arrive at plausible effective return assumptions. Within the framework of the following analysis of the OECD return simulations, this important aspect will be discussed in more detail.

2.1 OECD RETURN SIMULATIONS

OECD return simulations published in 2009 (D'Addio et al. 2009; Whitehouse et al. 2009) are used to back up their return assumptions in long-term projections for funded pensions.[2]

On the basis of historical data on returns on equities and government bonds for eight OECD countries (G7 plus Sweden), spreads of future returns were estimated for a forty-five-year period using a complex simulation process based on different portfolio compositions. For this group of countries as a whole, based on a balanced portfolio composition (50 percent equities and 50 percent bonds), a median (gross) real return of 7.3 percent was found.[3]

The net returns were estimated taking account of various costs (Whitehouse et al. 2009: 38). Administrative costs in the accumulation and pension start-up phase were estimated at 1.3 – 2.0 percentage points. Agency governance effects accounted for a reduction of 1 percentage point or more.[4] Other effects – like tracking errors[5] and future demographic shifts – that depress (future) returns relative to the (historical) market returns as measured by an index, are even more difficult to quantify. These effects are mentioned, but disregarded in the calculations. The model also neglected that index-based return calculations due to survivorship bias also lead to overestimation.[6]

Whitehouse et al. (2009: 38) put the quantified cost effects that correspondingly lower effective returns at 2.3 – 3.0 percentage points. This touches upon a fundamental aspect: the supposed return advantages of funded pension schemes cannot be justified by arguing that conventionally determined capital market returns are slightly higher than wage bill growth. Rather, the reported "return advantage" would have to open up a significant gap in order to create a plausible advantage in effective returns.

The adjustment of simulated effective returns carried out by Whitehouse et al. (2009: 17f.) for the cited effects and costs turns out to be quite inconsistent. The median (simulated) effective returns for a balanced portfolio are claimed to be 5.0 percent for the group of countries as a whole. Therefore, the adjustment merely makes up for the

1 Bloomberg data for the S&P 500 clearly shows that the dividend return has declined considerably, with the mean for the last twenty years (around 1.8 percent) less than half the figure for the preceding twenty years. Nonetheless, this return component should not be ignored.

2 Until recently the OECD (2013: 144) assumed an average effective real return of 3.5 percent (baseline assumption) with the results of the return simulations cited to back this assumption. In Pensions at a Glance 2015 (OECD 2015), published in December 2015, the real return assumption was reduced to 3.0 percent and the real wage growth assumption from 2.0 percent to 1.25 percent. The revision was motivated by the major economic developments affecting all OECD countries over the last decade, which suggest lower future rates.

3 In the following returns always refer to gross returns (before the deduction of costs). Returns after deduction of costs are referred to as effective returns.

4 Fund managers' interests do not coincide with those of stakeholders. Stakeholders also have less information at their disposal, and effective oversight is associated with substantial costs.

5 The tracking error refers to the (unintended) difference between performance of an actual portfolio and a benchmark portfolio. Typical benchmark portfolios are stock market indices.

6 Survivorship bias is the tendency to exclude failed companies from the indices. This exclusion results in overly optimistic projections.

minimum quantified effects of return reduction reported in the aforementioned analysis. The effects mentioned – but not quantified – in the OECD analysis were disregarded. This practical approach thus conflicts with the findings previously reported by the authors.[7]

Of course, given the complexity of the issue, an accurate and comprehensive estimation of costs is almost impossible. Furthermore, an overestimation of capital market returns may also be accompanied by an overestimation of at least some costs. However, there is a series of reasons why returns achieved by individuals on their pension funds are (substantially) less than market returns as measured by indices.

2.2 OECD SIMULATIONS ARE BASED ON INADEQUATE DATA SETS

The crucial underlying weakness of these simulations lies in the "historical" data used in the calculations. Data was drawn from 1980/82/85/89 to 2006, depending on the country (period of 18 to 27 years). Not only were the implications of the financial crisis neglected, but the base periods used can in no way be considered representative, due to abnormal equities performance. The same is true for the methods chosen to determine bond returns. This will be illustrated below with the data used for the United States, which dominates the overall results of the OECD simulations.

The unusual nature of the chosen period must have struck the authors, as they themselves report that on the basis of the returns of the twenty-five years prior to 2006, one could double one's assets (inflation-adjusted) with bonds every thirteen years and with stocks every nine (D'Addio et al. 2009: 20). On average, bonds in the eight countries yielded a real annual gain of 5.4 percent, stocks 8.2 percent. In contrast, it took the real GDP of G7 economies the whole period from 1980 to 2006 to double. Average growth in real GDP for the G7 states from 1980 to 2006 was 2.7 percent.[8] An assumption that bond returns can sustainably remain twice as high as economic growth, let alone that returns on stocks can be three times as high, is risky, to say the least.

2.3 HISTORICAL CAPITAL MARKET RETURNS ON STOCK INVESTMENT IN THE UNITED STATES

The OECD simulation of "expected" real returns on stocks for the next forty-five years used a value of 10 percent as the "historical" average (1980–2006) of real total return on stock investment in the United States (D'Addio et al. 2009: 12, Table 2).[9]

Based on monthly data from Bloomberg for the S&P 500 and CPI (Consumer Price Index) data from the US Bureau of Labor Statistics (2014, 2016) as of 1927, the geometric mean of the real total return – taking into account the dividend yields – was determined for periods of forty years, starting in 1967.[10] Figure 1 shows that this "average" return of 10 percent was (almost) reached only once – at the start of

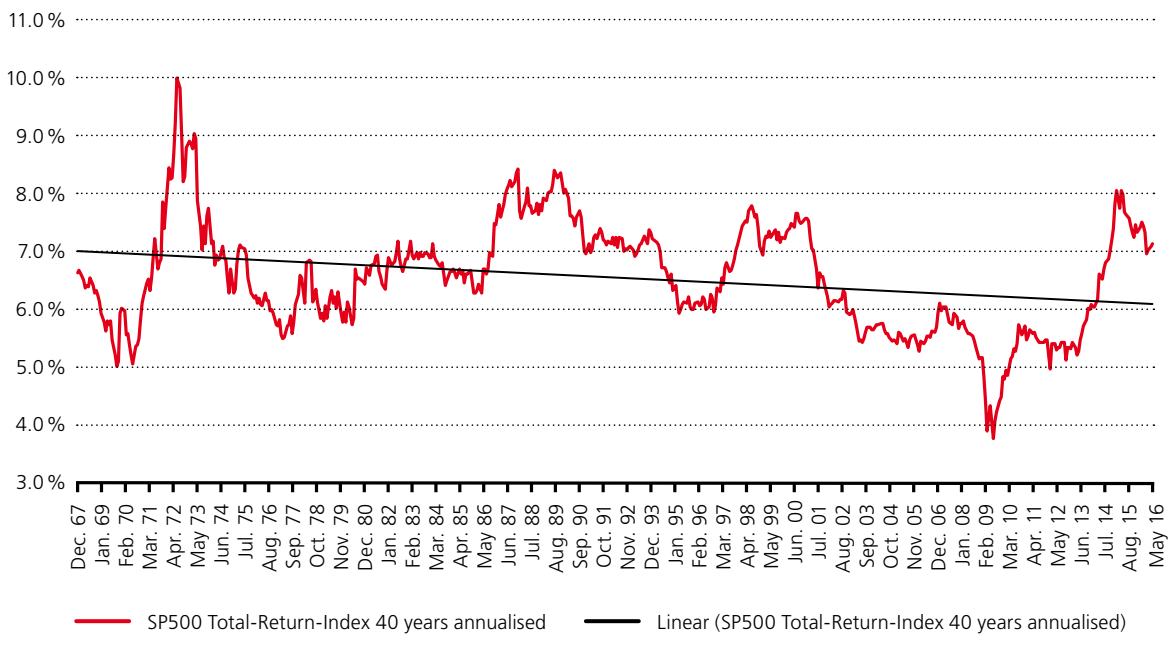
7 This could also be the reason why, in the 2013 edition of the OECD standard reference Pensions at a Glance (OECD 2013: 144), the median is reported as 4.3 percent instead of 5.0 percent, with no concrete source offered.

8 Authors' own calculations, data: St. Louis Fed, http://research.stlouisfed.org/fred2.

9 The US value is thereby much higher than that of the G7 plus Sweden.

10 The geometric mean of a growth rate over a certain period is equivalent constant growth rate that would yield the same final amount.

Figure 1
Real annualised returns on U.S. equities (S&P 500)
assuming investment periods of 40 years and reinvestments of dividend payments



Source: Authors' own calculations, data: Bloomberg; US Bureau of Labor Statistics 2014, 2016.

the 1970s – in all of the 582 observations, including May 2016. In a relatively clear downward trend, the arithmetic mean and the median are both 6.5 percent – 3.5 percentage points below the value used in the OECD simulations.[11]

It should not to be overlooked, either, that long-term conditions for the US stock market are considerably more favourable than for Europe or the Asian market, and therefore the average long-term returns also turn out to be accordingly higher.[12]

Nevertheless, based on the empirical data, even the higher returns on investments exclusively in US stocks would hardly make a good case for funded pensions over PAYG. Long-term average GDP growth calculated over forty-year periods can serve as an approximation.[13] The mean for the United states since 1967 is 3.6 percent,[14] 2.9 percentage points less than the (gross) return on US equities as measured by indices. Given the considerable volatility associated with investment exclusively in stocks, the real effective returns, taking into consideration return-reducing costs, might exceed average real GDP growth somewhat, but hardly to a point that would bring it even close to justifying the considerable risks associated with stocks.

The sheer magnitude of share performance volatility, apparent even in a forty-year average, can easily be seen in Figure 1. The long-term average return from the start of 2009 was barely half as high as that of the end of 2000 or fall 2014. This means that a few years' difference in the start of retirement would lead to completely different benefit amounts and thus to a "pension lottery".

In addition to the well-known importance of comparative risks, another aspect of PAYG schemes has not yet been fully taken into account in the literature but might have an important influence on the relative attractiveness of funded and unfunded pension schemes. Well-designed PAYG pensions are tied to wages. This lowers the uncertainty of an individual's future relative position and increases the attractiveness of unfunded pensions, assuming that people care about relative consumption (Knell 2010: 727f.).

Altogether, it is clear that the average real returns on stocks inferred from "historical" data limited to a short and abnormal period – as used in OECD simulations – exceeds the value found in a longer historical observation by around 3.5 percentage points.

2.4 HISTORICAL CAPITAL MARKET RETURNS ON INVESTMENTS IN US BONDS

Even more obvious discrepancies are found in the "historical" bond returns used in the OECD simulations. The real US bond return based on observations for 1980–2006 averaged 5 percent (D'Addio et al. 2009: 12, Table 2). This very striking value can only be accounted for by the observation period chosen, in combination with the calculation method applied.

Calculation of bond returns was also carried out using total return indices, which take into account price variations and reinvestment of interest payments. All government bonds with an original maturity of at least one year were mapped. Inflation was adjusted using CPI (D'Addio et al. 2009: 10).

The total return of a long-term investment in bonds can be estimated relatively easily using the geometric mean of annual interest rates, supposing that each bond is kept until maturity. Using this approach, a systematic discrepancy arises out of the fact that the current interest rate lasts only one year, yet is applied to the whole portfolio. In reality, return on a portfolio – assuming that bonds are held to maturity – results from the weighted average of all bonds. By way of example, in a portfolio consisting of routinely rebalanced ten-year government bonds, current interest rates only partially affect the total interest, just as the interest rates of the previous nine years do. This imprecision accordingly loses importance in calculations of long-term average returns.

Calculation of bond returns based on total return indices requires no constraining assumptions regarding holding periods; it is therefore a more suitable method for determining rates of return on bonds. Nonetheless, such methods can lead to substantial distortions, especially in combination with the use of few and relatively short observation periods. Bond prices are known to reflect changes in market interest rates. If, for example, the interest on ten-year government bonds drops, then the price of the higher-rated bonds already in circulation increases in order for their effective interest rate, assessed over the remaining time to maturity, to adjust to the current market rate.

Falling interest thus leads to rising bond prices, and vice versa. Cumulative interest advantages or disadvantages (with respect to market interest rates) over the remaining term are factored into price variations. Average bond returns thus calculated are defined not only by interest levels, but to a large extent by changes in interest levels.

If, as in the OECD return simulations, a period of only twenty-seven years is used (whose early stage is characterized, moreover, by an unusually high nominal interest level,[15] decreasing almost constantly throughout the observation

11 The difference between our method (see Figure 1) and the method applied by the OECD is that we calculated average returns over forty-year investment periods on a rolling basis, based on the monthly data (starting with the period from December 1927 to December 1967). The OECD used only the period from 1980 to 2006 and treated it as representative. Using only this single period, the stock return in the US is indeed almost 10 percent. However, this represents only the result for one cohort, whose assessment period of twenty-seven years ends in 2006. An assessment period of forty years corresponds better to the normal duration of savings in a working life. The results for the longer period are significantly lower, using the S&P data available from the end of 1927. The figure of 10 percent was only reached for one observation.

12 Based on data from 1900–1999, Knell (2010: 718) calculated an average real return on equities over twenty-year periods of 6.4 percent for the United States. According to the authors' own calculations based on data from Knell (2010: Table 1), the corresponding value for the G9 (including Japan, Germany, France, United Kingdom, Italy, Spain, Canada and Australia) is 4.7 percent.

13 From the authors' point of view, real GDP growth seems to be a better approximation of growth of wage bill than growth rate of GDP per capita.

14 Authors' own calculations; data source: Bureau of Economic Analysis 2016; GDP prior to 1929: Measuringworth.com.

15 This period of high interest was set in motion by the FED. The Effective Federal Funds Rate rose from ten percent at the beginning of 1979 to the beginning of 1981 to about 19 percent (Board of Governors of the Federal Reserve System (US), 2015); the prime rate of 11.75 percent in the first quarter of 1979 rose to 20.35 percent in the fourth quarter of 1980 (OECD 2015b).

period), then a gravely distorted picture emerges – resulting from the high initial interest level and almost nonstop clear rate gains. This picture is then "typical" of an exceptional period, but definitely not of overall historical trends.

The gravity of the distortions produced by this approach is illustrated below using calculations for ten-year US government bonds. The data is based on nominal annual interest rates from 1927 to 2015 and the bond returns derived from it, calculated taking into account interest and bond price (Damodaran 2015). Real returns are adjusted for inflation via the CPI (U.S. Bureau of Labor Statistics 2014, 2016).

Figure 2 shows nominal and real interest rates and the geometric mean of total returns on bonds, based on interest and bond prices for the trailing twenty-seven-year periods beginning in 1954 and historical forty-year periods beginning in 1967. Twenty-seven-year periods are shown to offer a comparison with the "historical" values upon which the OECD return simulation is based. The geometric mean of the real rate of return on ten-year US government bonds for 1980–2006, thus calculated, averages out at 5 percent, corroborating the value for the dataset used by the OECD.

It is also clearly visible that this is a value from around 2007. Apart from that absolute peak, average returns over twenty-seven-year periods are always considerably lower; in twenty-six instances negative (i.e. less than inflation).

Likewise, it is clear that the real interest rate was normally markedly below 5 percent. Solely at the beginning of the 1980s did the combination of very high nominal interest rates with sharply falling inflation result in markedly higher real interest rates (just as short-lived as those in the brief but severe period of deflation at the start of the 1930s).

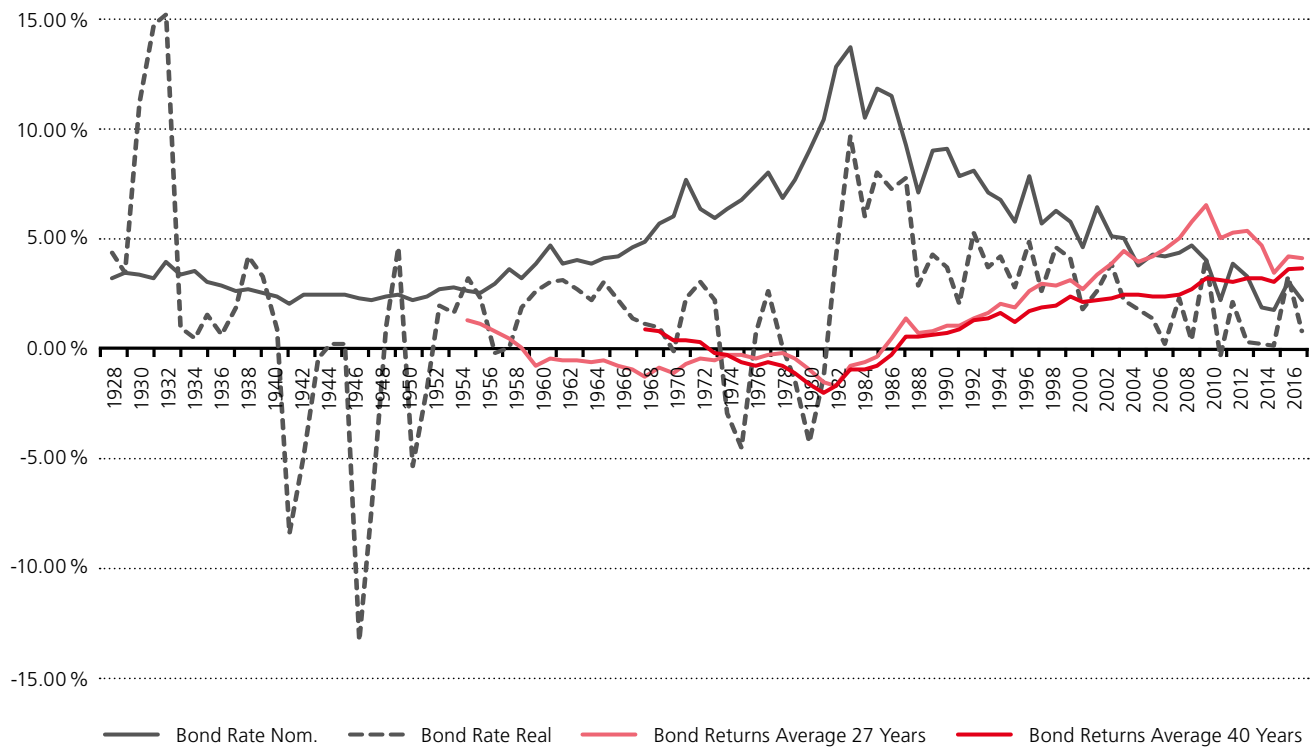
The arithmetic mean of the real interest rate on ten-year US government bonds for the whole period was, accordingly, barely 2 percent; the geometric mean was 1.88 percent.

Average total returns were subsequently calculated for forty-year periods, corresponding to a "typical" lifetime duration of employment. Calculating total bond returns using interest rates and bond prices, the average real rates of return (geometric mean) changed by between minus 2 and plus 3.7 percent; the median and arithmetic mean are 1.2 percent and 1.1 percent respectively. The real average rate of return of five percent as calculated for the twenty-seven-year period ending 2006 is thus not remotely reached, not even once; the real average rate of return for forty-year periods is almost 4 percentage points lower.

Historically representative real bond returns can in no way be generated from the average real bond return calculated for 1980–2006. The "historical" data on which OECD return simulations are based thus proves totally unsuitable for estimating prospective bond returns. Forecasts based thereon will inevitably be grossly overestimated.

This approach appears even more unrealistic if we consider the present situation in the bond market, which is characterized by low real interest rates and low inflation. If the interest level were to remain stable, then long-term bond returns would gradually approach this level. If, however, it were to markedly increase, then a corresponding price loss would occur to counter the effect of the rising

Figure 2
10-year U.S. government bonds, real and nominal interest rates plus average total returns on long-term investments in bonds



Source: Authors' own calculations, dataset: Damodaran 2015; U.S. Bureau of Labor Statistics 2014, 2016; Board of Governors of the Federal Reserve System 2016.

real interest rates over the period of adjustment. A rise in inflation would even further amplify the price loss. An increase in average bond returns over a long period would only emerge after a considerable delay. These effects are illustrated in the appendix "Scenarios for prospective developments of long-term bond returns".

2.5 HISTORICAL US CAPITAL MARKET RETURNS ON A BALANCED PORTFOLIO

Lastly, using the historical total returns on US stocks and ten-year US government bonds, we calculated returns on investment in a "balanced" portfolio (made up of 50 percent equities and 50 percent government bonds) and compared them to the basic assumptions of the OECD return simulations. The calculations are based on annual data from the end of 1927 to the end of 2015. It is assumed that the portfolio is restructured at the end of each year in order to restore the balanced distribution of equities and bonds.

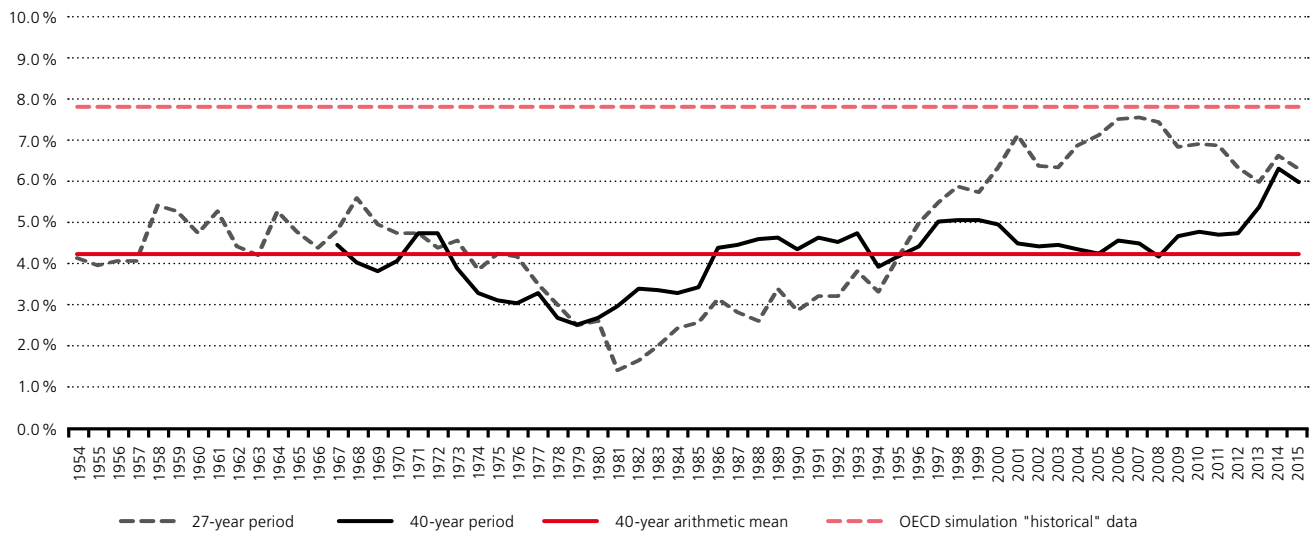
The "historical" data used for OECD return simulations, based on a balanced investment, indicate an average real (gross) return – before deducting costs – of 7.8 percent (D'Addio et al. 2009: 12, Table 2).

Using historical US data since the end of 1927 produces annual real returns of -21.5 percent to +28.6 percent on a balanced investment. Average returns (geometric means) over twenty-seven-year periods fluctuate between 1.4 percent and 7.6 percent. The highest value, from 2007, falls just below that proposed by the OECD (base period: 1980 2006). Normally, however, returns over twenty-seven-year periods are considerably lower.

For investment periods of forty years – again, approximately the duration of lifetime employment – average returns (geometric means) fluctuate between 2.5 percent and 6.3 percent. Throughout the observation period, the figure never came close to a return of 7.8 percent over a forty-year investment period. The average return on all forty-year investments is 4.2 percent, 3.6 percentage points below the value used as an empirical basis for OECD simulations.

Average real GDP growth in the United States over the same period was 3.6 percent, exactly 0.6 percentage points less. The gap between average real gross return and average real GDP growth is therefore so small that even under the assumption of significantly lower costs than those quantified by the OECD, effective returns on a balanced portfolio would not on average exceed GDP growth. Based on historical data for the United States, it turns out that the average effective return – after deduction of costs – that can be realistically assumed for funded pension schemes is (considerably) less than average GDP growth. A returns advantage for funded pensions over PAYG schemes is thus not empirically supported.

Figure 3
Average real gross returns (before deduction of costs) on a balanced portfolio (50 % US stocks and 50 % US goverment bonds) over 27-year and 40-year periods



Source: Authors' calculations; data source: Bloomberg; Damodaran 2015; U.S. Bureau of Labor Statistics 2014; 2015; Board of Governors of the Federal Reserve System 2016.

3

REALISTIC RETURN EXPECTATIONS REQUIRE ADJUSTMENTS OF LONG-TERM PROJECTIONS

When historical data for a long period is used, rather than relatively short and non-representative observation periods, it becomes apparent that a considerably more sober estimate of future return expectations is necessary. Not only does the supposed return advantage for funded schemes lose its foundation, it also becomes clear that the return assumptions backing long-term pension projections are usually excessive and need to be lowered substantially.

The OECD (2013) argued that its basic assumptions with respect to average real effective returns on funded pensions – in line with its long-term projections of 3.5 percent – are well supported. Based on a median total (gross) return of 7.3 percent for G7 plus Sweden, the median effective return would thus be 4.3 percent for the eight OECD countries altogether, and the lower quartil at 3.3 percent. In just under 75 percent of cases, an even higher yield would thus be calculated (OECD 2013: 144).[16] This argument clearly does not hold up for data from a longer period of time.

As mentioned above, the 2015 edition of Pensions at a Glance (OECD 2015a: 113) reduced the real effective return assumption to 3.0 percent – on the basis of the major economic developments over the last decade. The OECD assumptions are therefore in line with the assumption of real effective returns of 3.0 percent in funded pension schemes that serves as a basis for the EU Commission's long-term projections (EU Commission 2014: 106). Likewise the real wage growth – and productivity growth – assumption was reduced from 2.0 percent to 1.25 percent (OECD 2015a: 113). The implicit OECD assumption regarding the gap between effective returns on pension investments and GDP growth was in fact increased by this change.

As show above using historical US data, the average total gross return on a balanced portfolio over forty-year investment periods is 3.6 percentage points below the value used as the empirical basis for OECD return simulations. An average real effective return of 3.0 percent must be regarded as substantially inflated in the face of historical data.

This is all the more true when one considers that long-term attainable returns are in large part influenced by macroeconomic developments, and thus plausible future return assumptions cannot be made in isolation from assumptions on future GDP growth.

The same long-term projections on which assumptions for long-term attainable effective real returns of 3.0 percent are based, forecast considerably lower real GDP growth rates, and presumably rightly so. Whereas average long-term real GDP growth of 3.6 percent served as the basis for the (empirical) average real gross return on a balanced investment indicated above, long-term projections by the European Commission for the whole European Union for 2013–2060 are based on a real GDP growth rate assumption of only 1.4 percent (EU Commission 2014: 100). In the OECD's long-term projections – as mentioned above – the real wage growth assumption (and therefore implicitly the productivity growth assumption too) was reduced to 1.25 percent (OECD 2015a: 113).

The basic assumptions for future real effective returns thus require a substantial downward correction, which would have considerable implications for anticipated levels of funded pensions. As a rough approximation, a return reduction of 1 percentage point would cause the replacement rate[17] to fall by 20 percent (OECD 2013: 144). This is of great importance assessing the long-term adequacy of pension schemes and their financial sustainability. On the basis of significantly inflated return assumptions alone, it appears that an adequate level of future pensions is endangered in many countries (OECD 2015a: 141, 147). Applying more realistic return assumptions therefore produces a markedly worse picture for countries with pensions more heavily weighted toward funds.

16 D'Addio et al. (2009: 28, Table 6) assume a median of 5.0 percent. In about 85 percent of the cases here, a median exceeding 3.5 percent would be obtained.

17 The replacement rate is the ratio of pension income to the last earned income before retirement.

4

CONCLUSION AND OUTLOOK

As we have demonstrated above, the supposed advantage for funded schemes is not substantiated by empirical evidence. No evidence for a return advantage for funded schemes was found, even for the United States, despite its long phase of development free of the ravages of war on its own soil, and despite its highly advanced financial markets. Based on US data available since 1927, average real returns on bonds over a forty-year accumulation period are 1.1 percent; on stocks 6.5 percent; and on balanced portfolios (50 percent stocks and 50 percent government bonds) 4.2 percent, all before deduction of corresponding effective-return-reducing costs. The empirical real rates of return on a balanced investment in the United States lay 3.6 percentage points below those assumed in the "historical" data used in the OECD simulations.

Average real growth of US GDP over the same period was 3.6 percent, exactly 0.6 percentage points less than empirical gross total return on balanced investments. The gap between average real gross return and average real GDP growth is therefore so small that even under the assumption of significantly lower costs than those quantified by the OECD, effective returns on a balanced portfolio would not exceed GDP growth rate on average. Thus, based on historical data for the United States, it turned out that the average effective return that can be realistically assumed for funded pension schemes should be (considerably) less than average GDP growth. A return advantage for funded pensions over PAYG schemes is thus not empirically supported.

Furthermore, realistic return expectations require a commensurate adjustment of long-term projections. The OECD argued in 2013 (144) that its earlier basic assumption of 3.5 percent average real effective return on funded pension schemes was well supported. This rationale is clearly rebutted by historical data.

In any case, the former figure for future real effective returns used in the OECD's long-term projections, its downward revision to 3.0 percent (OECD 2015a: 113), and the EU Commission's figure of 3.0 percent (2014: 106) all prove to be substantially exaggerated. This is all the more true when these long-term projections are adjusted for considerably lower real GDP growth rates. Realistic expected rates of return ultimately lead to substantially lower funded pensions, and depending on the weighting of the funded part, also to accordingly lower total pensions.

The expected pension levels assumed for funded pension schemes in OECD calculations and long-term projections by the EU Commission will thus as a rule only be achieved through significantly higher contributions and therefore substantially higher costs, or will not be achieved at all.

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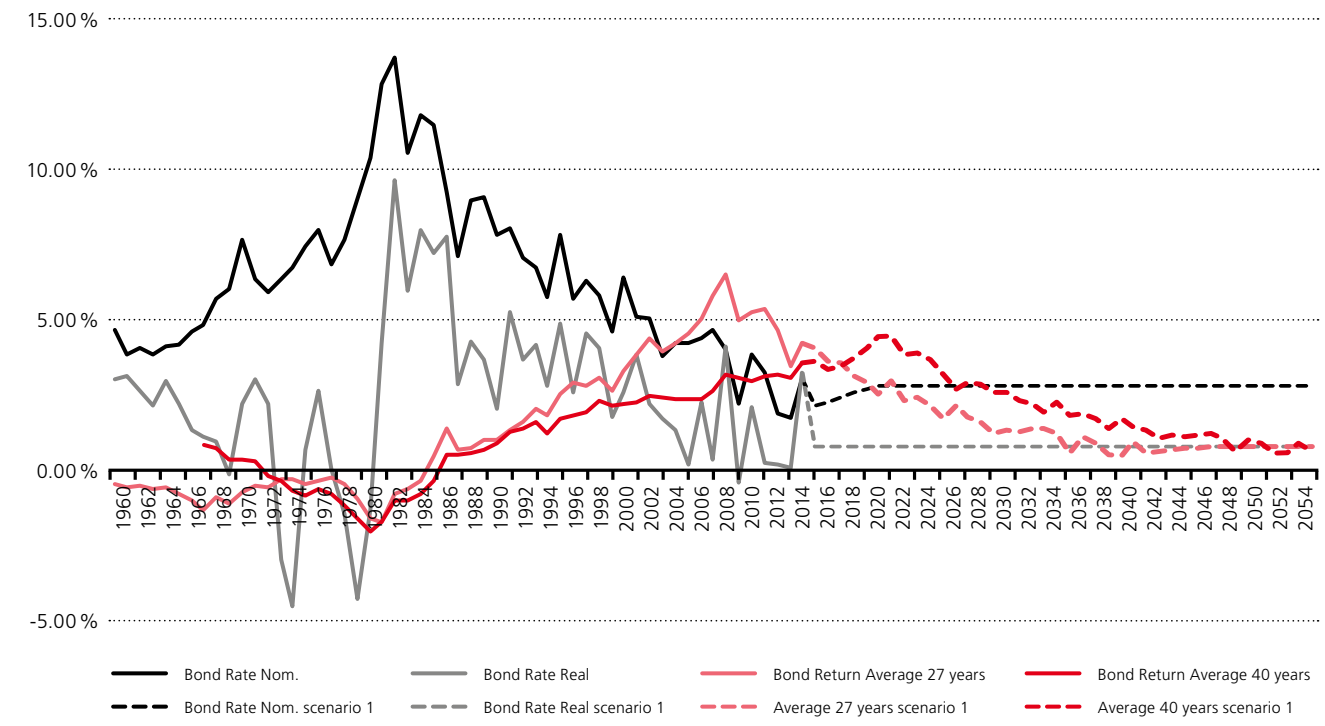
APPENDIX
Scenarios for prospective developments of long-term bond returns

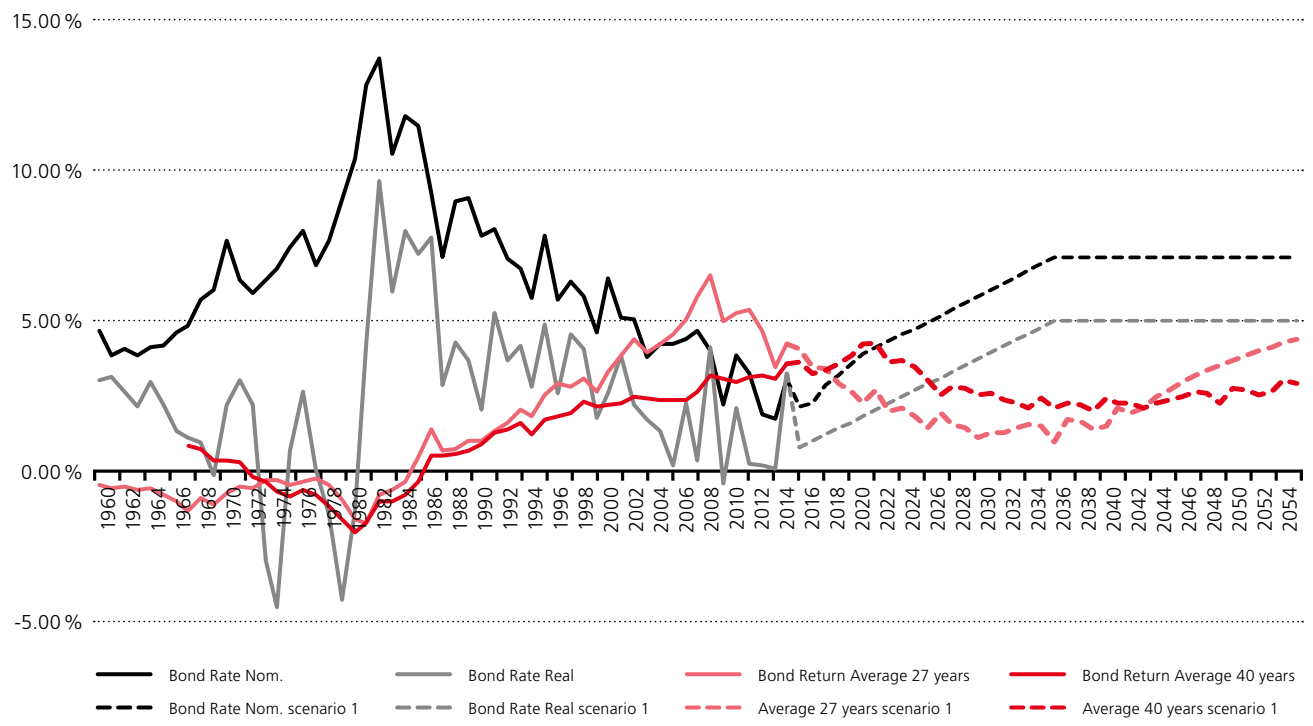
In scenario 1, it is assumed that the real interest rate as of the year 2015 remains stable, and the rate of inflation rises slightly over a period of five years to 2 percent. In scenario 2, it is assumed that the real interest rate rises to 5 percent over a period of twenty years, and then stays at that level. Neither situation is very plausible, but they offer a range within which real interest rates will probably move, and demonstrate the following: based on the present situation, the realisation of higher bond returns over the next few decades is highly improbable.

Scenario 1
Real and nominal interest rates remain at low levels



Source: Authors' own calculations, data source: Damodaran 2015; U.S. Bureau of Labor Statistics 2014, 2016; Board of Governors of the Federal Reserve System 2016.
For a more precise description of the assumptions on which scenario 1 and 2 are based on see above.

Scenario 2
Real interest rate rises to 5.0 % over a period of 20 years



Source: Authors' own calculations, data source: Damodaran 2015; U.S. Bureau of Labor Statistics 2014, 2016; Board of Governors of the Federal Reserve System 2016.
For a more precise description of the assumptions on which scenario 1 and 2 are based on see above.