

## Return on private financial assets taking into account inflation and taxes

*Nominal interest rates have fallen sharply in recent years, and the rate of return on new investments in interest-bearing instruments is low from a longer-term perspective. However, developments in Germany are much less pronounced when inflation and taxes are taken into account and after-tax real interest rates, which are particularly relevant for private investments, are considered. After-tax real interest rates are dependent on the interplay between nominal interest rates, the inflation rate and the tax rate.*

*Developments are heterogeneous for short and longer-term investments. In the case of savings deposits with a short notice period, the nominal interest rate has declined significantly, and the real interest rate is also very low and has fallen into negative territory. Even in the past, however, the real interest rate was frequently negative, especially after tax, making a perceptible move into positive territory in only a small number of years. At the beginning of the 1980s and 1990s, for example, the after-tax real interest rate was clearly negative for higher personal tax rates. Overall, the after-tax real interest rate was supported over time by the fact that inflation rates tended to decrease and tax rates were also lowered. With regard to longer-term investments in ten-year bonds, a downward trend has been observed both in nominal and real returns since the early 1980s. If tax is also taken into account, however, no clear trend (in the case of higher personal tax rates) is visible here up to the start of the current decade either. Over the past few years, real returns on new investments have fallen to a very low level, both before and after tax, and also stood in negative territory of late.*

*The statutory tax rates for (nominal) private interest income have been lowered perceptibly, especially since the introduction of the withholding tax. Private interest income is consequently taxed at a lower rate compared with the personal income tax rate on higher incomes. However, in the current debate about a possible reform or discontinuation of the withholding tax, it should also be noted that the compensation for inflation contained in nominal returns does not constitute a gain in financial capacity, but merely compensates for the inflation-induced depreciation of savings. When real interest rates are low, even the lower rate of withholding tax results in high effective tax rates on real interest returns, even in combination with moderate inflation rates.*

*Inflation and taxes also important for returns on private savings*

## Development of interest rates on private financial assets taking into account inflation and taxes

In recent years, (nominal) interest rates have declined significantly worldwide, including in Germany, and are now at a historically low level.<sup>1</sup> This reduces the return on private financial assets and, all other things being equal, makes it less attractive to save. From the perspective of savers, the burden arising from inflation and taxes also has to be taken into account, however. For example, the development of short-term real interest rates (nominal interest rates adjusted for inflation)<sup>2</sup> on financial assets with a short lock-in period, which are often the preferred choice in Germany (savings accounts, for instance), has been less exceptional from a longer-term perspective because inflation has also been lower over the past few years. This is even more so the case if after-tax real interest rates are taken into account as these reflect the interplay between the rates of return, inflation and taxes. Reductions in statutory (nominal) tax rates and, above all, the lower weight of taxation on the inflationary compensation when inflation rates are lower have, when viewed in isolation, supported the development of after-tax real rates of return over time.

## Taxation of private interest income

*Since 2009, significantly lower taxation of nominal interest income owing to withholding tax*

Since 2009, private investment income in Germany is, as a general rule, subject to a withholding tax – provided that the interest income does not fall under the savers' tax-free allowance on capital gains<sup>3</sup> – charged at a flat rate of 25%,<sup>4</sup> in addition to the solidarity surcharge and, where applicable, church tax.<sup>5</sup> Investment income, such as interest and dividends, but also capital gains are subject to taxation. Losses on sales can be offset against gains from the same asset class. Any negative interest is interpreted by the tax authorities as "custody and

deposit fees" and thus as income-related expenses, which is deemed to be covered by the savers' tax-free allowance. At the enterprise level, dividends are subject to upstream charges of corporation tax (plus the solidarity surcharge) as well as local business tax, whereas interest remains largely untaxed at the corporate end.<sup>6</sup> Investment income incurred prior to 2009 used to be taxed together with other relevant income as part of the (progressive) income tax scale, and account was taken (schematically) of upstream tax on dividends at the corporate level. The tax rates on nominal interest income were significantly reduced when the income tax rate was lowered, especially at the turn of the millennium, and, for higher taxable income, by the introduction of withholding tax (see, for example, the upper chart on page 71).

<sup>1</sup> See also Deutsche Bundesbank, German households' saving and investment behaviour in light of the low-interest-rate environment, Monthly Report, October 2015, pp 13-31, and Deutsche Bundesbank, Developments in real interest rates on deposits in Germany, Monthly Report, July 2017, pp 101-103, in which the development for various types of deposits is shown over an extended period of time.

<sup>2</sup> Here, the actual rate of consumer price inflation is used. This is appropriate for the actual interest income earned after tax, whereas for questions relating to investment decisions, inflation expectations are more relevant.

<sup>3</sup> In 2009, the lump-sum allowance for income-related expenses and the previous savers' tax allowance were consolidated into a standard savers' tax-free allowance (€801 for single persons and €1,602 for couples who are assessed jointly for income tax purposes). Since then, it has not been possible to claim a tax deduction for actually incurred income-related expenses in connection with investment income. Previously, the savers' tax allowance was in some cases lower than the current standard allowance (up to 1992), but in some cases also significantly higher (eg DM 6,000 (€3,068) for single persons between 1993 and 1999).

<sup>4</sup> It is possible to request that private investment income be taxed on the basis of the statutory income tax rate (together with other taxable income) if this results in the tax burden being lower on the whole (identification of more favourable tax treatment). For single persons, a tax rate of above 25% is currently applied to the portion of annual taxable income exceeding €16,071.

<sup>5</sup> Unless otherwise stated, the tax charges specified in the following include the solidarity surcharge, provided that this was levied in the year in question. Church tax and the associated reduction, on the other hand, are generally disregarded as church tax is not attributable to federal income tax. Church tax rates differ depending on the respective state government.

<sup>6</sup> Unlike corporation tax, where fewer restrictions apply, interest payments are not fully deductible from the tax base in the case of local business tax.

## The importance of inflation and real interest rates for the taxation of real interest income

*Relative tax burden on real interest income always higher than the statutory tax rate amidst inflation*

Income tax is, in principle, linked to financial capacity. In the case of interest-bearing investments, inflation depresses the value of savings in real terms and part of the remuneration goes purely towards compensating for this loss. This inflationary compensation therefore does not increase the financial capacity, it merely maintains the purchasing power of the savings. Taxation systems generally use the nominal rate of interest, however. In times of positive inflation, the relative tax charge on real income (herein-after referred to as the "real tax rate") is therefore always greater than the relative tax charge on nominal income ("nominal tax rate"). For a given nominal tax rate, the real tax rate increases in line with the relationship between inflation and real interest rates. In the event of low real interest rates, real burdens of over 100% can already occur even with the low withholding tax rate in combination with moderate rates of inflation (see the lower adjacent chart).<sup>7</sup> Conversely, for a given real interest rate, the after-tax real rate of return declines as inflation rates rise (provided that the nominal interest rate is positive and thus taxes are payable at all). With a given savers' tax-free allowance, higher and higher investment amounts generate tax-free income, the lower the nominal interest rate.

## The development of after-tax real interest rates on savings deposits

*Short-term real interest rates at the current juncture ...*

The development of returns on the interest-bearing investments of households in Germany has varied significantly both in nominal and real terms, as well as before and after tax. By way

<sup>7</sup> Given a real interest rate of 0.25% and an inflation rate of 1%, for example, a real tax rate of over 130% is achieved if the current rate of withholding tax (including the solidarity surcharge) is applied.

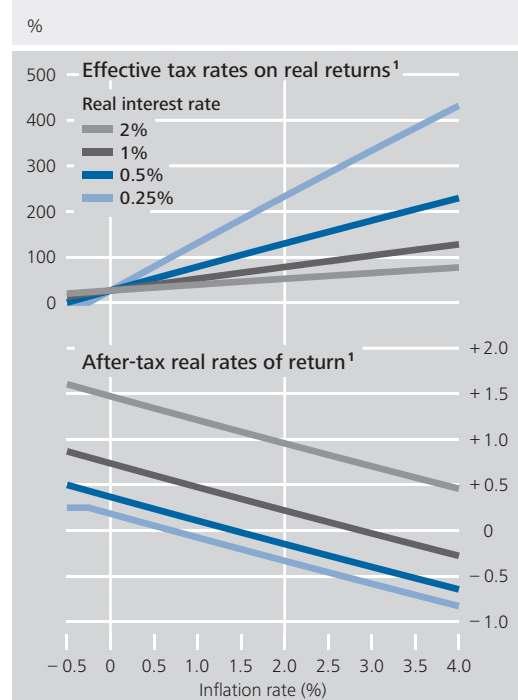
Statutory tax rates for interest income\*



\* The chart shows the respective marginal tax rates, i.e. the tax rates that are applied to each additional taxable euro of income above the basic tax allowance or after reaching the highest tax rate. **1** As the statutory tax rate for individuals earning higher interest income, the chart uses, by way of example, the highest rate of income tax (excluding additional top-income tax bracket in the amount of 45% from 2007) up until the year 2008, and from 2009 onwards the withholding tax rate, in each case including the solidarity surcharge (provided that it was levied in the year in question). **2** Starting rate of the income tax scale (owing to the tax-free allowance excluding the solidarity surcharge).

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Effective tax rates on real returns and after-tax real rates of return

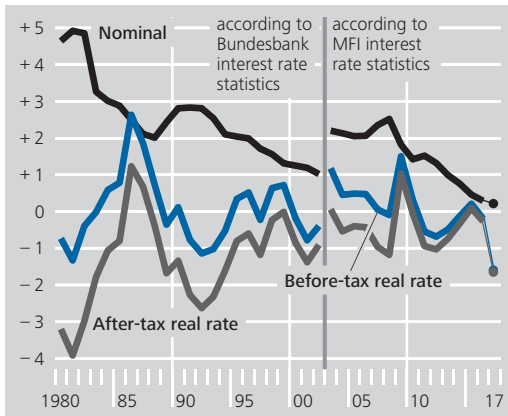


<sup>1</sup> For various combinations of real interest and inflation for the applicable rate of withholding tax (25%) plus solidarity surcharge (+1.4 percentage point) and excluding the savers' tax-free allowance.

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### Savings deposits with a notice period of up to three months\*

Interest as an annual percentage rate



\* Interest rate obtained by households for savings deposits with an agreed notice period of up to three months (effective interest rate according to the MFI interest rate statistics from January 2003 onwards, previously nominal interest rate according to earlier Bundesbank interest rate statistics). MFI interest rate statistics are not available for the years prior to 2003, and the Bundesbank's interest rate statistics were discontinued following the methodological change; see also Deutsche Bundesbank, Changes to the MFI interest rate statistics, Monthly Report, July 2017, p 94. Adjusted for inflation using the consumer price index (CPI). The after-tax real interest rates were calculated in a stylised way using the "highest tax rate" shown in the chart on page 71. For 2017, data are shown up to and including May. For further information about real interest rates on bank deposits, see Deutsche Bundesbank, July 2017, op cit.

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of example, short-term and longer-term interest-bearing investments are shown here for the period since 1980. For savings deposits with a notice period of up to three months, there is a downward tendency in nominal interest rates (see also the chart above). They were at a low level in 2016 and decreased somewhat further in the first half of this year. In real terms, however, interest rates developed without a marked trend. Last year, real interest rates were slightly negative, although not exceptionally low. Given that the inflation rate has risen in the meantime, though, real interest rates declined again distinctly in the first half of the current year.

... less unusual after tax

After-tax real interest rates were lower in the past.<sup>8</sup> Whenever personal tax rates were higher, these were negative in the vast majority of cases and distinctly positive in only a few years. As a result, they were less favourable in the early 1980s and 1990s than at the current juncture. In previous years, relatively high infla-

tion rates and the tax burdens that accompanied them played a particularly significant role in this context. While the tax burden did, to all intents and purposes, fall when withholding tax was introduced (provided that the relevant income tax rate was higher, as assumed in the stylised calculations presented here), the (after-tax) real interest rate was likewise negative – markedly so in most cases – in the period from 2011 to 2014. In 2015 and 2016, it hovered at around zero, close to the nominal rate, due to the low inflation rate. In terms of the tax burden on households' savings deposits, the combination of low nominal interest rates with low inflation was therefore not especially unfavourable in 2015 and 2016 compared with previous years. This is all the more true when taking the savers' tax-free allowance into account, which exempts a greater volume of savings from tax when interest rates are low. In the first few months of this year, however, real interest rates before and after tax returned to significantly more negative territory in the light of higher inflation rates. That said, given that the nominal interest rate is close to zero, taxation still plays only a minor role when it comes to interest rates. The difference between the real interest rates before and after tax all but disappeared in the period from 1980 (when it amounted to around 2.5 percentage points) to 2016.

The relationship between inflation and the real interest rate is a key element in determining the

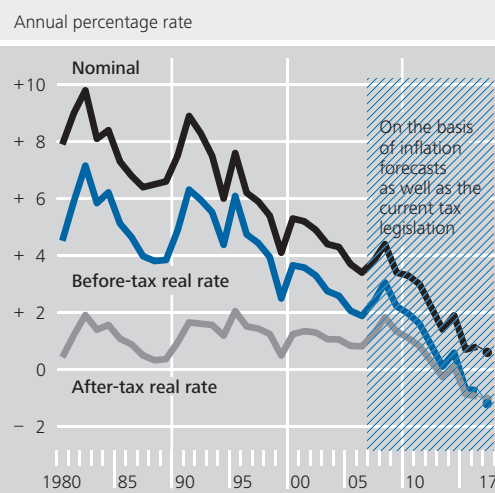
<sup>8</sup> As described above, for the purpose of determining the after-tax real rate of return here, a stylised assumption of the relevant top tax rate is made for the period prior to the introduction of withholding tax in 2009. Given the relatively high income thresholds, the additional top-income tax bracket (tax rate of 45% on income above €256,304 at present for single persons) that was introduced in 2007 is excluded. For the sake of simplicity, standard allowances (as well as income-related expenses) are factored out. If, instead of the top tax rate, it were always, for example, the starting tax rate that was of relevance (see also the chart on p 71), the burdens would lie somewhere between the before-tax and after-tax real rates of return depicted in the charts on this page and p 73. If investment income were to undershoot the thresholds for standard allowances, or if no tax were to be paid when identifying the more favourable tax treatment, the before-tax real interest rate would equal the after-tax real interest rate.

*Real tax rates usually very high, ...*

*... but only comparatively low tax-induced decrease in returns when nominal interest rates low*

real tax rate. The real tax rate was usually well above the statutory tax burden. Despite negative before-tax real rates of return, tax payments were still incurred in a number of years. The lowest real tax rate for the other years was over 30%, which was recorded in 2009. However, in terms of saving incentives, a bigger role is played by the absolute differences in returns owing to tax payments – in combination with low inflation rates (despite potentially very high tax rates), at least, these tend to be small when returns are low.<sup>9</sup> If the nominal interest rate is zero or less, there is ultimately no tax payment due (and the tax rates are zero, accordingly). The effect of standard allowances, which are becoming more important in the low-interest-rate environment in that higher investment volumes remain tax-exempt, is disregarded. For example, at a nominal interest rate of ¼% and taking into account the savers’ tax-free allowance of €801, the income on an investment amount of €320,000 would currently be tax-exempt for single persons.<sup>10</sup>

### Return on investment in ten-year domestic debt securities\*



\* Yields on outstanding domestic debt securities with an average residual maturity of nine to ten years (December average value of the previous year). The real returns are calculated using the inflation rates realised during the maturity period (up until 2016 the consumer price index, from 2017 to 2019 the Harmonised Index of Consumer Prices based on Bundesbank estimates, and from 2020 Consensus Economics forecasts). The after-tax real rate of return is determined using the “highest tax rate” applicable during the maturity period (see the chart on p 71). An unchanged tax system is assumed as of 2017. The value for a given year therefore takes account of the nominal coupon from December of the previous year as well as the inflation rates and the tax framework of the current year and the following nine years.  
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## The development of after-tax real rates of return on ten-year bonds

*After-tax real rate of return on investments in ten-year bonds*

Longer-term investments in fixed-income securities figure less prominently than instruments such as short-term bank deposits in the average financial asset portfolio in Germany.<sup>11</sup> However, in order to illustrate the range of return patterns, developments ought to also be described here using the example of long-dated bonds. The starting point for these calculations is the nominal average yield on outstanding ten-year German debt securities that are held to maturity (see the above chart). To determine the real rate of return, payments are adjusted for purchasing power using the consumer price inflation realised over the bond’s holding period. In the case of investments made from 2007 onwards, the end of the holding period lies in the future. For the years from 2017 onwards, therefore, inflation is approximated by current inflation forecasts.<sup>12</sup> To deter-

mine the after-tax real rate of return, nominal coupon payments received are taxed at the tax rate applicable at the time of payment.<sup>13</sup> The real return on a nominal bond that will actually be generated in future for investments made from 2007 onwards is therefore uncertain and

<sup>9</sup> For instance, at a nominal interest rate of 0.3%, an inflation rate of 0.2% and a tax rate of 25%, the resulting after-tax real rate of return and real tax rate would be 0.02% and 75% respectively. Though the real tax rate is very high, the absolute difference in returns owing to taxation is on the small side.

<sup>10</sup> In this example, it is assumed that no income-related expenses are incurred and no other relevant investment income has to be recognised.

<sup>11</sup> See Deutsche Bundesbank (2015), op cit, p 20. The share of directly held longer-term debt securities is much lower than the share of bank deposits. At just under 40%, households’ claims on insurance corporations are weighty, and insurance corporations hold a significant share of longer-term bonds. That said, the taxation described here often does not apply to the taxation of these bonds, and they do not form the main focus of this article.

<sup>12</sup> The Bundesbank’s estimate for the Harmonised Index of Consumer Prices is used for this purpose for 2017 to 2019, with survey data from Consensus Economics being used from 2020.

<sup>13</sup> See the chart on p 71. An unchanged tax system is assumed as of 2017.

hinges on the future path of inflation as well as any changes to tax legislation (the last point only applying with respect to the after-tax real rate of return). The later the investment was made, the greater the extent to which this applies.

*No clear tendency displayed by after-tax real rate of return until start of 2010s, ...*

The before-tax real rates of return on ten-year bonds are usually higher than those on short-term investments, which means not least that the relative significance of taxing the inflationary compensation is lower. Overall, before-tax nominal and real rates of return run more in parallel for these forms of investment. Unlike savings deposits, real rates of return on these bonds have fallen significantly over time, starting in the early 1980s. They have been negative since 2015. By contrast, the after-tax real rate of return displayed no clear tendency until the current decade, as the decline in real rates of return was cushioned by shrinking real tax burdens (when personal income tax rates were higher) due to falling inflation rates and, furthermore, as statutory tax rates were lowered. The after-tax real rates of return fluctuated almost consistently between ½% and 2%. In the current decade and, in particular, over the last few years, however, the before-tax real rates of return then dropped into negative territory and differed comparatively little from the after-tax real rates of return in the period under review. This year, developments are virtually unchanged compared with 2016 and, provided inflation develops as forecast and tax legislation remains unchanged, the after-tax real rate of return amounted to -1.2% at last report.

*... but currently unfavourable*

*Real tax rate well above statutory rate in case of ten-year bonds, too*

On the whole, it can be determined in the case of investments in ten-year bonds as well that the decline in the nominal rate of return, which has been observed for some time, is much less pronounced when taking into account inflation and taxation. The effect of taxation, ie the difference between the before-tax and after-tax real rate of return, on ten-year bonds has diminished, falling significantly between the early 1980s (when the difference stood at around 5 percentage points) and 2016 (0.1 percentage

point). In the case of these long-dated bonds, too, the relative real tax burden has been significantly higher than the statutory tax rate on an annual average since 1980 – but, due to the higher and more stable real interest rate, it has also been lower and less volatile than the burden associated with short-term deposits. At the current juncture, the rates of return on new investments are low by any measure (nominal, real and real after tax).

## ■ Concluding remarks

Nominal interest rates in Germany are currently historically low. Thus, on the one hand, financing conditions are highly favourable over the entire maturity and risk spectrum. This applies not only to government financing but also, for example, to financing for enterprises, households and banks. The low interest rates are attributable to a number of structural and cyclical factors. In addition to the highly accommodative monetary policy still being pursued on account of persistently low inflation in the euro area, an important role is also being played by a decline in potential growth and a high propensity to save, partly in the face of demographic change. On the other hand, the low interest paid by borrowers also means that savers are generating low returns on their financial assets.

*Nominal interest rates historically low*

When assessing interest rate movements from the savers' perspective, a distinction should be made between nominal interest rates, which are often at the heart of the debate, real interest rates and after-tax real interest rates. For instance, all in all, the decline in interest rates is weaker and less remarkable when looking at real interest rates before and after tax. For savings deposits terminable at short notice, for instance, real interest rates after tax (in the case of higher personal tax rates) were frequently negative even in the past, making a perceptible move into positive territory in only a few years. The real rates of return on investments in ten-year bonds have also dropped markedly in the

*Real interest rates after tax less remarkable than nominal interest rates*

period under review. The decline is somewhat weaker than in nominal terms. Looking at after-tax real rates of return (at higher tax rates) up to the start of this decade, however, no clear tendency can be identified, with values fluctuating between ½% and 2%. As a result of receding inflation, real tax burdens shrank and, in addition, statutory tax rates were cut. Both of these factors counteracted the decline in before-tax nominal interest rates. In the past few years, however, the after-tax real rates of return on longer-term bonds have also fallen significantly, moving into negative territory.

*Real tax rate often well above statutory tax rate*

On the whole, taxation of interest income has been scaled back in Germany over the past few decades. The factors that have contributed to this are general income tax cuts and, in particular, the introduction of withholding tax in 2009. In terms of the tax system and the economic effect, it should be noted that the inflationary compensation contained in nominal returns does not constitute a gain in financial capacity, but merely compensates for the inflation-induced depreciation of the savings amount.<sup>14</sup> Taxing nominal interest income can lead, even when inflation rates are moderate, to a high tax burden on real interest income. For example, if the inflation rate were close to 2% and the long-term real return on investment slightly above expected real potential growth of 1¼%, this would result in a nominal rate of

return of around 3½%. Factoring in the withholding tax rate of 25%, this would produce a real tax rate in the order of 60%, which would still be markedly higher than the current top income tax rates of 42% and 45% respectively. When real interest rates are lower or inflation rates higher, the relative real tax burden is even higher.

Taxation of private interest income that is fully based on real values is not currently up for discussion and would probably be fraught with implementation issues in practice (eg when determining tax-relevant annual returns or selecting inflation variables). Irrespective of that, it would be necessary to bear in mind the high real burden in some cases when taxing at nominal rates in connection with a reform of withholding tax as discussed in some quarters and the advantages and drawbacks that this would entail. Since the introduction of withholding tax, nominal interest income is taxed at a lower rate than the personal income tax rate for higher incomes. However, even when inflation rates are moderate, low real interest rates result in high real tax rates on interest income.

*Withholding tax and inflation-induced depreciation*

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<sup>14</sup> The nominal principle set out in tax legislation tends to lead in some areas to the taxation of components that only compensate for inflation, eg also more generally in the case of income tax. However, the effect when taxing interest is usually particularly great.