The European market for investment funds and the role of bond funds in the low interest rate environment

As a result of substantial net inflows of capital and significant increases in value, assets under management in investment funds have grown strongly worldwide over the past few years. The general ascendancy of capital markets as a source of funding and investment opportunities observed since the financial crisis is thus in evidence in the fund industry as well. Furthermore, cross-border funds are gaining in importance in the European market for investment funds. This is a sign of increasing market integration.

European bond funds, which managed assets to the tune of €3.4 trillion at the end of the second quarter of 2019, have been influenced to a large extent in recent years by the increasingly entrenched low interest rate environment in which they have been operating. For one thing, the declining interest rates buoyed investor demand for fund investments, as these benefited from price gains and alternative, interest-bearing investments promised slimmer returns. For another, the search for yield increasingly left its mark on funds' asset management practices, with funds giving higher weights to riskier, less liquid and long-dated debt securities. For funds invested in European debt securities, this translated into a higher share of corporate bonds at the expense of government bonds and bank debt securities. The mounting liquidity risks this has caused for funds' asset holdings is a particular issue for retail funds with a large number of small-scale investors. Analyses conducted in this field show that periods of falling prices leave these funds especially vulnerable to outflows, which can be amplified by feedback loops with securities markets. Overall, this underlines the importance of actively managing portfolio liquidity as a way of preventing illiquidity-induced, self-reinforcing outflows of capital from funds.

The global market for investment funds

Strong growth in market for investment funds

Assets under management (AuM) in investment funds have grown strongly worldwide in recent years. Globally, this market continues to be dominated by US funds. At an equivalent of €48 trillion, US funds currently account for almost half of global AuM (see the table on p. 35). Funds domiciled in the euro area manage just under one-quarter of global AuM: at the end of the first quarter of 2019, they held assets amounting to €11.4 trillion, which is slightly more than double the end-2011 figure. Fund AuM also rose markedly relative to annual gross domestic product (GDP). At last count, they were roughly on a par with euro area GDP in 2018, whereas they corresponded to no more than around three-fifths of GDP in 2011.

Market growth reflects net inflows of capital and increases in value

Growth in fund AuM reflects both significant increases in value and substantial net inflows of capital. Since the start of 2012, investors worldwide have acquired investment fund shares worth €10.7 trillion net, investing similar amounts in European and US funds (€3.8 trillion and €3.7 trillion, respectively). US funds in particular, whose assets have increased by a total of €12.0 trillion since 2012, also recorded substantial increases in value. As a case in point, global equity prices – as measured by the MSCI World index – went up by 78% between the end of 2011 and the end of March 2019.[1] In the United States, meanwhile, shares appreciated by as much as 125% (S&P 500).[2] By comparison, the assets managed by European funds rose by a smaller €5.8 trillion. Their markedly weaker increases in value were probably due primarily to the comparatively minor importance of European equity funds.

Equity funds most significant globally, but mixed funds and bond funds also important in euro area

With respect to investment focus, equity funds are the biggest investment funds globally, accounting for 42% of total AuM. This reflects, in particular, the important role played by US equity funds, which manage more than half of US fund assets. Compared to the United States, investment funds domiciled in the euro area focus more on debt securities. In addition to general investor preferences, this is also likely – in Germany, for instance – to reflect the importance of institutional investors, which invest to a greater extent in mixed funds and bond funds. Overall, the assets managed by European equity funds, mixed funds and bond funds are broadly on a par with each other.

Growing relevance of capital markets buoys market for investment funds

The increased significance of investment funds is related to the growing relevance of capital markets as a source of funding and investment opportunities. First, this is explained by factors whose effects may be time-limited, such as the monetary policy accommodation and non-standard monetary policy measures implemented by central banks in the aftermath of the financial and sovereign debt crisis. In the euro area, the Eurosystem's asset purchase programmes probably played a part in reducing market-based debt financing costs. The corporate sector purchase programme (CSPP) is also likely to have buoyed non-financial corporations' issuance activity in the bond market.[3] Second, longer-term factors, such as efforts on the part of enterprises to make greater use of non-bank funding sources, the tighter banking regulations in the wake of the global financial crisis and the ongoing consolidation of banks' balance sheets, are also bound to have made a major contribution to the increased significance of capital market financing. In the euro area, this development was also accompanied by initiatives to advance the capital markets, including, for instance, the still relatively small, newly established equity and bond markets targeting medium-sized enterprises.[4]

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1 This price increase is for the US dollar-denominated MSCI World index.
2 Fund companies also generated price gains from the decline in bond market yields. In addition, funds denominated in US dollars, when translated into euro, benefited from the 15% appreciation in the US currency against the euro during the analysis period.
3 See Deutsche Bundesbank (2017), p. 25.
4 For example, the introduction of SME growth markets as defined in the Second EU Markets in Financial Instruments Directive (MiFID II) saw the creation of a new category of trading venues to facilitate access to capital markets for SMEs.

Advantages of investment funds from investors' perspective

From the point of view of investors, investment funds also offer certain advantages that are likely to have supported market growth. Funds let them diversify their investments with comparative ease, have them professionally managed and invest in markets that might otherwise be difficult to access. Exchange-traded funds (ETFs), whose market volume has been growing at a very dynamic pace over the past few years, also offer investors the advantage of comparatively low fund fees.[5]

Increased significance of funds generally beneficial in macroeconomic terms

As a general rule, the increased significance of investment funds can help boost financial system efficiency and resilience and thus bring with it key macroeconomic benefits. Investment funds can be an important additional source of funding for the real economy – especially in times of crisis. Their increased relevance is also likely to stimulate international investment and strengthen competition for capital in the financial system. However, these benefits are counterbalanced by risks to efficient capital allocation and, in extreme cases, even to financial stability. It is likely that these risks, which ultimately have their roots in specific incentives for fund managers and investors, have grown in the current low interest rate environment. One factor here is that a period in which funds search for yield may be followed by their abruptly offloading risky assets, and investors might have an incentive to redeem their fund shares more quickly than other investors (first-mover advantage).

Key features of the European market

Financial centres play an important role in European market for investment funds

A large part of the assets held by European investment funds (including money market funds) is managed by funds domiciled in the financial centres of Luxembourg and Ireland. The dominance of these two financial centres has reached new levels in recent years, with their share of total net AuM climbing from around 46% to 54% between early 2012 and June 2019. At last count, funds domiciled in Germany and France accounted for 19% and 11%, respectively, of total euro area AuM.

Assets managed by investment funds*

Item	World	United States	Euro area
Fund assets in Q4 2011 (€ billion)	23,311	10,601	5,601
Relative to GDP in 2011	0.4	0.9	0.6
Fund assets in Q1 2019 (€ billion)	48,017	22,555	11,427
Relative to GDP in 2018	0.7	1.3	1.0
Share of equity funds (%)	42	54	29
Share of mixed funds (%)	17	14	26
Share of bond funds (%)	21	20	29
Aggregate net inflows from 2012 to Q1 2019 (€ billion)	10,668	3,697	3,784

Sources: International Investment Funds Association (IIFA), IMF, ECB (for the euro area). * Net assets of open-end investment funds including money market funds. The latest data available from all sources are for the first quarter of 2019. However, figures for the euro area are already available for the second quarter of 2019 (€11.7 trillion).

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UCITS directive likely to have strengthened financial centres

The traditionally important role which financial centres play for the investment fund sector is likely to have been given an additional boost by the regulatory framework, particularly the UCITS (undertakings for collective investment in transferable securities) directive.[6] This harmonised set of EU rules makes it possible, for instance, to allocate a fund's shares to multiple fund share classes. Share classes can differ in terms of currency, appropriation of income or front-end load. This allows certain investor groups to be selectively targeted and tax regu-

5 See Deutsche Bundesbank (2018).
6 The original UCITS directive dates back to 1985 and has since been amended several times. The purpose of the UCITS directive was to establish a single set of rules for investment funds and, in doing so, regulate the cross-border provision of investment funds. It was designed to ensure that providers of financial products in the EU remain competitive and that investors have a wide range of financial products to choose from.

lations to be taken into account. Another key feature of the UCITS directive is the European passport. This means that a fund domiciled in one EU country can be distributed and purchased in another EU country. The European passport is therefore designed to further the goal of forging a single market for investment funds. The increased competition this sparked among fund companies is likely to have made financial centres more attractive. Financial centres that were relatively quick to transpose the UCITS directive into national law offer favourable conditions for funds. Empirical studies conducted on this topic show that they also benefit from fund-specific legislation, a well-established approval process and on-hand expertise.[7]

Growing importance of cross-border funds, …

Another reason why financial centres have grown in importance is the increasing number of investors investing in cross-border funds, i.e. funds domiciled in a different jurisdiction than the investor. According to information provided by the European Fund and Asset Management Association (EFAMA), the assets managed by these funds as a share of total fund assets held by European investors have increased distinctly over the past few years to around one-third. To give some context to this share, which varies considerably between the individual European countries, it is important to note that it includes what are known as round-trip funds – funds which the management company sets up in a different Member State, but then markets exclusively in the country in which it is established.[8] In some euro area countries, including Germany, round-trip funds of this nature – which should be distinguished from "real" cross-border funds that are distributed in multiple countries – account for a relatively large proportion of cross-border funds held by investors.

… but market integration still incomplete overall

Overall, the increase in the cross-border distribution of European investment funds is indicative of progressive market integration. However, this integration process is still incomplete, as shown, amongst other things, by the very high number of European investment funds, by international standards, with relatively low AuM levels on average.[9] Incomplete integration limits the economies of scale which asset managers could generally achieve and is likely to have an unfavourable effect on the fund fees paid by investors. As the European Commission sees it, regulatory barriers, which include national marketing requirements, regulatory fees, administrative requirements and notification requirements, represent a significant disincentive to cross-border distribution.[10] The capital markets union, which aims to deepen and integrate capital markets in the EU, is a major project in the fight to break down such barriers.

Non-banks: most important investor groups

The financial accounts show each individual institutional sector's exposure to investment funds. For funds domiciled in the euro area, such data are available starting in the fourth quarter of 2013. The most important groups of investors are European non-banks, above all other financial corporations – the category to which investment funds themselves belong –, insurance corporations and pension funds, as well as households (including non-profit institutions serving households). Taken together, these three investor groups have purchased investment fund shares (excluding money market fund shares) worth €1,978 billion since the fourth quarter of 2013; this equates to around 62% of net inflows to funds domiciled in the euro area (see the chart on p. 37). Other financial corporations as well as insurance corporations and pension funds stood out on account of their high exposures and, in the case of insurance corporations especially, the relatively steady increase in their investments. According to information provided by EFAMA, they fo-

7 See Lang and Schäfer (2013).
8 Possible reasons for setting up round-trip funds relate to tax advantages as well as supervisory practices and the "brand name" of the fund's domicile.
9 According to data provided by the International Investment Funds Association (IIFA), there were 48,439 investment funds domiciled in the euro area at the end of the first quarter of 2019, compared with 11,580 US funds.
10 See European Commission (2018), p. 1.

cused on domestic funds. One reason for this is undoubtedly that insurance corporations and pension funds in Germany and Austria traditionally invest to a larger extent in specialised funds. These funds, which are reserved for institutional investors and domiciled in the latter's home country, usually manage capital for an individual investor or a small group of investors. In addition, insurance corporations – those in France, for example – play a highly important role in occupational pension schemes and, to this end, likewise invest heavily in domestic funds.

New investment by credit institutions low, by investors outside euro area strong

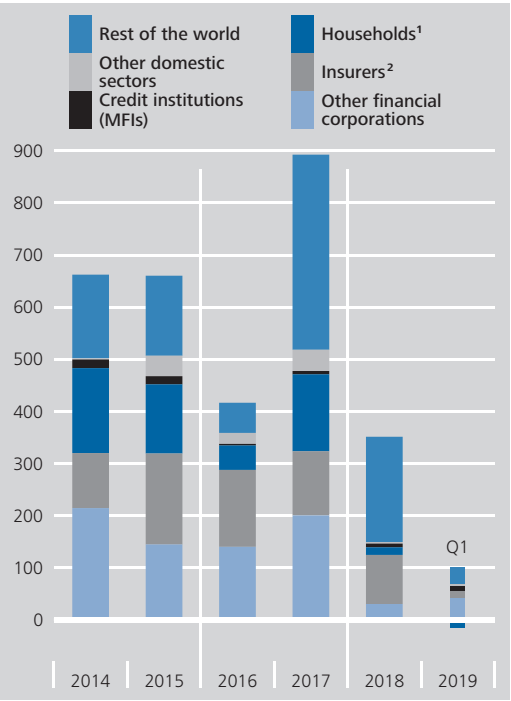
Credit institutions resident in the euro area, many of which scaled back their holdings of investment fund shares in the immediate aftermath of the financial crisis, invested a relatively small amount of fresh capital (€64 billion). By contrast, investors outside the euro area increased their portfolios of European investment fund shares significantly, adding €1,041 billion, or roughly one-third of total net inflows. They have expanded their exposures markedly, particularly since 2017. According to market observers, this demand was fuelled to a notable degree by investors from Asia and Latin America, who were attracted to cross-border European funds for reasons of security and diversification.

Households acquire a small volume of investment fund shares

Compared to insurance corporations and pension funds, households (including non-profit institutions serving households) acquired far fewer investment fund shares; furthermore, for the most part, new investment dipped somewhat over time. Given that households accumulated a relatively robust level of financial assets at the same time, this means that they preferred other financial assets such as, in particular, deposits with credit institutions, which made a stronger and more stable contribution to their accumulation of financial assets.

Net inflows to investment funds domiciled in the euro area

€ billion



Sources: ECB, Eurosystem financial accounts. **1** Including non-profit institutions. **2** Insurance corporations and pension funds.
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The market for European bond funds

Bond funds of particular interest from a central bank perspective

The strong growth recorded by the market for investment funds was also reflected in a marked rise in the significance of European bond funds: as this report went to press, they were managing assets worth €3.4 trillion, compared to €1.9 trillion at the end of 2011. Although bond funds have not been investigated in as much detail as equity funds in the literature to date, they are of particular interest from a central bank perspective. This is because falling risk-free interest rates and a capital market environment of asset purchases by central banks have an especially strong bearing on these funds which invest primarily in debt securities – both in terms of their assets and the risk-return profile of their range of investments. Funds are faced with various types of risk on the investment side: besides maturity and credit risk, these include liquidity risk, which materialises

when their assets are relatively illiquid, but they themselves make their investors the usual guarantee that fund shares can be redeemed at any time. This liquidity mismatch between liabilities and assets is also referred to fund liquidity transformation. In the absence of adequate liquidity management, this mismatch leaves a fund susceptible to a run by investors, especially in periods of stress. The potential risk this poses to financial market stability is what makes it a relevant issue for central banks. Although this concerns all funds managing illiquid assets, the following analysis focuses for the aforementioned reasons on European bond funds, looking at both their net inflows and asset management.

Net inflows to corporate bond funds and other bond funds

Bond funds account for almost one-third of net inflows

At €1.2 trillion, almost one-third of total net inflows to investment funds domiciled in the euro area since the start of 2012 have been registered by bond funds. Retail fund data from the private data provider Morningstar make it possible to gauge the extent to which corporate bond funds or other bond funds were the beneficiaries of this fresh capital.[11] This is of interest from a central bank perspective in that corporate bond funds are often made up of illiquid assets. Furthermore, net inflows to funds with a focus on high-yield corporate bonds, in particular, allow inferences to be made about fund investors' risk preference. For example, corporate bond funds and high-yield funds recorded relatively high net inflows, particularly until the second quarter of 2015 (see the chart on p. 42). These funds attracted strong investment from financial corporations (excluding banks), insurance corporations and pension funds as well as households, in particular. Whilst all three investor groups shunned corporate bond funds for the most part in 2018, shares of other bond funds were added to the holdings of financial corporations (excluding banks) and insurers up to and through 2018.

Inverse relationship between net inflows to corporate bond funds and risk aversion

According to a Bundesbank analysis, the strong net inflows overall to bond funds can be explained in part by the decline in risk-free interest rates since the beginning of 2012 and the funds' positive performance (see the box on pp. 39-41). Moreover, the case of corporate bond funds shows that the investor inflows significantly depend on the development of market uncertainty and market participants' general risk aversion. The latter fell sharply in the period up to 2015. This is suggested by an aggregate indicator, which can be estimated based on multiple separate risk indicators (see the explanatory notes on pp. 44 f.). A correlation analysis confirms that net inflows to corporate bond funds and high-yield bond funds, in particular, are negatively correlated with changes in general aversion to risk, while this correlation is less pronounced for other bond funds.[12] In 2017, in particular, these other bond funds recorded substantial net inflows as risk aversion declined at a more measured pace. Heavier net outflows from corporate bond funds and other bond funds occurred during periods of mounting risk aversion as well as in the course of intermittent jumps worldwide in risk-free interest rates during what has been dubbed the US taper tantrum in mid-2013 (see also p. 45). The strong outflows in 2018 were probably driven in part by the deterioration of the capital market environment at that time amid growing concerns about the economy, falling equity prices and rising credit risks. These outflows took place against a backdrop of predominantly negative fund returns.

11 Morningstar data indicate that net inflows to European bond funds since the start of 2012 came to €835 billion. One significant difference from the ECB investment fund statistics is that net inflows to specialised funds reserved for institutional investors are not included in this figure.
12 The correlation between (monthly) net inflows and changes in general risk aversion calculated for corporate bond funds and high-yield bond funds since the beginning of 2012 is -0.6; for other bond funds, this correlation comes to -0.3.

Flow determinants of European bond funds

Investor flows to European bond funds respond to other (financial) variables. These response patterns can be systematically analysed by means of a panel estimation. Significant variables which potentially influence net flows are, for example, the fund return recorded in the previous period, changes in the interest rate level and general market uncertainty or risk aversion. Market liquidity, too, can be an important determinant of fund flows. The panel is estimated using monthly data for the period from January 2012 to March 2019 on the basis of the above-mentioned variables.

One important finding of the estimation is that the net inflow depends positively on the lagged fund return. Following negative returns, investors withdraw their capital from the bond funds; conversely, they expand their investment if the lagged return is positive. Assuming a one-percentage-point increase in the lagged fund return, bond funds exhibit a net inflow of roughly 0.2% of total net assets (coefficient θ_1 in the table on p. 40) if these are not corporate bond funds, and of approximately 0.3% (coefficient sum $\theta_1 + \theta_2$) if these are corporate bond funds. This relationship points to a momentum strategy on the part of investors. This strategy describes a behavioural pattern whereby investors respond positively to past returns and thus tend to reinforce market trends.

Changes in the interest rate level are a further key determinant of flows to European bond funds. According to the estimations, a decline in yields on ten-year Bunds was accompanied by inflows to bond funds. From an economic perspective, this can be explained by the fact that investors with a diminishing safe yield increasingly invested in alternative, higher-yield assets. Another effect caused by the interest rate level is the discount effect: a declining discount rate increases the market valuation of the bond portfolio and therefore also the contemporary fund return, which can stimulate inflows.[1] In terms of monetary policy and financial stability, this estimated relationship is also of interest in that it provides indications as to how a potential future interest rate rise would influence fund flows. If one supposes – for the sake of simplicity – that the estimated sensitivities apply even in periods of an interest rate rise, and if one assumes an interest rate rise of 100 basis points combined with a 6% drop in the value of the fund's portfolio,[2] corporate bond funds would have to accept outflows of 2.9% of their assets and other bond funds outflows of 2.5% of their assets. This would result in total net assets shrinking by a total of 8.9% and 8.5%, respectively.[3]

Other macroeconomic determinants are market uncertainty – as measured by the implied volatility of the German equity market (VDAX) – and general risk aversion in the capital market (see the explanatory notes on pp. 44 f.). The corresponding, in each case negative estimation coefficients for corporate bond funds show that investors expand (reduce) their investment in these funds in times of decreasing (increasing) uncertainty or risk aversion. This result is consistent with the negative correlation

1 In the estimation, this contemporaneous effect on the fund return is not recorded in the fund return in the previous month, $R_{i,t-1}$, but instead in the yield on Bunds $\Delta Yield_t^{Bund}$.
2 Assuming a bond portfolio duration of six years.
3 See also the estimations by the European Central Bank (2017), p. 105, according to which the total net assets of euro area bond funds shrink by 8.6% following an interest rate shock of 100 basis points.

Fixed effects estimation of the flow-performance relationship of European bond funds°

Dependent variable: net flow[1] as a percentage of total net assets in the previous month

Explanatory variable	Estimation coefficient	Specifications	
		(1)	(2)
$R_{i,t-1}$	Θ_1	0.2246*** (0.0175)	0.2205*** (0.0178)
$R_{i,t-1} \cdot Dummy_{i,t-1}^{Corp.\ bond\ fund}$	Θ_2	0.0959*** (0.0343)	0.0650* (0.0350)
Memo item[2]:	$\Theta_1 + \Theta_2$	0.3205*** (0.0300)	0.2855*** (0.0306)
$Net\ flow_{i,t-1}$	·	0.1856*** (0.0067)	0.1856*** (0.0067)
$Log\ total\ net\ assets_{i,t}$	·	0.0007 (0.0013)	0.0006 (0.0013)
$PSPP_t$	·	– 0.0054*** (0.0007)	– 0.0051*** (0.0007)
$CSPP_t$	·	0.0025*** (0.0006)	0.0023*** (0.0006)
$Bund\ spread_t^{KfW}$	κ_1	0.0002 (0.0027)	0.0008 (0.0027)
$Bund\ spread_t^{KfW} \cdot Dummy_{i,t}^{Corp.\ bond\ fund}$	κ_2	– 0.0204*** (0.0047)	– 0.0171*** (0.0048)
Memo item[2]:	$\kappa_1 + \kappa_2$	– 0.0201*** (0.0042)	– 0.0163*** (0.0043)
$\Delta Risk\ aversion_t$	γ_1	·	– 0.0006 (0.0004)
$\Delta Risk\ aversion_t \cdot Dummy_{i,t}^{Corp.\ bond\ fund}$	γ_2	·	– 0.0045*** (0.0008)
Memo item[2]:	$\gamma_1 + \gamma_2$	·	– 0.0050*** (0.0007)
$\Delta VDAX_t$	λ_1	0.0000 (0.0001)	·
$\Delta VDAX_t \cdot Dummy_{i,t}^{Corp.\ bond\ fund}$	λ_2	– 0.0010*** (0.0001)	·
Memo item[2]:	$\lambda_1 + \lambda_2$	– 0.0010*** (0.0001)	·
$\Delta Yield_t^{Bund}$	·	– 1.1737*** (0.1545)	– 1.1393*** (0.1548)
$\Delta Growth\ expectation_t^{Consensus\ GDP}$	·	0.3474*** (0.1016)	0.3595*** (0.1014)
Number of monthly observations	·	369,948	369,948
Number of funds	·	8,551	8,551
R^2 (between)	·	0.5904	0.5910
R^2 (within)	·	0.0378	0.0378

Sources: Morningstar and Bundesbank calculations. **o** Estimation period: January 2012 to March 2019. Only bond funds (excluding ETFs) domiciled in the euro area form part of the analysis. In this estimation, funds with multiple share classes are aggregated. Funds are classified as corporate bond funds ($Dummy_{i,t}^{Corp.\ bond\ fund} = 1$) if more than half of their portfolio comprises corporate bonds. For other bond funds, $Dummy_{i,t}^{Corp.\ bond\ fund} = 0$ applies. Indicator variables for the Eurosystem's asset purchase programmes, $PSPP_t$ and $CSPP_t$, have values of 0 or 1 (value = 1 from the start of the PSPP in March 2015 and from the start of the CSPP in June 2016). $\Delta Risk\ aversion$ denotes the month-on-month change in the estimated risk aversion indicator (see the explanatory notes on pp. 44 f.). $\Delta VDAX$ denotes the month-on-month change in the implied volatility of German equities and is an indicator of the change in market uncertainty. $\Delta Yield_t^{Bund}$ denotes the month-on-month change in yields on ten-year Bunds. */**/*** indicate significance at the 10%/5%/1% level according to the estimator robust to autocorrelation. **1** Inflow of funds if positively signed or outflow of funds if negatively signed. **2** The sum of the two respective estimation coefficients indicates the overall effect for corporate bond funds.

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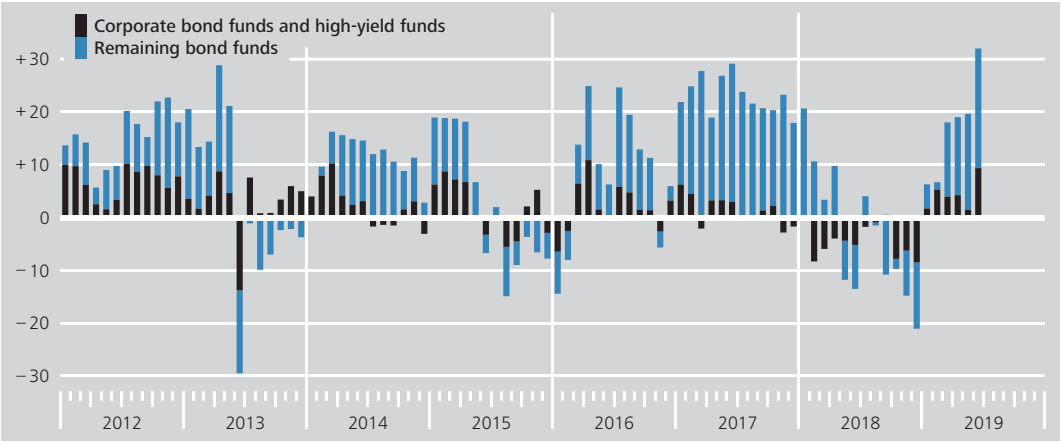
between the flows of corporate and high-yield bond funds and general risk aversion. For other bond funds, however, such a relationship is not evident. This is likely to reflect the fact that investors consider other bond funds that invest more heavily in government bonds less risky – because, if these are government bonds with high credit ratings, their prices could even receive a boost in periods of stress on account of safe haven flows.

In periods of heightened uncertainty, investors prefer safe and liquid bonds, such as Bunds. In periods of stress, this preference for liquid assets prompts market participants to require increasing compensation for an investment in debt securities with lower liquidity. In periods such as these, investors reduce their investment in corporate bond funds; conversely, corporate bond funds benefit from falling liquidity premiums. This is indicated by the impact of the yield spread between ten-year KfW bonds and Bunds with the same maturity, a common indicator for liquidity premiums. The estimation shows that this spread relates negatively to the flows to corporate bond funds. By contrast, other bond funds do not show a significant effect.

This panel estimation explicitly takes into account the time periods of two of the Eurosystem's asset purchase programmes. The results suggest that investors invested somewhat less in bond funds when government bond purchases under the public sector purchase programme (PSPP) began in March 2015 than they did previously. Meanwhile, a countervailing, partially compensatory effect was apparent in the period from June 2016, during which the Eurosystem acquired corporate bonds under the corporate sector purchase programme (CSPP). One possible interpretation of this finding is that investment in funds with a focus on government bonds lost some of its appeal among fund investors after the launch of the PSPP owing to the already very low government bond yields, meaning that bond funds subsequently sold some of their holdings of government bonds to the Eurosystem (see the chart on p. 45). Conversely, the price gains recorded on corporate bonds after the launch of the CSPP could have prompted investors to expand their indirect investment in such bonds – which continued to exhibit a positive yield spread over safe bonds – via bond funds.

Net inflows to euro area bond funds*

€ billion



Source: Morningstar. * Retail funds excluding exchange-traded funds.
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Asset management of European bond funds

Search for yield on funds' assets side

Recent studies show that the search for yield in financial markets is leaving a mark not only on the behaviour of fund investors but also on funds' active asset management.[13] In a study on US corporate bond funds, Choi and Kronlund (2018) find that fund managers have a greater tendency to shift their portfolios into riskier instruments if the level and slope of the yield curve are low and the yield spreads for taking on credit risk are slim. According to the literature, the search for yield has also intensified in German bond funds and mixed-mandate funds, with Barbu et al. (2019) showing that – unlike at the end of 2009 – a large proportion of German specialised funds actively pursued a yield-boosting strategy in their investment activities at the beginning of 2015. This usually involves taking on higher risks.

Portfolio adjustments by European bond funds

According to the ECB's investment fund statistics, European bond funds steadily increased their exposures to corporate bonds as risk-free interest rates declined. Since the beginning of 2012, their share of all the debt securities issued by euro area issuers has increased from around just over 25% to 38% at present. This contrasts with a drop in the share of government bonds, which have been posting ever lower and sometimes even negative yields, in particular since early 2015; at last count, this share came to only 42% (see the chart on p. 45). The portfolio share of bank debt securities likewise fell perceptibly on balance: while these instruments had made up 26% of the bond portfolio in 2012, this share amounted to only 20% of late.

Fund returns more sensitive to high-yield corporate bonds

As the weight of corporate bonds in the fixed-income portfolios of European bond funds increased, so, too, did the sensitivity of their returns to price developments in the corporate bond market; the impact of European government bond yields on fund performance, on the other hand, decreased. Bundesbank estimates based on a multifactor capital asset pricing model (CAPM) identify in particular a rise in sensitivity to high-yield corporate bonds, which indicates that the funds have larger exposures to such bonds (see the box on pp. 43-44).

13 This conclusion is with regard to actively managed funds. By contrast, ETFs are, for the most part, passively managed index funds replicating a benchmark index. In the case of ETFs, then, the question is more whether they pose an additional risk compared with the individual securities in the benchmark index; see Deutsche Bundesbank (2018), pp. 92 ff.

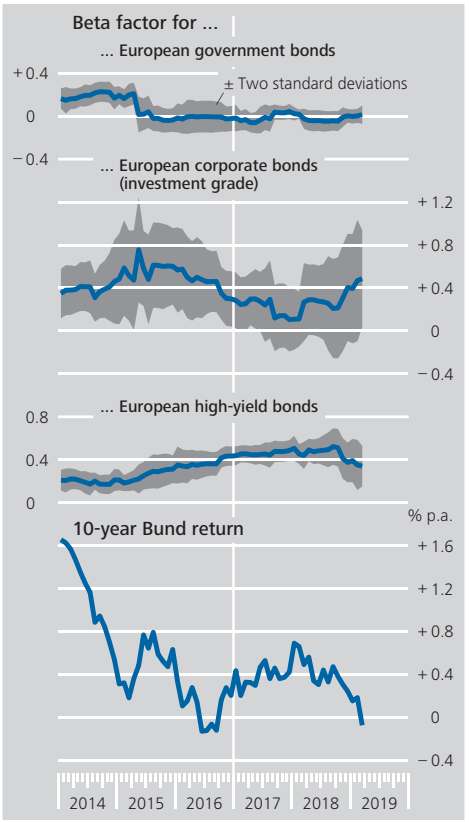
Estimating a CAPM for European bond funds

A single-factor (unifactor) capital asset pricing model (CAPM) describes a market equilibrium in which the expected return on a risky asset is made up of the risk-free return plus a risk premium. Under this model, the risk premium, which compensates the investor for taking on the non-diversifiable systematic risk inherent in the asset, is equal to the market price of that risk, multiplied by the quantity of risk involved in the asset in question (beta factor). A multifactor CAPM, meanwhile, expands on the single-factor model by splitting the beta factor into multiple separate systematic beta factors. As a result, the expected return on the risky asset, as calculated using this multifactor CAPM, is made up of the risk-free return plus several different risk premia, with the individual beta factors measuring the respective systematic quantities of risk. Applied to the portfolio of an investment fund, the individual beta factors indicate the sensitivity of the portfolio's return to each of the risk factors. Seeing as this sensitivity is positively correlated with the weight of the risk factor in the portfolio, they can be interpreted as a measure of the investment fund's exposure to these risk factors.

To explore how sensitive the assets held in European bond funds are to (risky) government and corporate bonds, this box will estimate the funds' sensitivity using a multifactor CAPM. The bond funds' realised monthly excess return over a risk-free asset is inputted into the model as a dependent variable. This excess return is the median return on European bond funds, less the return on Germany's REX index for government bonds. Three systematic risk factors have been chosen as independent variables in this model, these being relevant benchmark bond indices: one for European government bonds, one for European investment grade corporate bonds, and one for European high-yield corporate bonds. The model is estimated over a rolling 24-month window. Based on this configuration, the time-varying beta coefficients indicate the sensitivity of the excess return to each risk factor over this period.

The estimated beta factors suggest that the excess returns on European government bonds stopped contributing significantly to

Estimated beta factors in a capital asset pricing model (CAPM)*



Source: Thomson Reuters and Bundesbank calculations. * The beta coefficients shown here are based on the following CAPM: $(r-r_s) = \alpha+\beta_{GOV}(r_{GOV}-r_s)+\beta_{IG}(r_{IG}-r_s)+\beta_{HY}(r_{HY}-r_s)+\varepsilon$, where r represents the median return on European bond funds, r_s the risk-free return, and r_{GOV}, r_{IG} and r_{HY} the returns on the benchmark indices for European government bonds, investment grade corporate bonds and high-yield corporate bonds. The model was estimated over a rolling 24-month window.

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bond funds' median return (in excess of the risk-free return) following the sharp decline in the risk-free rate up until the spring of 2015 (see the chart on p. 43). Instead, the funds' returns were initially driven above all by the excess returns on corporate bonds. Between mid-2017 and the beginning of this year, the only remaining significant influence identified by the model comes (temporarily) from excess returns on high-yield corporate bonds; towards the end of the observation period, however, investment grade corporate bonds also began to contribute significantly to returns once more. Viewed in aggregate, these findings are consistent with the observation that the funds have shifted their (relative) holdings away from (risky) European government bonds into corporate bonds and stepped up their exposure to high-yield corporate bonds in particular.

The search for yield explained

Investment funds' search for yield largely reflects general risk appetite

One obvious explanation is that the search for yield by investment funds is closely linked to the increasingly entrenched low interest rate environment, just as it is for other (institutional) market participants. This section of the article analyses the extent to which this brisker demand for higher-yield assets reflects a general shift in risk preferences in European financial markets. For this purpose, a measure of general risk appetite is calculated based on a principal component analysis of several individual indicators which are relevant for risk assessments.[14] Over the observation period from 2012 onwards, this indicator has recorded mainly negative values since roughly 2014, when interest rates began to decline sharply; this suggests that market participants' risk aversion was below-average or their risk appetite was above-average. The indicator's subsequent predominantly sideways movement is indicative of relatively strong demand for risk-bearing assets since then. Both developments taken together indicate that the search for yield on the part of investment funds largely reflects the increase in financial market participants' general risk appetite.

Non-standard monetary policy increases incentive for risky investment

Another factor which is bound to have indirectly fuelled this greater risk appetite was the non-standard monetary policy measures, as shown by the increased importance of the portfolio rebalancing channel of monetary policy transmission. This is understood as the relationship in portfolio theory between monetary policy measures and investor behaviour. According to this transmission channel, a lower risk-free interest rate induced by monetary policy measures reduces the return on a risk-free asset and simultaneously makes borrowing more attractive as a result of financing costs

14 For details on the methodology of the principal component analysis, see the box in Deutsche Bundesbank (2008), pp. 38 f.

being pushed down. This shifts the efficient frontier for all manner of assets.[15] In the new equilibrium, the optimal portfolio, from an investor's perspective, will then exhibit a higher level of risk. This effect is amplified further if non-standard monetary policy accommodation is accompanied by lower financial market volatility. Taken together, declining interest rates and reduced financial market volatility thus represent an incentive for investors to shift their portfolios into riskier assets.

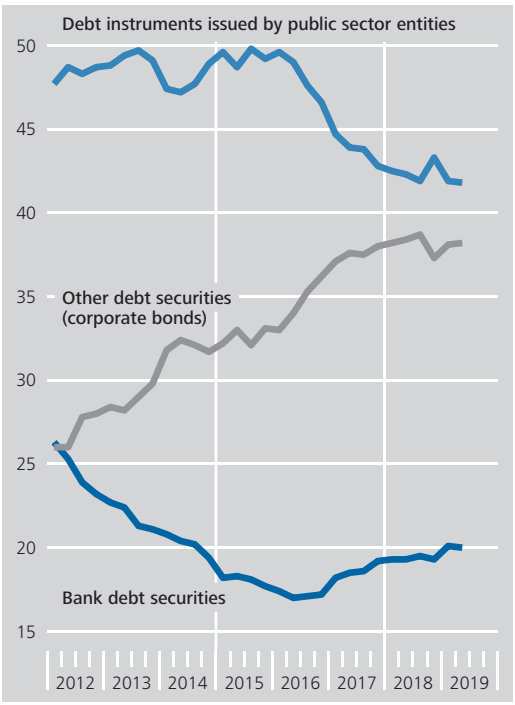
Rivalry with other funds may encourage search for yield and fire sales of assets

Besides general risk appetite, the asset management of (actively managed) bond funds is likely to reflect other fund manager incentives as well. Ultimately, these incentives come about because fund investors delegate their own investment decisions to funds and, in return, often rank fund managers relative to other funds. Rivalry with other funds and fund managers' desire to have a good ranking can, therefore, also influence their portfolio decisions. On the one hand, this may reinforce managers' risk appetite. On the other hand, however, it can also – in combination with a restrictive monetary policy measure – lead to a reversal in managers' search for yield and even contribute to them abruptly selling off risky assets.[16] In this context, Feroli et al. (2014) present a theoretical model in which an increase in the risk-free short-term interest rate beyond a certain threshold can lead to an abrupt correction of risk premia if the fund managers previously stepped up their exposure to risk-bearing, high-yield assets for fear of receiving a bad performance ranking. This enables even unlevered funds to exert destabilising effects on financial markets.

Outflows during the taper tantrum

One example of abrupt outflows from bond funds following monetary policy-induced price losses in capital markets is the US taper tantrum of May 2013. This term describes the surge in US Treasury yields after the Federal Reserve's announcement in May 2013 to reduce (taper) the pace of quantitative easing going forward. At the time, bond fund investors on both sides of the Atlantic responded by making large-scale withdrawals. By contrast, the sudden rise in Bund yields in spring 2015 (the Bund tantrum), which was virtually unaffected by monetary policy expectations, triggered no prominent outflows from European bond funds.

Euro area bond funds: bond portfolio shares by sector*



Source: ECB (investment fund statistics). * Aggregate holdings of debt securities of euro area issuers by issuer sector.
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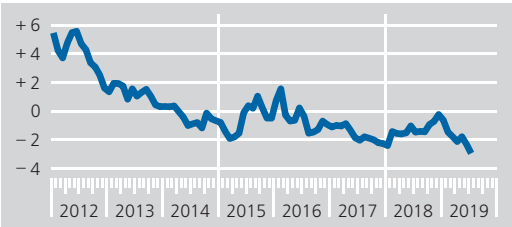
How monetary policy contributes to shifts in funds' portfolios

Recent empirical studies support the view that the expansionary monetary policy observed in the past few years provided an incentive for investors to shift their portfolios into riskier,

15 A portfolio is said to be efficient if there is no other portfolio offering less risk for a given level of expected return or a higher expected return for a given level of risk.
16 Relative rankings could imply that even major loss risks are disregarded. For more on the issue of evaluating funds relative to their peers, see also International Monetary Fund (2015), p. 98 and p. 100 f.; the report states that the delegation of investment decisions introduces incentive problems between investors and fund managers.

General risk aversion in the capital market*



Sources: Bloomberg, Thomson Reuters and Bundesbank calculations. * First principal component of a principal component analysis on the basis of the following individual indicators: the implied volatility of European shares (VSTOXX), the time-varying correlation between the returns on long-term Bunds and the EURO STOXX, the term premium on ten-year Bunds, the yield spreads of European BBB-rated corporate bonds, and the CDS spreads of European enterprises (iTraxx Europe and iTraxx Europe Crossover). Positive (negative) values represent a higher (lower) than average level of risk aversion.

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higher-yielding paper.[17] According to Abbassi and Schmidt (2019), German investment funds exhibit a tendency, when interest rates are low, to give bonds with low ratings and corporate bonds a stronger weighting in their portfolios and also to increase their exposure to securities with longer maturities. In addition, the International Monetary Fund points out that the low interest rate environment has prompted investment funds to invest more in less liquid financial assets.[18] The bid-ask spread of debt securities held by German bond funds, for instance, shows that the illiquidity differential between corporate bond holdings and holdings of other debt instruments has risen since 2012.

Trend reinforced by illiquidity

Liquidity risks in response to the search for yield

Overall, then, the search for yield by European bond funds is likely to have pushed up the weight of corporate bonds and other relatively illiquid securities in their portfolios. This also leaves the funds more vulnerable to liquidity risk, because generally speaking, funds which invest more in illiquid assets run the risk of incurring higher liquidation costs in the event of outflows. This is particularly true when the funds hold large stocks of illiquid securities, because adverse market developments can be amplified by trend-reinforcing mechanisms – a drop in market valuations, and thus in the fund's portfolio return, will be reflected in a lower redemption price for fund shares. Investors pursuing a momentum strategy (see the box on pp. 39-41) will respond to this by withdrawing their capital, potentially forcing the fund manager to liquidate assets, unless these outflows can be financed by other means, such as out of the fund's cash holdings.

Illiquid assets side might amplify outflows

If fund managers need to sell off less liquid assets to meet redemptions, the remaining fund investors might be exposed to additional losses because illiquid assets can only be sold in the market at a discount. Given the typical redemption modalities in retail funds, these costs are not normally borne by the investors withdrawing from the fund but by the remaining shareholders. Strategic investors anticipating this risk of loss therefore generally have an incentive to withdraw their capital early. Such illiquidity-induced outflows can particularly have a bearing if the liquidation value of fund shares decreases over time. In this case, investors will have an incentive to redeem their fund shares earlier than other shareholders (first-mover advantage). Compounding this issue in times of stress is the fact that illiquidity-induced outflows affect market prices, particularly in relatively illiquid markets, potentially triggering feedback effects on fund flows.[19]

Liquidity management to prevent liquidity shortfalls

The mechanism described above implies that funds with illiquid portfolios can become exposed to self-reinforcing outflows. That said, fund managers can influence and control this risk to a degree by managing the funds' liquid-

17 See European Central Bank (2017), p. 97, which writes that investment funds scaled back their exposure to euro area government bonds by around 10% and trimmed their holdings of bank debt securities by 6%. At the same time, they stepped up their holdings of securities from borrowers outside the euro area. Moreover, Cenedese and Elard (2018) and Bubeck et al. (2018) find evidence suggesting that fund managers have reduced their assets from countries conducting unconventional monetary policy and increased their investment in other countries.
18 See International Monetary Fund (2015), p. 96, and International Monetary Fund (2014), pp. 1 f.
19 See, for example, Coudert and Salakhova (2019) for an analysis of the French market for corporate bond funds.

Corporate bond funds: the role of liquidity and ownership structure

Recent years have seen European investment funds allocate an increasing share of their assets to corporate bonds. One reason for this will undoubtedly have been the decline in interest rates, which amplified the incentive to search for yield and thus stimulated demand for higher-yielding, but also riskier debt instruments. Although the supply of corporate bonds also registered an increase over the same period, the brisker demand narrowed their yield spreads. This drove up liquidity risk in the portfolios of bond funds because corporate bonds tend to be less liquid than (high-volume) government bonds.

The literature notes that investment funds can be exposed to stronger withdrawals in periods of stress if the liquidity of their assets is low. Fund managers looking to finance such outflows can use their available cash holdings, draw on any credit facilities they might have, or sell off fund assets.

If a fund manager uses cash or sells liquid securities – such as AAA-rated government bonds – to accommodate investor redemptions, the transaction costs will be relatively low, which would also mitigate the downward pressure on valuations of the remainder of the portfolio.[1] At the same time, that would, however, risk worsening the fund's portfolio liquidity on a permanent basis if the fund manager is unable to acquire new liquid assets due to a lack of fresh inflows of capital. In turn, an increasingly illiquid portfolio risks inducing further outflows if the fund's investors lose confidence in the manager's commitment to keep the fund liquid and fully meet redemptions (which might be triggered if the fund performs badly).[2] This is due to the fact that dwindling liquidity makes it more costly to convert fund assets into cash. In this case, the fund would no longer be able to accommodate all the shareholders' claims if all its assets were liquidated, assuming unit prices remain unchanged. Investors might therefore have an incentive to redeem their fund shares earlier than other shareholders. Such an incentive arises when the liquidation value of fund shares shrinks as investors hesitate to redeem. Accordingly, investors who withdraw from the fund quickly would have a first-mover advantage. Against this background, Goldstein et al. (2017) argue that an illiquid bond portfolio creates incentives for strategic investor behaviour and increased outflows when fund performance is poor. In addition, the first-mover advantage will be amplified if the fund meets outflows by first selling its relatively liquid security holdings. This is because the return of early redeemers is higher than that of investors who stay invested in the fund for longer and thus shoulder more outflow-induced losses.

According to the literature, this amplification mechanism does not apply to all illiquid funds in equal measure. Research on US and German corporate bond funds has found that the proportion of institutional investors in a fund dictates the extent to which it will be affected by withdrawals.[3,4]

1 See Choi and Shin (2016).
2 Cases have been observed in the past where funds with illiquid assets were forced to suspend redemptions in critical situations or because of their investment strategy. Redemption gates or gating provisions are the names given to measures introduced to suspend, at least temporarily, redemptions of fund shares by open-end funds.
3 See Goldstein et al. (2017) and Dötz and Weth (2019).
4 Dötz and Weth (2019) use data from the Bundesbank's investment fund statistics in combination with information from the Eurosystem's securities holdings statistics for the period from November 2009 until June 2016. In line with the literature and theoretical considerations on strategic investor behaviour, they confine their analysis to observations with a negative fund performance.

This research demonstrated that a shortage of liquid assets combined with a poor performance will trigger heavier outflows from predominantly retail-based funds than from those held chiefly by institutional investors.[5] It is a phenomenon which can be traced back to differences in liquidation costs: if a retail investor withdraws from a fund and a small volume of securities need to be sold at a discount, only the remaining shareholders will bear the costs associated with the discount. The retail investor withdrawing from the fund, however, benefits from the first-mover advantage. By contrast, if a major institutional investor makes large-scale withdrawals from a fund, the cost of generating the necessary liquidity cannot be passed on in full to the remaining investors but will have to be borne, at least in part, by the withdrawing institutional investor. This will make institutional investors more reluctant to withdraw from illiquid funds at their own expense. Evidence for German corporate bond funds suggests that outflows from institutional funds in response to poor performance are only ever significant if those funds are sufficiently liquid – that is to say, if it costs them little or nothing to liquidate fund assets.

The empirical evidence indicating that a fund's vulnerability to outflows depends on its investor structure raises the question of whether liquidity management also differs between retail-based funds and institutional-oriented funds. Generally speaking, the approach of first selling liquid assets to accommodate fund outflows (i.e. basing sales on a liquidity pecking order) offers the advantage of low transaction costs. On the downside, though, this leaves an increasingly illiquid residual portfolio, particularly when outflows are high. So how do funds trade off these pros and cons? Not only does an illiquid residual portfolio increase the risk of having to sell illiquid securities at some point in the future, it also means that replenishing liquid assets will come at a cost if the fund fails to attract inflows of capital. This can be problematic in times of elevated market uncertainty.[6] From the investor's point of view, the risk that the fund might have to sell illiquid assets makes it more advantageous to withdraw from the fund early, and it can contribute to a run.[7]

From the fund manager's perspective, the amount and likelihood of future outflows depend on both fundamentals and the liquidity of the portfolio. Liquidity here is not exogenously given, but is managed and targeted by the fund manager. This conjecture has been investigated in two recent studies, both of which identify the key role played by market uncertainty in determining whether a fund manager will sell off securities according to a liquidity pecking order or aim instead to preserve portfolio liquidity by selling illiquid assets proportionally. Jiang et al. (2017) conclude for US corporate bond funds that fund managers exposed to outflows prefer to sell liquid financial instruments during tranquil market conditions but prioritise liquidity preservation in spells of heightened uncertainty. Dötz and Weth (2019), meanwhile, highlight the role played by the investor base in German corporate bond funds. They show that the share of institutional investors is pivotal not just for investor flows, but also for differences in the way a fund's liquidity is managed. According to their research, managers of

5 Estimates by Dötz and Weth (2019) indicate that an assumed negative fund return of -5% will trigger outflows from illiquid funds of between 3.0% and 4.3% of the assets under management in the case of retail-based funds. Underperforming funds held primarily by institutional investors, by contrast, have more reason to fear outflows when liquidity levels are high: assuming a fund return of -5%, the outflows here come to between 2.5% and 3.2% of their fund assets.
6 See the empirical evidence gathered on this point by Chernenko and Sunderam (2016) as well as Coudert and Salakhova (2019).
7 See Jiang et al. (2017) and Stein (2014).

retail-based funds will tend, in times of stress, to preserve portfolio liquidity by selling securities of different liquidity proportionally (pro rata). Given the strategic behaviour of investors in retail-based funds, such a pro rata selling strategy can be interpreted as an incentive to avoid accelerated withdrawals induced by shrinking liquidity levels. Their paper found that, unlike retail-based funds, institutional-oriented funds have less reason to fear illiquidity-driven outflows: it turns out that they finance outflows in periods of stress mainly by selling liquid assets. In so doing, they save transaction costs but accept a deterioration in portfolio liquidity. This finding can be explained by the fact that these funds are less vulnerable to illiquidity-induced outflows.

In conclusion, then, it can be said that ownership structure and fund liquidity do not only affect the relationship between flows and fund performance – the fund's investor base also helps explain which securities the fund manager will sell to accommodate withdrawals. The different responses shown by illiquid retail-based and institutional-oriented funds are due to differences in their respective vulnerability to strategic investor behaviour: a fund held mainly by retail investors is more at risk of outflows. This is because the common redemption modalities tend to favour investors who redeem their fund shares early and can pass on the costs resulting from the sale of illiquid securities to the fund's remaining shareholders. This strategy is more readily available to retail investors with small investments than to institutional investors with large exposures.

ity. Two key liquidity management tools are cash reserves and highly liquid government bonds. Another is active liquidity management in the remainder of the investment portfolio as a precautionary measure against a potential illiquidity-induced sell-off. Fund managers' considerations here include weighing up the extent to which they will sell off securities according to a liquidity pecking order, if need be, to finance outflows. These relationships are explored in the box on pp. 47-49, using the German market for bond funds as an example. The box also discusses the degree to which the strategic incentive for investors to withdraw their capital early on depends on them being retail or institutional investors. It appears that, in periods of stress, managers of retail-based funds mainly strive to preserve portfolio liquidity, whereas the priority for managers of institutional-oriented funds is to avoid transaction costs.

Conclusion

Assets managed by investment funds have risen sharply worldwide in recent years, in a reflection of the general ascendancy of capital markets as a source of funding and investment opportunities since the financial crisis. There is also evidence that cross-border funds are gaining in importance in the European market for investment funds. The marked increase in assets under management in European funds can be traced back to perceptible net inflows from institutional investors in particular, but it also reflects increases in value fuelled by share price gains and the declining and sometimes even negative risk-free interest rates observed in recent years. With €3.4 trillion in assets under management at last count, European bond funds showed signs of being affected by the increasingly entrenched low interest rate environment, both in terms of their net inflows and their portfolio management. Thus, the Bundesbank has estimated that the dwindling

Bund yields helped buoy investors' propensity to invest in bond funds, while portfolio management in these funds has been increasingly driven by a search for yield since 2012. Research on this topic suggests that many funds rebalanced their portfolios more strongly into risk-bearing, less liquid and longer-dated debt securities during this period. In their portfolios of European bonds, funds reduced the weights of government bonds and bank debt securities and switched into corporate bonds, thereby driving up liquidity risks on their assets side. More recent analyses see this mainly as an issue for retail funds with a large number of small-scale investors, given that such funds are especially vulnerable to outflows in periods of falling prices if their portfolios are illiquid. This highlights the major importance of actively managing portfolio liquidity as a way of preventing illiquidity-induced, self-reinforcing outflows.

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