German households' saving and investment behaviour in light of the low-interest-rate environment

Since the outbreak of the financial and economic crisis, nominal interest rates have fallen to historical lows, particularly for bank deposits. This has notably affected German households, which traditionally hold a significant portion of their financial assets in the form of these deposits. Some are therefore publicly questioning whether it is worth saving in the first place. In actual fact, however, bank deposits are not the only form of investment in households' portfolios, with insurance claims and securities also making up a substantial share of their financial assets. Limiting the debate to deposit interest rates therefore oversimplifies the issue. Furthermore, nominal interest rates are of limited value in adequately gauging the level of property income. Indeed, in this context it is more appropriate to look at real returns, which besides taking into account the inflation-related erosion of purchasing power also factor in other income components such as valuation effects and dividends.

If all the major investment forms in households' financial portfolios are taken into consideration, real returns in recent years have been higher than deposit interest rates would suggest. One reason is that financial assets also include other, higher-yielding forms of investment. What is more, households' real total return has also been low at other times in the past, sometimes even far lower than in recent years.

However, these real returns have at best only marginally influenced the saving and investment behaviour of German households since the beginning of the 1990s. Factors relating to income and wealth, as well as demographics and the institutional framework, are likely to have been far more important determinants. Furthermore, household preferences concerning the liquidity and riskiness of financial assets also seem to influence their behaviour. The low-interest-rate environment is unlikely to have changed this in any substantial way. In reality, the persistent strong risk aversion has been further diminishing the significance of returns as a determinant of investment behaviour.

Introduction

Nominal interest rates in Germany historically low, …

Since the outbreak of the financial and economic crisis, nominal interest rates in Germany have fallen to historically low levels. This is particularly apparent in the case of bank deposits, where returns on investment are now at zero in some cases or even in negative territory. The upshot of this for households, which traditionally hold a significant proportion of their financial assets in the form of bank deposits, is that the property income they earn on a substantial part of their portfolios has shrunk to unprecedented lows in recent years.

… sparking a debate over their impact on households' saving and investment behaviour

These developments are stirring a debate whether households should even save in the first place, the concern being that people might abandon longer-term saving objectives, particularly private old-age provisioning. This debate sometimes over-generalises the low interest rate level for bank deposits and does not always give other financial assets and the income they generate the attention they deserve. The prospect of reduced saving efforts potentially having undesirable knock-on effects has even prompted calls in some quarters for the state to do more in the way of bonuses and other subsidies to make saving a more attractive proposition.

Against this backdrop, this article essentially explores three questions. First, how does the current return on German households' financial assets stack up historically, taking the various investment forms into account?[1] Second, how did German households' saving and investment behaviour develop over the past few decades and in the more recent past? And third, to what extent do returns influence this behaviour? Are there any indications that the low-interest-rate environment has caused these patterns to change? These questions will be answered primarily from a macroeconomic perspective – that is to say, distribution aspects within the household sector will not be discussed. The data set is largely extracted from the financial accounts.

Real returns – theory and development in Germany

Theoretical reasoning

Nominal rate of interest particularly easy to grasp, but neglects inflation-induced erosion of purchasing power

For private savers, the nominal rate of interest on their deposits is a particularly easy notion to grasp. It is often quoted directly in the terms and conditions of a given financial investment, such as banks' saving agreements, making it frequently one of the main factors considered in investment decisions. The nominal interest rate denotes the income from a financial investment in the form of interest payments in relation to the nominal value of the investment. What this view of things neglects, however, is that inflation varies the purchasing power of nominal interest rates.[2] Indeed, if the inflation rate exceeds the nominal interest rate, the interest income may have increased the financial assets nominally, but effectively those financial assets will buy less goods and services than before.

Real interest rate the more suitable indicator

A more appropriate indicator for the rate of return on households' assets, then, is the real interest rate r_t, which approximates the difference between the nominal interest rate i_t and the rate of inflation expected over the period in

1 Non-financial assets, which notably consist of real estate, are disregarded in this debate on two grounds. First, investments in non-financial assets are often not made with a view to making a return. In the case of real estate in particular, the main motivating factor is often the desire to own property, regardless of potential returns on investment. Second, constraints on the availability and comparability of data – which for non-financial assets are only published annually and at replacement costs rather than market prices – would considerably hamper the analysis.
2 From the vantage point of the real economy, interest is defined by the time preference theory as a measure of the reward for forgoing current consumption in favour of future consumption. The liquidity preference theory, on the other hand, describes interest as compensation for temporarily parting with liquidity (means of payment).

question π^{e}_{t+1}. It can be formally represented by the following equation.[3]

$$r_t = i_t - \pi^{e}_{t+1}$$

Returns encompass interest payments as well as income from price changes and dividends

However, interest payments are just one form of income from a financial investment. Depending on the financial asset in question, other income components can come into play as well. While interest payments are ultimately the only source of income from bank deposits, income from securities (ie shares, debt securities and investment fund shares) is driven to a large extent by changes in the price of a given security. Shares and certain investment funds, meanwhile, usually accrue dividends, too. The sum of these components represents the total income from a given financial investment. Total income as a percentage of the amount invested is the return on that investment. The real return on that investment is then calculated by adjusting the nominal return for the expected inflation rate.

In practice, however, using inflation expectations to calculate real returns is a difficult undertaking, especially because information is lacking on the intended investment horizon[4] and the expected nominal returns. The use of inflation expectations therefore requires additional assumptions to be made, rendering it a highly uncertain approach. For consistency reasons, the actual inflation rate is used throughout the remainder of this article.[5]

Real returns by financial asset

Mixed real returns on financial assets in households' portfolios over time

The chart on page 16 shows how real annual returns on the main financial assets held by households in Germany have developed since 1991 (see the box on pages 17 to 19 for a description of how returns were calculated). Many of the returns were seen to vary widely over time and follow very different paths in some cases. However, selected financial assets, such as shares and investment fund shares on the one hand and deposits[6] and insurance claims on the other, can be seen to exhibit similar return patterns.

Real return on bank deposits low throughout the period under review

The real return on bank deposits saw comparatively little fluctuation over the period under review. From the 1990s onwards, it was usually less than 1% and even dipped into negative territory on occasion, though never to such a great extent or as persistently as in the current setting of low nominal interest rates. There was once a spell in the early 1990s, for instance, when high nominal interest rates coincided with the comparatively high inflation rates caused by the reunification boom, meaning that the real return was low overall. However, towards the end of this boom phase and with inflation starting to recede in 1994, real returns began to climb again. A similar pattern was also in evidence in the late 1990s before the New Economy bubble burst and also in the years running up to the global financial and economic crisis. But since the end of 2010, real returns on bank deposits (particularly transferable deposits) have been negative, essentially eroding the purchasing power of the assets held as deposits. The dwindling rate of inflation

3 The definition of real interest also makes it possible to formulate the condition for a portfolio equilibrium. If one assumes that, through arbitrage, the income from a financial investment matches that from a real economic investment, the following equation holds. $(1+i_t)=(1+r_t)\frac{P^{e}_{t+1}}{P_t}$, with i_t denoting the nominal interest rate of the financial investment, r_t the real interest rate on the real economic investment and P_t the price level at point in time t in each case. P^{e}_{t+1} stands for the expected price level in $t+1$. With the aid of the definition for the expected inflation rate $(\pi^{e}_{t+1}=\frac{P^{e}_{t+1}}{P_t}\text{-}1)$, one arrives at the Fisher equation $(1+i_t)=(1+r_t)\ (1+\pi^{e}_{t+1})$. After expanding the right-hand side of the equation and disregarding the cross-product, which is very minor in the case of low inflation and nominal interest rates, the above equation is transformed into a condition for equilibrium. This relationship was formally derived for the first time in I Fisher (1896), Appreciation and Interest, Publications of the American Economic Association, pp 23-29 and pp 88-92, and can nowadays be found in nearly all introductory books on macroeconomics.

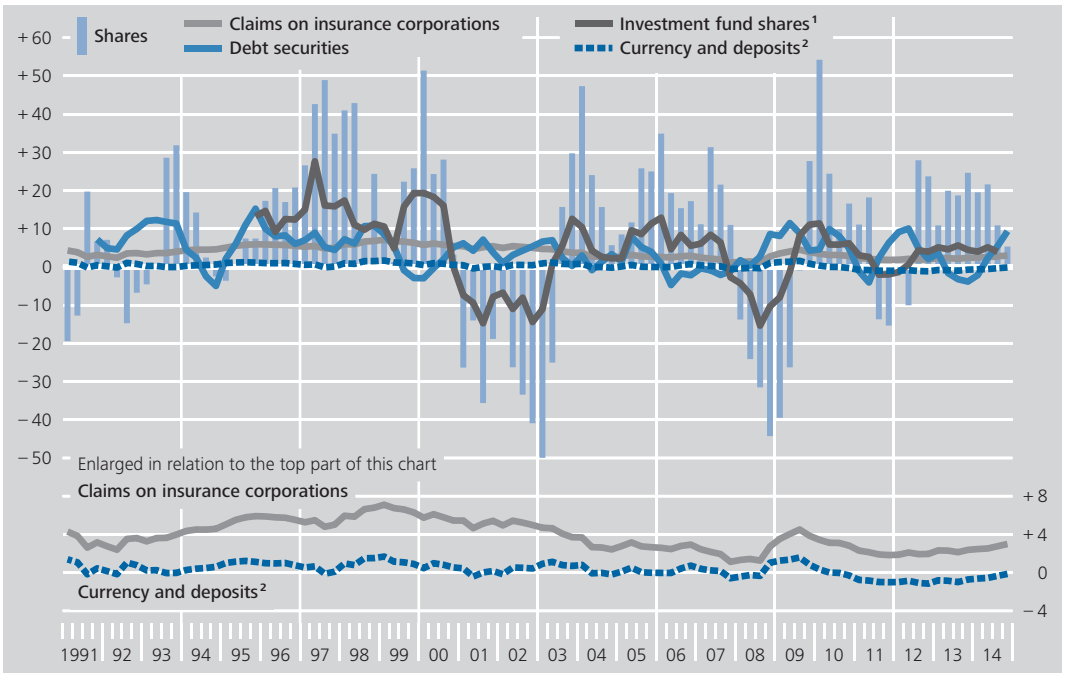
4 A distinction is made here only between short-term and long-term maturities; a more nuanced approach capturing individual maturities and notice periods is not used.

5 Similar calculations were carried out using inflation expectations from the Consensus Forecast and various assumptions regarding the investment horizon, with the overall picture essentially remaining intact.

6 In the following, deposits include currency.

Real returns on various types of financial asset held by households in Germany

% pa, quarterly



Sources: Thomson Reuters Datastream, Assekurata, German Insurance Association (Gesamtverband der Deutschen Versicherungswirtschaft) and Bundesbank calculations. **1** Data on the annual return on investment fund shares are available from 1995 Q4 to 2014 Q3. **2** Nominal deposit interest rates are based on the Bundesbank's interest rate statistics until 2002 and on the harmonised MFI interest rate statistics as from 2003. The period prior to 2003 and the years from 2003 onwards can therefore only be compared to a limited degree.

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since 2012 sent the return on deposits slightly higher again to a level close to 0% at the end of 2014.

Real return on insurance claims followed a similar pattern at a higher level

The return on insurance claims followed a similar path to that of bank deposits in the period under review, but always at a level a few percentage points higher.[7] Although the maximum technical interest rate for life insurance policies[8] (also known as the guaranteed interest rate) has been successively lowered in recent years, the real return has remained consistently in positive territory, even managing to climb since 2012 as a notable consequence of the lower inflation rate. As a result, the real return was usually above 2% even in the low-interest-rate environment. This may be down on the long-term average, but it has returned to the level seen in the early 1990s and the mid-2000s, especially of late. Hence it cannot be said that the return environment for claims on insurance corporations is exceptionally poor at the current juncture, particularly when measured against bank deposits.

Equity returns significantly higher, but extremely volatile

In contrast to bank deposits and insurance claims, the return on shares held by households exhibited very strong volatility indeed over the period under review. Extended periods marked by high returns, such as during the New Economy boom and in the run-up to the financial crisis, gave way to slumps that were nearly as pronounced. That being said, shares came in with a real annual return of just over 8% on average between 1991 and the end of the period under review, making them the highest-yielding asset type in the portfolio. The same can be said for the last few years, their lacklustre performance of late notwithstanding.

7 Insurance corporations' return on investment is also discussed in Deutsche Bundesbank, Metrics for life insurers' return on investment, 2014 Financial Stability Review, p 53. **8** The maximum technical interest rate is the maximum interest rate that insurance corporations are allowed to guarantee their customers on their insurance claims. Its level is determined by the Federal Ministry for Finance.

Calculating the real returns on key financial assets in households' portfolio

Existing statistical sources can be used only to a limited degree to calculate returns on the main types of investment held by households. While interest rate statistics deliver a major part of the information necessary for determining the nominal rate of interest on bank deposits, returns for claims on insurance corporations, shares, mutual fund shares and debt securities, which are based on *ex post* observations, can only be estimated on the basis of assumptions. This box illustrates how the nominal returns presented in the main article are calculated and converted into real variables.[1]

Bank deposits (including currency)

The interest rate figures for bank deposits held by households before 2003 are based on the Bundesbank's interest rate statistics, which were discontinued in the same year (survey of lending and deposit rates on selected products, which shows the unweighted average interest rates in nominal terms), and subsequently on the harmonised MFI interest rate statistics (volume-weighted average interest rates and effective interest rates). The comparability of the data prior to and after 2003 is impaired owing to the different data sources.[2]

The *ex ante* return on transferable deposits is calculated based on the interest rate for overnight deposits. Since these data only started being collected in 2003, internal estimates based on the Bundesbank's old interest rate statistics are used for the previous period. From 2003 onwards, returns on time deposits are based on interest rates for deposits with an agreed maturity of up to two years as well as more than two years; before this time, internal Bundesbank estimates are used. For savings deposits, interest rates on deposits redeemable at notice of up to three months as well as more than three months are used from 2003 onwards, and before this a combination of savings deposits with minimum, base and higher rates of return from the Bundesbank's interest rate statistics is used. Together with currency, for which a nominal return of 0% is assumed, the return series for the individual types of deposits are weighted with their time-varying portfolio shares derived from the financial accounts and shown as the weighted interest rate on deposits (including currency). The resulting time series represents a measure of the average interest rate on deposit holdings.

Claims on insurance corporations

The return earned by households from their claims on insurance corporations is primarily calculated using the current return on life insurance policies determined by Assekurata.[3] Life insurance and private pension insurance schemes make up a significant share of households' claims on insurance corporations, meaning that the current return on these contracts should approximate the rate of return for the total claims on insurance corporations. As these figures are only available from 1999 onwards, the series before then is back-estimated using, amongst other things, data from the German Insurance Association *(Gesamtverband der Deutschen Versicherungswirtschaft)* on the net annual return on insurers' investments.

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1 Conceptually, the calculation of returns on securities and claims on insurance corporations differs from that of deposit returns. While the former primarily reflect the income generated over a fixed period in the past, the latter are also partly forward-looking and mostly correspond to an interest rate agreed for a set period.
2 See Deutsche Bundesbank, The new MFI interest rate statistics – methodology for collecting the German data, Monthly Report, January 2004, pp 45-59.
3 For a detailed account of the various types of return on insurance investments, see Deutsche Bundesbank, Metrics for life insurers' return on investment, Financial Stability Review 2014, p 53.

Shares

Established domestic and foreign indices are used to calculate the average return on shares owned by households. Since dividend payments also need to be factored into the calculation of an *ex post* total return, performance or total return indices are used. For the period prior to 2006, a total return is derived from the CDAX share price index because a weighting according to securities issuers is not possible for this timeframe for data availability reasons. From 2006 onwards, sub-indices of the Prime All Share Index for banks, financial service providers and insurers are used, while the return on shares of non-financial corporations ($R_{NFC,t\text{-}1,t}$) is calculated as a residual. Thus, the following applies to the quarterly *ex post* rate of return of the Prime All Share Index:

$$R_{Prime\ All\ Share,t-1,t} = \sum_{i=1}^{3} w_{i,t} R_{i,t-1,t} + w_{NFC,t} R_{NFC,t-1,t}$$

where

$$R_{i,t-1,t} = \frac{\text{Performance index}_{i,t}}{\text{Performance index}_{i,t-1}} - 1$$

denotes the return of the issuer sector i and

$$w_{i,t} = \frac{\text{Market capitalisation}_{i,t}}{\text{Market capitalisation}_{Prime\ All\ Share,t}}$$

denotes the weight of this sector relative to the overall index. $w_{NFC,t}$ indicates the weight of shares of non-financial corporations. Shares of foreign issuers are calculated based on the MSCI World Index for developed markets. The resulting returns are then weighted based on the financial accounts according to domestic and foreign issuers and aggregated to form a single time series. Finally, the time series is annualised.

Mutual fund shares

The average rate of return on investment in mutual funds is approximated based on changes in the prices of all publicly offered funds subject to reporting requirements in Germany. The following measure of monthly return can be determined for individual funds from monthly price data and balance sheet information at the fund level:

$$r_{i,t-1,t} = \frac{P_{i,t}}{P^*_{i,t-1}} + \frac{Distribution_{i,t-1,t}}{FA_{i,t-1}} - 1$$

where $P_{i,t}$ denotes the current redemption value and $P^*_{i,t\text{-}1}$ the modified redemption value. The modified redemption value $P^*_{i,t\text{-}1}$ is equal to the redemption value in the preceding period plus past distributions. By taking past distributions into account, it is possible to compare distribution funds with reinvestment funds. Therefore, the return $r_{i,t\text{-}1,t}$ of fund i comprises the ratio of the current redemption value to the modified redemption value in the previous month plus the fund's distribution ratio in the current month, where the latter is expressed in relation to the fund's assets in the preceding period, $FA_{i,t\text{-}1}$. These individual fund returns are then consolidated into an average return $R_{k,t}$ at the fund category level[4] k. In this context, each fund return is weighted with the relevant fund assets $FA_{i,t}$. The following applies to the average return $R_{k,t}$ of the fund category k.

$$R_{k,t-1,t} = \frac{\sum_i FA_{i,k,t} \cdot r_{i,t-1,t}}{\sum_i FA_{i,k,t}} \ \forall\ i \in k$$

The necessary data are taken from the Bundesbank's investment fund statistics from 1993 onwards. Finally, an average return across all fund categories is determined based on the asset holdings $X_{k,}$ of the individual fund categories in the domestic fund portfolio of households at the end of year τ. To this end, data from the securities holdings statistics are combined with the investment fund statistics. The following time-varying weight applies to the unit share held by fund category k.

$$w_{k,\tau} = \frac{X_{k,\tau}}{\sum_k X_{k,\tau}}$$

4 The fund categories considered are equity funds, bond funds, mixed securities funds, open-end real estate funds, money market funds, funds of funds, mixed funds, pension investment funds, hedge funds, derivatives funds and other funds.

For the years prior to 2006, weights from 2006 are used. However, these are also progressively adjusted to reflect the growing number of fund categories since 1993. The overall return for households can then be expressed as follows.

$$R_{t-1,t} = \sum_{k} w_{k,\tau} R_{k,t-1,t} \; \forall \; t \in \tau$$

For foreign mutual fund shares owned by households, the simplifying assumption is made that these achieve the same return as domestic mutual fund units. The returns on domestic and foreign funds are likely to show fewer fundamental differences the more domestic funds are invested abroad. The annual rate of change of the aggregate time series is determined in a similar way to the annualisation of the return on shares.

Debt securities

Similarly to the return on shares, the average *ex post* return on debt securities is determined by subdividing the bonds owned by households according to issuer sectors. In addition to financial and non-financial corporations, government is classified as a separate issuer. The following performance indices are used. For the period up to 2005, the calculation is based on the German bond performance index REXP, which measures the investment performance of German one-year to ten-year public sector bonds.[5] This is likely to represent the lower bound for households' return from debt securities for this period. From 2006 onwards, a combination of Merrill Lynch's German Government Index, J. P. Morgan's EMU Index for Germany and Citigroup's World Government Bond Index for Germany is used for public-sector issuers. For domestic credit institutions, FTSE's German Pfandbrief Index is used as an approximation. For insurers, mutual investment funds and other financial intermediaries, Merrill Lynch's Euro Financial Index is used, while the figures for non-financial corporations are based on Bundesbank calculations on the basis of corporate bonds with a BBB rating (source: Merrill Lynch). The returns on bonds of foreign issuers are calculated using Citigroup's World Government Bond Index and Merrill Lynch's Global Broad Market Index and Global Non-Sovereign Index as an average of public and private debt securities. From 2006 onwards, an aggregate rate of return can be determined from these sectoral bond returns, whereby a weighting with the sectoral bond holdings of households is based on the financial accounts. The annual rate of change can then be determined.

Calculating real returns

In order to convert the respective nominal returns into real returns, the individual time series are adjusted for inflation using the realised consumer price index for Germany. In the context of households' investment decisions, a more precise calculation of the real returns would require more specific information on the intended investment horizon, the expected future returns as well as inflation expectations corresponding to this time horizon. However, this kind of information is not available in a suitable form or in the required volume. Only inflation expectations can be obtained from the Consensus Forecast for different time periods in the future; however, taking these into account does not have a major impact on the overall picture. Because of the lack of information on the intended investment horizon, in particular, this approach is not superior to calculating *ex post* returns. For reasons of consistency, the *ex post* realised values are therefore used for calculating both the nominal returns and the inflation rate.

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5 The German bond performance index REXP (like the German bond index REX) is based on weighted average prices of bonds with maturities ranging from one year to ten years. It comprises fixed-rate bonds, notes and treasury notes issued by the Federal Government, the German Unity Fund and the former Treuhand agency. Only bonds with a minimum nominal volume of €500 million are taken into account. See Deutsche Börse AG (2014), Guide to the REX Indices.

Return on investment fund shares follows a similar pattern, but less volatile than for shares

The return on investment fund shares held by households broadly followed the same path, which is not surprising, seeing as a large share of the retail funds they hold are equity funds. That said, it followed a much less volatile path than the return on shares. Overall, the real return since records began in 1995 has been just under 5% on average, which is substantially less than the return on shares.

Real return on debt securities lower than for other securities

The return on debt securities deviated substantially from the return on other financial investments throughout the period under review.[9] In particular, it proved to be largely immune to crises and similar events. Furthermore, it was less volatile and also slightly lower, in terms of long-term averages, than the returns on other types of security, though significantly higher than for bank deposits. Latterly, however, debt securities have seen their returns climbing strongly on the back of higher market prices.

How the total return on financial assets has fared

Real total return on financial assets determined in part by their structure

A glance at the real returns on the various asset classes makes it clear that households, besides holding bank deposits that currently yield particularly low returns, also hold higher-yielding financial assets in their portfolio. Any investigation into the impact of the current setting of low nominal interest rates on the real income from households' financial assets therefore needs to look at the total return on the entire portfolio. This is calculated by weighting the returns on the various asset classes according to their share of the total portfolio – a step which logically means that the structure of households' financial assets is also a determinant of the total return. The portfolio structure has itself seen some changes over the period under review (see the chart on page 21), which will be addressed in detail later on.

Drivers of total return varied over the period under review

The chart on page 22 shows how the real total portfolio return has developed since 1991, together with the contributions made by the individual types of financial asset. Claims on insurance corporations made a positive contribution – even a material one in crisis periods – to the total return throughout virtually the entire period. The communication and information technology boom which sent equity prices skyrocketing meant that shares took over as the main driver of the total portfolio return for a while in the late 1990s. The story was similar, albeit on a slightly smaller scale, for investment fund shares, which started to emerge in significant numbers in the 1980s.[10] Thus, in the second half of the 1990s and, to a lesser extent, in the mid-2000s as well, the real total return climbed to sizeable levels on the back of the strong contributions made by share investments held either direct or indirectly (in the form of investment fund shares). Between 1991 and 2007, the real total return stood at 3.5% on average.

By contrast, the real portfolio return in the years since the outbreak of the financial and economic crisis has been substantially lower, standing on average at just over 1.5% between 2008 and the start of 2015. One factor in this inferior performance was undoubtedly the crisis, which caused the average real returns on some securities to dwindle in recent years. Another, far more significant development, however, was the change in the structure of households' financial assets, which saw assets being shifted out of time and savings deposits and into transferable deposits with lower or even negative interest rates.

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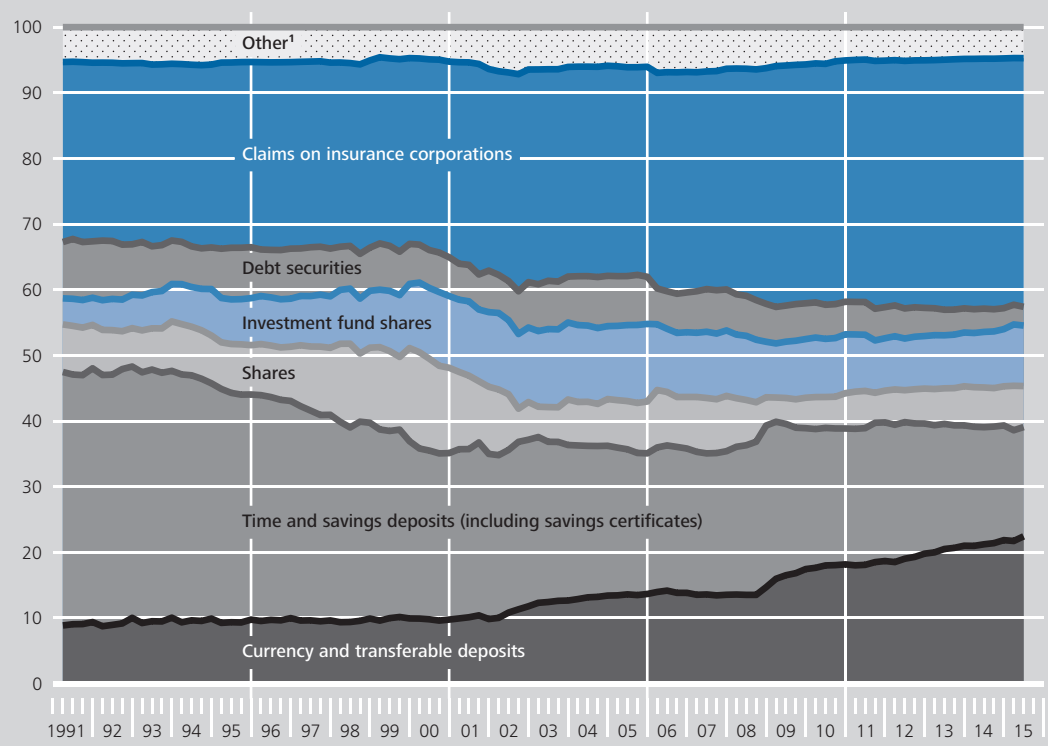
9 The returns on debt securities shown here are not to be confused with the average rate of interest on these securities, which disregards price changes (the yield on bonds outstanding).

10 The general development of households' financial assets in the 1990s is also discussed in Deutsche Bundesbank, Changes in households' asset situation since the beginning of the nineties, Monthly Report, January 1999, pp 33-50, and A Eymann and A Börsch-Supan (2002), Household Portfolios in Germany, in L Guiso, M Haliassos and T Jappelli (eds), Household Portfolios, Massachusetts. For detailed information on early trends in and the significance of investment fund shares, see Deutsche Bundesbank, The trend in and significance of assets held in the form of investment fund certificates, Monthly Report, October 1994, pp 49-72.

Composition of financial assets held by households in Germany

%, end-of-quarter data



1 Here this encompasses other accounts receivable and other equity.
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Significance of returns and other determinants for households' saving and investment behaviour

Theoretical reasoning

Correlation between interest rates and the saving level theoretically driven by the income effect, …

Economic theory posits that interest rates and returns can influence both the level and the structure of saving. Typically, the influence of interest rates on the amount of saving is formally described using a multi-period life-cycle model. In this standard model, the relationship between saving and the interest rate level is essentially shaped by three effects.[11] A drop in interest rates will, all other things being equal, initially result in savers receiving less income from their savings than previously expected (a phenomenon known as the income effect), forcing them to save more and consume less today if they wish to maintain future consumption at the previously targeted level.

… the substitution effect …

At the same time, an interest rate reduction can drive up current consumption at the expense of future consumption (substitution effect). That is because the lower income from saving makes current consumption less expensive, relatively speaking, since households are effectively forgoing less income than before. Consequently, current income is increasingly channelled into current consumption, pushing saving down.

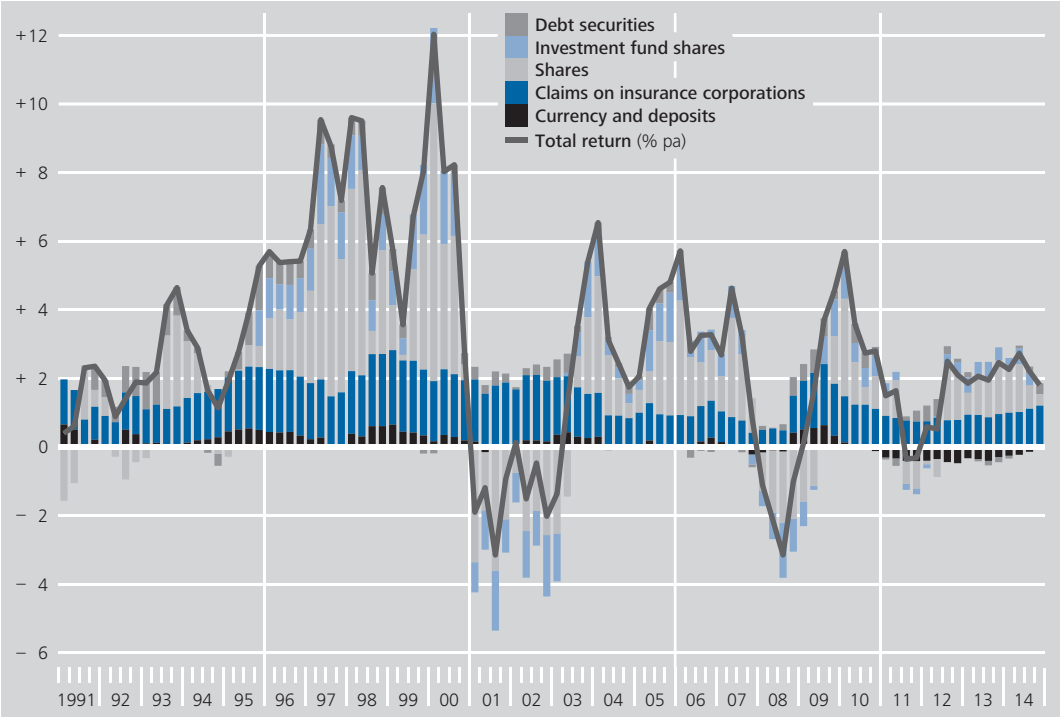
… and the wealth effect

Depending on how much wealth a household has, a wealth effect comes into play, too. A reduction in interest rates lifts the prices of a household's securities holdings, theoretically

11 The income, wealth and substitution effects are discussed, for instance, in D W Elmendorf (1996), The Effect of Interest-Rate Changes on Household Saving and Consumption: A Survey, Fed Finance and Economics Discussion Series, No 27; J M Poterba (2000), Stock Market Wealth and Consumption, The Journal of Economic Perspectives 14 (2), pp 9-118; and R Cromb and E Fernandez-Corugedo (2004), Long-Term Interest Rates, Wealth and Consumption, Bank of England Working Paper, No 243.

Contribution of individual types of financial asset* to the real total return of households in Germany

Percentage points



***** Weighted according to share of total financial assets.
Deutsche Bundesbank

improving that household's consumption options. At least this is the case as long as these valuation gains are unexpected and thought to be permanent. The substitution and wealth effects therefore counteract the income effect. At the end of the day, the interest rate elasticity and return elasticity of saving thus depend on which of these effects is predominant.

In theory, investment behaviour, too, depends on interest rates

The structure of saving, ie investment behaviour, is another factor which economic theory says is influenced by interest rates. For example, the theory of money demand in conjunction with the mechanisms posited in portfolio theory reveals that the decision to hold certain types of financial asset always entails a comparison of the anticipated returns.[12] This decision is founded on the microeconomic reasoning that returns affect the utility that a household can derive from a given financial asset.[13] A household looking to construct an efficient financial portfolio that maximises overall utility will thus allocate its assets so as to derive an optimal portfolio structure.

Other factors besides interest rates also theoretically impact on saving and investment behaviour …

But returns are just one of several determinants that can influence households' behaviour. Economic theory also takes other factors into account. The aforementioned life cycle model, for instance, makes saving patterns dependent on a household's disposable income and time

12 Useful models for creating an efficient portfolio are provided by portfolio theory, a line of thinking which owes much to papers by Markowitz and Tobin in the 1950s. See H M Markowitz (1952), Portfolio selection, Journal of Finance 7 (1), pp 7-91, and J Tobin (1958), Liquidity preference as behavior towards risk, The Review of Economic Studies 25, pp 65-86. Empirical analyses on estimating money demand that take into account portfolio theory correlations can be found, for example, in R A De Santis, C A Favero and B Roffia (2013), Euro area money demand and international portfolio allocation: A contribution to assessing risks to price stability, Journal of International Money and Finance 32, pp 377-404, and G De Bondt (2009), Euro Area Money Demand: Empirical Evidence on the Role of Equity and Labour Markets, ECB Working Paper, No 1086.

13 See F Ramb and M Scharnagl (2011), Households' Portfolio Structure in Germany – Analysis of Financial Accounts Data 1959-2009, ECB Working Paper, No 1355.

preferences as well. A household's attitude to risk can be another determinant, particularly for investment behaviour, the theoretical reasoning being, for instance, that a household's attitude to risk is influenced by its wealth.[14] Factors such as a lack of foresight, negative experiences from earlier investment decisions, and general or financial literacy levels might also come into play.[15] On top of these individual factors, the institutional framework, notably the tax and social security systems, can also sway saving and investment behaviour in as far as they impact on (expected future) disposable income.[16]

… and also influence the nature of saving motives

These determinants play a crucial role for the relevance of the different types of saving motive, ie the reasons why households save and invest money in the first place. Major saving motives include saving for a rainy day (precautionary saving), private old-age provisioning (retirement saving) and inheritance considerations.[17] The importance of retirement saving, in particular, can vary from one phase of life to another, as assets are for the most part built up during one's working life and then used to finance consumption during later phases when income is lower. Bearing this in mind, the age structure of a population is a major factor determining the saving and investment behaviour of households overall.

Saving and investment behaviour over time

Saving ratio of German households changed only gradually over time

The chart on page 24 shows how the saving ratio of German households has evolved over recent decades. German households have consistently saved at least 9% of their disposable income since 1991, sometimes significantly more. Fluctuations in the saving ratio have been relatively modest during this time, with abrupt changes being few and far between and adjustments usually occurring gradually.

As a case in point, the 1990s saw the saving ratio following an almost uninterrupted downward path over many years, while the total return trended upwards.[18] This decline reflected two factors. First, it was a step back from the perceptibly higher saving levels that had been brought about by a tax reform in the second half of the 1980s. Second, the cyclical lull that followed in the wake of the reunification boom and the emergence of structural deficits, particularly in eastern Germany, also took their toll – social security benefits increasingly took the place of earned income, while the latter was saddled with mounting taxes and social contributions, constraining households' capacity to save.

The 1990s saw the saving ratio dropping steadily, …

The years after the New Economy bubble burst, meanwhile, saw a gradual recovery in the saving ratio. This increase – a relatively untypical phenomenon in a spell of lacklustre economic activity – was largely fuelled by the growing significance of precautionary and retirement saving.[19] Several years of subdued macroeconomic momentum, high levels of increasingly stubborn unemployment, and widespread un-

… before recovering somewhat after the New Economy bubble burst

14 See C Gollier (2001), Economics of risk and time, Cambridge, MIT Press.
15 See R H Thaler (1994), Psychology and Savings Policies, American Economic Review 84, pp 186-192.
16 See M Feldstein (1976), Social Security and Saving: The Extended Life Cycle Theory, American Economic Review 66 (2), pp 77-86, and R Barro (1974), Are Government Bonds Net Wealth? Journal of Political Economy 82, pp 1095-1117.
17 The theoretical reasoning behind the traditional saving motives has already been documented inter alia in the seminal works of Keynes (1936), Modigliani and Brumberg (1954) and Friedman (1975). See J M Keynes (1936), The General Theory of Employment, Interest and Money, London, Macmillan; F Modigliani and R Brumberg (1954), Utility Analysis and the Consumption Function: An Interpretation of Cross-section Data, in J H Flavell and L Ross (eds), Social Cognitive Development Frontiers and Possible Futures, Cambridge, University Press; and M Friedman (1975), A Theory of the Consumption Function, Princeton, University Press.
18 A detailed description of developments in the 1990s can be found in Deutsche Bundesbank, Changes in households' asset situation since the beginning of the nineties, Monthly Report, January 1999, pp 33-50.
19 The saving ratio mostly followed procyclical patterns in earlier economic cycles. Households would save a smaller proportion of their disposable income during subdued economic spells as a way of stabilising their consumption, but would increase their saving ratios again when incomes began to rise. See Deutsche Bundesbank, Private consumption in Germany since reunification, Monthly Report, September 2007, pp 41-55.

Saving ratio and real total return on the financial assets of households in Germany*

* The saving ratio applies to households including non-profit institutions serving households. Separate data for the household sector are not yet available in the national accounts.

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certainty over the effects of the labour market reforms implemented during that period prompted households to forgo current consumption in favour of precautionary saving.[20] What is more, the debate over the long-term sustainability of the statutory pension insurance scheme and the reforms made to this system increasingly thrust the need for private old-age provisioning into the public eye.[21]

Onset of crisis sent saving ratio back into reverse

The upward trajectory of the saving ratio stalled with the onset of the financial and economic crisis. The downturn in macroeconomic activity eroded households' disposable income, leaving them with no option but to draw on their savings to stabilise their consumer spending. This, in turn, sent the saving ratio into retreat. The subsequent economic recovery saw an improving labour market situation slowly restoring disposable income levels, heralding a brief spell of stability in the saving ratio. There then followed a period marked by further income growth, a continued stable employment situation and a correspondingly upbeat consumer climate in which the saving ratio fell back further as an environment of subdued returns took hold. More recently, additional social security transfers and the dramatic fall in the price of oil in particular lent additional impetus to real household income. These increases in real income were used only in part for consumption purposes, however, which would suggest that their magnitude took households by surprise, and they therefore contributed to the latest recovery in the saving ratio.

Investment behaviour likewise characterised by gradual changes, with bank deposits and insurance claims playing an important role throughout

Households' investment behaviour, much like their saving behaviour, was characterised by gradual changes between the beginning of the 1990s and the end of the period under review. Barring a few exceptions, claims on insurance corporations and bank deposits were the main drivers of financial asset growth (see the chart on page 25). One of households' key motives for acquiring insurance claims, besides safeguarding against existential risks, was to build up private provisions for old age (see above).[22] Rising returns on insurance claims meant that there were times in the 1990s when this investment vehicle alone accounted for roughly half of all the financial assets acquired. Unsurprisingly, insurance claims accounted for a substantial share of existing financial assets at the end of the 1990s – standing at just under 30% – a level that was pipped only by bank deposits throughout the entire period under review. But weak inflows into bank deposits, particularly transferable deposits, meant that their importance dwindled over the course of the 1990s.

By contrast, securities, where returns saw lively growth in this period, gained a fair bit of

20 See Deutsche Bundesbank, Precautionary saving and income uncertainty of households in Germany, Monthly Report, September 2007, p 51.
21 A summary of the reforms made in the statutory pension insurance scheme during this period can be found in Deutsche Bundesbank, Outlook for Germany's statutory pension insurance scheme, Monthly Report, April 2008, pp 47-72.
22 See Deutsche Bundesbank, The insurance sector as a financial intermediary, Monthly Report, December 2004, pp 31-42.

The significance of securities increased distinctly in the 1990s, …

ground. This can be attributed to what were sometimes strong inflows of funds, especially to investment fund shares.[23] There was, at times, also buying of debt securities. Direct holdings of equities did not become significant until the New Economy boom and against the backdrop of the deregulation of the stock market, which started at around this time.[24] This rising stock market exposure, coupled with valuation gains on existing securities holdings, caused a clear increase, from around 20% to 30%, in the percentage that securities made up of German households' financial assets in the 1990s.

… but fell perceptibly after the New Economy bubble burst

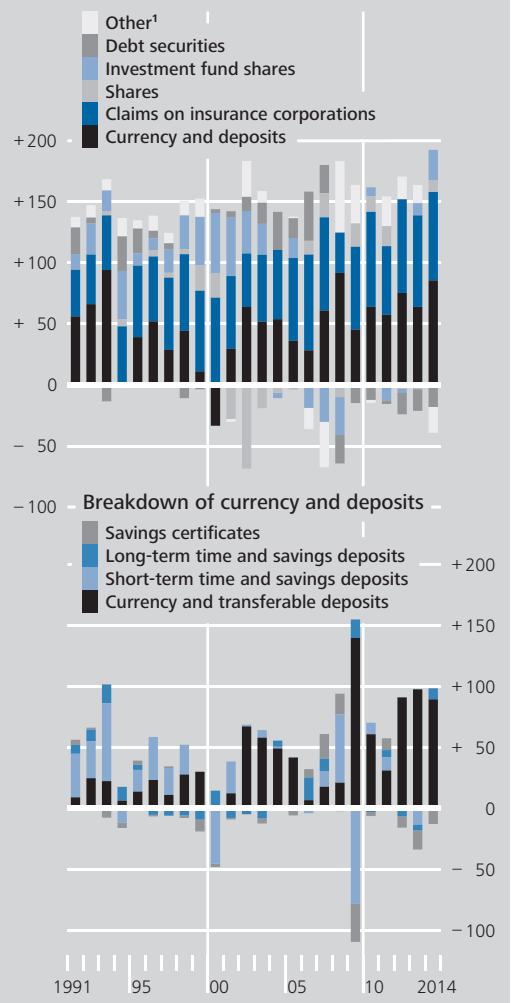
These patterns changed fundamentally when the New Economy bubble burst. Price losses and extensive net selling, especially of equities, caused the percentage of securities in financial assets to shrink in the early 2000s. Only debt securities continued to attract significant buying. Instead, there were strong inflows into transferable deposits, which can be attributed, amongst other things, to the heightened uncertainty brought about by the cyclical lull and the turmoil on the capital markets as well as the associated greater preference for liquid and safe investments. Since then, and unlike in the 1990s, other forms of deposit have no longer played a significant role. Looking at insurance claims, where yields had gradually dwindled since the year 2000, both the acquisition of financial assets and their portfolio share remained high.

Since the onset of the financial crisis, households have invested strongly in insurance products …

The financial and economic crisis did nothing to change this. On the contrary, the percentage of claims on insurance corporations in financial assets has risen further since 2008 to stand at just shy of 38% in mid-2015. The significance of securities, by contrast, continued to decline in an environment of moderate, yet positive returns; at around 19% at the beginning of 2015, the percentage was even lower than in the early 1990s. That share fell especially sharply in 2008 when the stock markets suffered large-scale losses as the financial crisis worsened. Although share prices rose, in some cases sharply, in subsequent years, direct share purchases have remained muted ever since. Debt securities fared worse still, with holdings being reduced consistently since the escalation of the financial and economic crisis.

Acquisition of financial assets by households in Germany

€ billion



1 Here this encompasses other accounts receivable and other equity.

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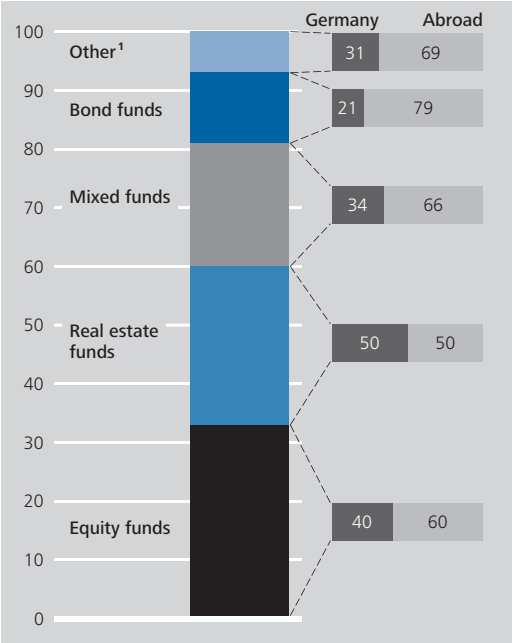
23 The relevance of investment fund shares for the acquisition of financial assets in the early 1990s is discussed in Deutsche Bundesbank, The trend in and significance of assets held in the form of investment fund certificates, Monthly Report, October 1994, pp 49-72.

24 One of the effects of the deregulation of the stock market was to bring down transaction costs and lower barriers to market entry. Another was a tightening of market supervision. These developments meant that German households increasingly favoured shares in their investment behaviour. See A Eymann and A Börsch-Supan (2002), op cit.

Investment fund assets of households in Germany by fund type and these funds' investment behaviour by region*

%, as at 2015 Q1



* Open-end domestic investment funds. **1** Includes funds of funds, money market funds, pension investment funds, hedge funds, derivatives funds and other funds.

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… and have bought into the capital market indirectly …

Only investment fund shares recorded perceptible inflows again from 2013 after earlier bouts of selling. Households were buyers in particular of equity funds, making them the most important fund type in the portfolio over the past years (see the above chart). These funds, in turn, invested the bulk of their cash inflows in enterprises abroad. This contrasts with households' direct share purchases, which concentrate on German issuers' paper, and suggests that households prefer to leave investments into what they see as potentially riskier assets to typically better informed professional investors.[25] This, coupled with the fact that they have, as a result of the financial crisis, cut back their direct capital market exposure significantly in favour of an indirect form of exposure suggests that there is pronounced and persistent risk aversion among households.

A look at transferable deposits, which are considered a safe asset, spells out the low appetite for risk even more clearly; since 2009, in an environment of historically low returns, they have represented the most important form of financial asset acquisition. Households have also shifted funds out of less liquid deposits into transferable deposits. This is likely to reflect not only households' risk aversion but also their very pronounced preference for liquidity right up to the current end, which was driven by the currently historically low opportunity costs for holding transferable deposits as well as, at times, heightened uncertainty in connection with the European sovereign debt crisis.

… as well as increasing holdings of transferable deposits

Possible determinants of saving and investment behaviour

Empirical literature suggests weak relationship between interest rates and saving in Germany …

Earlier empirical studies have already examined the question of the extent to which the saving and investment behaviour outlined above was influenced by real returns. Their results suggest that the relationship between interest rates and the level of saving tends to be fairly weak in Germany when other relevant determinants are taken into consideration. Depending on model specification, data set and period, it is sometimes positive, sometimes negative, but always low; at times, no statistically significant correl-

25 The tendency to invest primarily in the domestic market is called "home bias" in the literature. See, for example, K French and J Poterba (1991), Investor Diversification and International Equity Markets, American Economic Review 81, pp 222-226. This behaviour can be explained, amongst other things, by the existence of transaction costs and information asymmetries. In this context, it appears plausible that those fund managers in particular who are in charge of managing large portfolios should have better information and consequently make more investments abroad. See also J M Barron and J Ni (2008), Endogenous asymmetric information and international equity home bias: The effects of portfolio size and information costs, Journal of International Money and Finance 27, pp 617-635.

ation whatsoever is identified.[26] Overall, factors with opposite effects – income effect on the one hand and substitution and wealth effects on the other – therefore appear to roughly cancel each other out. Other determinants are of greater relevance, including in particular disposable income as well as the age structure of the population and the social security system, primarily the pension system. It becomes apparent, for instance, that the level of pension benefits expected in the future has a key impact on precautionary saving behaviour today.[27]

… which is probably also the case in the current environment of low nominal interest rates

Against this backdrop, the direct influence of the low interest rate level on the saving ratio has probably been at best small in recent years as well. Patterns are likely to have been determined much more strongly by the recent sharp rise in real incomes, the upbeat labour market situation and the associated improvement in income prospects. Private consumption responded to this by shrugging off its long-standing lethargy and making a perceptible contribution to overall economic growth – with the consequent negative impact on the saving ratio.

Own empirical analyses on the correlation between returns and investment behaviour show …

A similar pattern emerges when looking at the significance of real returns for the structure of saving, ie investment behaviour. We carried out our own econometric estimates and modelled the various forms of investment as a percentage of financial assets in a multivariate system of demand equations. Against the backdrop of the theoretical considerations, the portfolio structure depended on real financial assets, real asset yields and additional exogenous variables such as demographic variables.[28]

… that returns are not a central determinant of investment behaviour either, …

Such econometric studies at the macroeconomic level are associated with methodological problems, meaning that their results should be interpreted with caution. Nonetheless, the results suggest that while real returns do have an influence on the portfolio structure of households in Germany, this influence is not clear-cut and therefore fairly negligible overall – much like it is for saving patterns. Other factors therefore appear to be more important when determining how savings are distributed across various financial assets. Indeed, the results suggest that the age structure of the population, for instance, or the level of wealth exert a comparatively clear influence on portfolio structure – and one that is consistent with the theoretical reasoning. For instance, the percentage of shares and investment fund shares, ie forms of investment typically perceived as being risky, declines at the macroeconomic level as the overall population gets older. By contrast, all other things being equal, rising wealth causes an increase in this percentage.

… not even in the low-interest-rate environment

The current environment of low nominal interest rates does not appear to have brought about any significant changes in these relationships. In fact, the results of the estimates even suggest that real returns continue to play a

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26 For evidence of a positive correlation between interest rates and saving, see, for instance, F Geiger, J Muellbauer and M Rupprecht (2015), The Housing Market, Household Portfolios and the German Consumer, ECB Working Paper, forthcoming; and M Beznoska and R Ochmann (2012), The Interest Elasticity of Savings: A Structural Approach with German Micro Data, Empirical Economics 45, pp 371-399. The following paper, amongst others, concludes that saving is negatively correlated to interest rates: F Hüfner and I Koske (2010), Explaining Household Saving Rates in G7 Countries: Implications for Germany, OECD Economics Department Working Papers, No 754. Meanwhile, H-J Hansen (1996), The Impact of Interest Rates on Private Consumption in Germany, Deutsche Bundesbank Discussion Paper, No 3/96, and R Cohn and B Kolluri (2003), Determinants of Household Saving in the G7 countries: Recent Evidence, Applied Economics 35, pp 1199-1208 find no correlation at all.

27 See, for example, J Le Blanc, A Porpiglia, F Teppa, J Zhu and M Ziegelmeyer (2014), Household saving behavior and credit constraints in the Euro area, Deutsche Bundesbank Discussion Paper, No 16/2014.

28 This approach is known as the Financial Almost Ideal Demand System. To obtain a consistent demand system, a number of restrictions are imposed on the coefficients (adding-up, symmetry, homogeneity). The estimated coefficients allow wealth elasticities and own-rate and alternative-rate elasticities to be calculated. However, the approach has some limitations. For instance, estimates of the partial effects are inaccurate as yields have a high degree of multicollinearity despite various model specifications. In addition, changes in the variability of the yields and/or in risk aversion overall are not modelled here. This approach is described in detail in S Avouyi Dovi, V Borgy, C Pfister, M Scharnagl and F Sédillot (2013), Households' Financial Portfolio Choices: A Comparison between France and Germany, in B Winkler, A van Riet and P Bull (eds), A Flow-of-Funds Perspective on the Financial Crisis, Volume 1, Palgrave Macmillan.

Results from the PHF household survey on the impact of low interest rates on households' savings and investment behaviour in Germany

Analysing households' savings and investment behaviour at the macroeconomic level does not allow an examination of the savings behaviour of different categories of households. To do that, micro data are needed, such as those from household surveys like the Bundesbank's "Panel on Household Finances (PHF)" study.[1] Besides sociodemographic features of the surveyed households (eg age, education, employment), the PHF study also contains information on households' planned activities and expectations. In 2014, for example, questions were asked not only about interest and inflation expectations but also about whether households were changing their savings behaviour in response to low interest rates.

The results of the PHF study confirm the aggregate results in the main text.[2] Only a small number of households stated in 2014 that they had adjusted their savings behaviour because of low interest rates.

To the question "Have you adjusted your savings behaviour because of low interest rates?",[3] more than three-quarters of those surveyed (77%) answered "no". Only about 15% of households have reduced the amount they save, and roughly 7% are now investing differently than before. The fact that many households have not changed their savings and investment behaviour is surprising given that, in mid-2014, 75% of households were expecting negative real rates of interest for the coming year. The percentage of households with positive expectations about real interest rates that are not adjusting their savings and investment behaviour differs only marginally from the relevant percentage of households with negative expectations. There were hardly any differences with regard to expected nominal rates of interest. The only households that stand out are those which, in mid-2014, were expecting nominal interest rates to rise sharply. In this group, 97% state that they had not changed their investment and savings behaviour.

In the aggregate, the results indicate that households' savings and investment behaviour in the current environment of low nominal interest rates are influenced only marginally by interest rates and households' interest rate expectations. Nevertheless, there are some categories of households that respond more strongly to low interest rates than others do. For example, the percentage of households that adjust their savings behaviour goes up with increasing wealth.[4]

Looking at those households that change their savings and investment behaviour in response to low interest rates, the results correspond to the relevant considerations of economic theory. Households with more strongly diversified portfolios and greater appetite for risk state more frequently that

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1 Further information on the "Panel on Household Finances (PHF)" study may be found in "Household wealth and finances in Germany: results of the Bundesbank survey", Monthly Report, June 2013, pages 23-49, and at https://www.bundesbank.de/Navigation/EN/Bundesbank/Research/Panel_on_household_finances/panel_on_household_finances.html

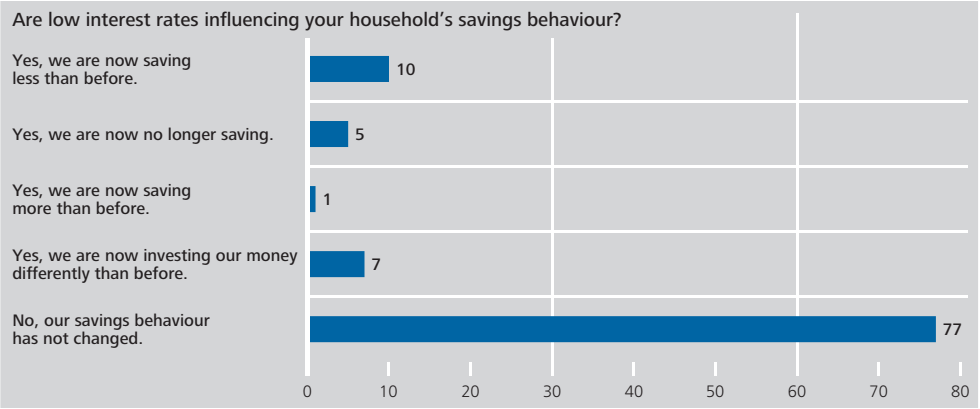
2 The data used here are to be regarded as provisional; among other things, missing data have not yet been imputed. Households that did not provide any information on certain questions cannot therefore be considered in the analysis. All values are weighted.

3 The concept of "savings behaviour" is not defined in greater detail in the question itself. The set response options do cover both the amount of savings and investment behaviour, however.

4 The processing of data from the second wave of the survey has not yet been completely finalised. For this analysis, it was therefore not possible to use a net wealth computed from individual asset components. Instead, use was made of the responses to the question "How high do you estimate your net wealth/the net wealth of your household/the net wealth of the household to be? Net wealth is the value of everything belonging to household members minus all liabilities". Experience from the first wave of the survey shows that self-estimated net wealth is indicative of wealth computed from individual components; above all, the allocation of households to individual quantiles is comparable.

Impact of low interest rates on savings behaviour

Percentage of households[1]



Source: PHF 2014. **1** Analysis for responding households (4,427 of 4,461), multiple responses possible.
Deutsche Bundesbank

their savings behaviour is now different as a result of the low interest rates. This is revealed clearly by the very wealthy households, for example, which typically hold a large percentage of securities in their asset portfolio. In this group, the percentage of households stating that they now save differently than before is highest, at almost 14%, although it is at a low level overall. Independently of wealth, it is evident that households possessing securities deposit accounts have adjusted their savings behaviour more to the low interest rate environment than households without such accounts. The difference between households with and without a securities deposit accounts in this respect is 10 percentage points (15% with securities deposits accounts compared with 5%). Holding securities is an indication that households are more prepared to take risks in their investments in order to achieve higher returns. This aspect can be investigated in greater detail because the PHF study also contains direct questions on households' risk appetite in investment and savings decisions. It is here that the structures found for securities holders are confirmed: households not prepared to take risks in order to achieve higher returns state much less often that they are now investing differently than before (5% compared with 14%).

Alongside wealth and securities holdings, households can also be classified according to sociodemographic features. Grouping households by their total gross income produces a picture that is very similar to the breakdown by wealth. Comparing various households with regard to the age of the main income earner, it is noticeable that older savers (55 years of age and over) state more frequently than younger savers that they are now saving less on account of the low interest rates. In relation to savings behaviour, it is apparent that younger savers state more often than older households that they are now choosing other forms of investment. It is known from the literature that older households are less prepared to take high risks in their investments and tend to possess more traditional portfolios.[5] In this respect, it is thus also true that households adjust their savings behaviour in line with the theory.

Taken altogether, the currently available results of the PHF study suggest that low nominal rates of interest have so far led to hardly any significant adjustments in the savings and investment behaviour of households in Germany, thus confirming the picture found at the macroeconomic level.

5 See inter alia J F Cocco, F J Gomes, and P J Maenhout (2005). Consumption and Portfolio Choice Over the Life Cycle. Review of Financial Studies 18(2), pp 491-533; R Jagannathan and N R Kocherlakota (1996). Why Should Older People Invest Less in Stocks than Younger People? Federal Bank of Minneapolis Quarterly Review 20(3), pp 11-23.

rather opaque and relatively insignificant role in the portfolio structure. This view is backed up by the stronger household investment in deposits, notably so in recent years, even though the real return on deposits was negative for an extended period, unlike that on every other form of investment. Similarly, the latest results of the Bundesbank's Panel on Household Finances (PHF) survey, which suggest that low nominal interest rates have, to date, had virtually no impact at all on the saving and investment behaviour of the respondent households, point in the same direction (see the box on pages 28 and 29).

It would therefore appear that other factors are key to investment behaviour, even in times of historically low nominal interest rates. Besides the age structure of the population mentioned earlier in this article and wealth levels, these include the uncertainty to which households were repeatedly exposed during the financial and sovereign debt crisis – for instance, in the form of increased volatility on the capital markets. For example, the above-mentioned investments in deposits consisted primarily of inflows into transferable deposits, which suggests that households have developed a stronger preference for highly liquid forms of investment which can be accessed at short notice for consumption purposes, if need be. However, this does not rule out the possibility that the narrower interest rate differential between transferable and longer-term deposits was sometimes a factor driving these strong inflows into transferable deposits.

Other factors such as risk aversion of greater significance

Analyses at the individual household level yield additional clues to other factors. Recent studies for Germany suggest, for instance, that investment behaviour is significantly shaped by the personal experiences that a household has made with certain forms of investment in the past.[29] Events such as heavy financial losses during a financial crisis can have a long-term impact on risk tolerance and consequently the willingness to add riskier assets to a household's portfolio. The large capital market losses after the New Economy bubble burst and in the wake of the financial crisis are thus likely to have further increased German households' already comparatively high risk aversion. That, in turn, was probably a key reason why their securities exposure has declined since the New Economy bubble burst and has been weak overall, especially since the onset of the financial and sovereign debt crisis, as outlined above – notwithstanding comparatively high returns.[30]

Conclusions

Nominal interest rates in Germany have been exceptionally low for some time now. As a result, interest rates on bank deposits especially, which make up a large percentage of households' financial assets, have been at unprecedented lows in recent years. This, in turn, has led to concerns that saving might no longer be worthwhile and that households could reduce their saving efforts.

However, the explanation outlined above shows that there are various reasons why such fears are largely unfounded. It is clear, first, that

29 For instance, Bucher-Koenen and Ziegelmeyer (2013) demonstrate for Germany that individuals that have had negative experiences with capital market products are sceptical about such products and are correspondingly less likely to invest in such products again. This relationship appears to be more pronounced the lower the respective households' financial literacy levels. Ampudia and Ehrmann (2014) confirm these results for the euro area. These studies were based on a study by Malmendier and Nagel (2011), which made similar observations for the United States. See M Ampudia and M Ehrmann (2014), Macroeconomic Experiences and Risk taking of Euro Area Households, ECB Working Paper, No 1652; T Bucher-Koenen and M Ziegelmeyer (2013), Once Burned, Twice Shy? Financial Literacy and Wealth Losses During the Financial Crisis, Review of Finance 18, pp 2215-2246; and U Malmendier and S Nagel (2011), Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?, The Quarterly Journal of Economics 126, pp 373-416.

30 Analyses based on Germany's Socio-Economic Panel (SOEP) confirm the influence of the household's attitude to risk on its portfolio structure. They show that high risk aversion is associated with portfolio underdiversification with typically no or very few securities. See N Barasinska, D Schäfer and A Stephan (2012), Individual risk attitudes and the composition of financial portfolios: Evidence from German household portfolios, Quarterly Review of Economics and Finance 52, pp 1-14.

Looking at the portfolio as a whole, returns are not exceptionally low in the low-interest-rate environment

the return on households' financial assets – measured in real terms and taking into consideration all the major financial assets in the portfolio – is not as meagre as the low nominal interest rates on bank deposits would initially suggest. Alongside the currently low rate of inflation, this can be attributed in large part to the fact that households hold not only comparatively low-yielding bank deposits but also financial assets that generate strong returns. The total return since the outbreak of the financial and economic crisis may be down on average compared to pre-crisis levels, but since the early 1990s there have been repeated spells in which the real total portfolio return has been far lower still.

Returns not central determinants of saving and investment behaviour

Second, there is quite some evidence to suggest that real returns are not a major driver of the saving and investment behaviour of households in Germany. In actual fact, this behaviour has probably, in recent decades, been shaped chiefly by developments in (expected) disposable income, changes in the institutional framework (especially the tax and social security system), demographics, wealth levels and households' preferences and (risk) attitudes. It appears unlikely that the – clearly volatile – real return(s) should be a dominant factor influencing saving and investment behaviour given that the latter has displayed constant patterns over time and been subject to only gradual changes.

No recognisable change in behaviour even in the low-interest-rate environment, but continued strong risk aversion

Third, this is unlikely to have changed significantly to date, notwithstanding the environment of low nominal interest rates. Households continue to save more than 9% of their disposable income – roughly as much as they did in the early 2000s when not just nominal interest rates but inflation rates, too, were perceptibly higher. These funds, in turn, are primarily invested in liquid bank deposits, even though this form of investment sometimes generated negative real returns. This can be explained, amongst other things, by a pronounced risk aversion among households, which has risen more perceptibly still in the recent past as a result of the capital market turmoil following the crisis and has (further) diminished the importance of return considerations.