

Individual Investors' Trading in Times of Crisis: Going It Alone or Giving Up?*

Daniel Dorn[†]
Martin Weber[‡]

This draft: January 28, 2013

Abstract

The overall equity allocation of the individual investors examined in the paper – a representative sample of 40,000 self-directed clients at one of the three largest German retail banks – remains stable between 2007 and 2011. In contrast, the investors' tendency to delegate their equity investments to mutual fund managers markedly drops during the 2008 crisis and never recovers. Passive stock funds and stock funds not affiliated with large financial institutions perform better in terms of fund flows, but much of the money previously allocated to active funds is directed towards individual stocks. Investors in active funds are also more likely to reduce their overall equity exposure or outright exit the stock market during the crisis, despite strong tax incentives to remain invested in equities. The financial crisis of 2008 appears to have disrupted a long and robust trend towards more delegated equity investing in non-retirement accounts. The paper's results point to a loss of trust in financial intermediation prompting some investors to abandon the stock market altogether and the remaining investors to take on more idiosyncratic risk, on average.

JEL codes: G01, G11

Keywords: individual investors, financial crisis, portfolio choice, equity allocation, equity diversification

*We thank an anonymous bank for providing the data used in the study. We thank Arvid Hoffmann, Christoph Merkle, and participants at the 2012 Boulder Summer Conference on Consumer Financial Decision Making (especially John Payne, the discussant) for comments. Daniel Dorn gratefully acknowledges the hospitality of the University of Mannheim and funding through a LeBow College of Business research fellowship.

[†]LeBow College of Business, Drexel University; 208 Academic Building; 101 North 33rd Street; Philadelphia, PA 19104; Email: dd79@drexel.edu

[‡]Lehrstuhl für Bankbetriebslehre, Universität Mannheim, 68131 Mannheim, and CEPR, London; Email: weber@bank.bwl.uni-mannheim.de

I Introduction

Fueled by the rise of defined contribution retirement plans and the benefits of mutual funds, there has been a strong trend towards delegated investing – in the U.S., Germany, and elsewhere. French (2008) notes, for example, that direct stock ownership by U.S. households declined from 47.9% in 1980 to 21.5% in 2007; as of 2004, households have been replaced by mutual funds as the largest owner of U.S. common stock.

Anecdotal evidence, however, suggests that individual investors have aggressively sold equity funds during the 2008 crisis. On December 22, 2008, a Wall Street Journal headline read "Stock Investors Lose Faith, Pull Out Record Amounts." The corresponding article reports that "Many [investors] have headed for the exits [and] pulled a record \$72 billion from stock funds overall in October alone."

Did the 2008 financial crisis slow or even disrupt the trend towards intermediated investing? How did households adjust the equity allocation and diversification of their portfolios during the financial crisis and why? This paper examines these questions, using a representative data set of 40,000 self-directed clients between 2007 and 2011 at one of the three largest German retail banks.

The normative recommendations for adjustments to the overall equity allocation and equity portfolio diversification during the crisis are fairly straightforward. Households are unlikely to have private information about the aggregate stock market. Since trading is costly, they should generally refrain from market timing, that is, betting on falling stock prices by selling their equity positions in the hope of buying back at lower prices. A change in the German tax system that took effect during the 2008 crisis imposes additional costs on implementing such a strategy, *ex ante*. Given the benefits of diversification and the failure of actively managed funds to deliver superior returns (as noted, e.g., by Carhart (1997), Fama and French (2010)), investors should shift their equity portfolio towards low-cost index funds. In his presidential

address to the American Finance Association, French (2008) quantifies the virtues of such a shift: “Under reasonable assumptions, the typical investor would increase his average annual return by 67 basis points over the 1980-2006 period if he switched to a passive market portfolio.”

During the whole period under investigation (January 2007 - October 2011), the overall equity allocation remains fairly stable. Retail investors even increase their aggregate stake in equities, indicating that they do not lose their appetite for risk. Cross-sectionally, investors with prior crisis exposure are less likely to actively reduce their equity holdings or exit the market during a crisis. Investors who hold a larger fraction of their equity in actively managed funds are more likely to reduce their equity exposure or exit the stock market altogether (“give up”).

Notwithstanding the stability of the overall equity allocation, the composition of the equity portfolio changes substantially during and after the 2008 crisis. Equity portfolio diversification worsens even though investors are net savers in all but two months in 2007. In fact, during the crisis investors are more likely to rebalance into individual stocks (“go it alone”) than during non-crisis times. Overall, the weight of active equity funds goes down during the sample period, but most sharply so during crisis months. Passive funds, and active funds that are not affiliated with a large financial institution fare relatively better.

At the stock level, there is a clear shift during the crisis towards larger domestic (German) stocks, but also more towards stocks with higher idiosyncratic volatility, and stocks that have performed particularly poorly, other things equal. These decisions do not affect average portfolio returns, i.e., a hypothetical buy-and-hold portfolio consisting of pre-crisis positions delivers the same average return as the actual rebalanced portfolio. However, the volatility of the rebalanced portfolio rises one third relative to the corresponding buy-and-hold portfolio for those investors who switch from active funds to stocks.

Prior research has established a number of stylized facts about individual investor behavior. Individual investors underperform the market (Barber and Odean (2000)) and are reluctant to sell losing investments (Odean (1998) and Weber and Camerer (1998)). Moreover, portfolio diversification appears to be a by-product of their trading decisions rather than an objective per se (Goetzmann and Kumar (2008), Dorn and Huberman (2010)). Little is known, however, about how these investors react to major market shocks which they have experienced during recent years. This paper focuses on the choice of whether or not to delegate equity investment decisions, especially during times of crisis, and the associated effects on portfolio performance. This focus distinguishes the paper from other studies that examine investor behavior during times of crisis. Weber et al. (2012) and Merkle and Weber (2012) report results based on a panel data set which combines investors beliefs and preferences with hypothetical and real choices. These papers document that there is no “renewed risk aversion” as risk attitudes remain pretty stable on average (see also Hoffmann et al. (2013), based on a Dutch data set). Consistent with this paper, Merkle and Weber (2012) report that investors tend to be buyers during depressed markets.

The remainder of the paper is structured as follows. Section 2 develops hypotheses about the dynamics of equity allocation and portfolio diversification. Section 3 describes the data set. Section 4 examines equity allocation changes. Section 5 examines changes in portfolio diversification. Section 6 discusses the representativeness of the results, and Section 7 concludes.

II Hypothesis development

A Broad equity allocation

Hypotheses about active changes in the broad equity allocation, whether in general or specific to the financial crisis period, are challenging to formulate. Since households own the available risky assets, the aggregate risky asset allocation in a representative sample should essentially follow the prices of these assets.

Sharper hypotheses are available regarding the cross section of investors. In the presence of household heterogeneity, households may trade with each other. To examine hypotheses about investment behavior, one typically needs information about investor's risk aversion, risk, and return expectations. Merkle and Weber (2012) and Hoffmann et al. (2013) are two recent examples of papers that elicit such information via surveys and link it to investor behavior during the crisis. A change in the German tax regime that took effect during the crisis allows us to identify *ex ante* allocation choices that are likely to be poor, even without explicit information about investor expectations. Capital gains on equity positions established before January 1, 2009, are not taxable unless they are realized within one year of purchase; in contrast, realized gains on positions established after that date are generally subject to a withholding tax of more than 25%, regardless of the holding period. The tax change creates an additional disincentive to time the market by selling equity investments before the end of 2008 in the hopes of coming back in 2009 or later.

Based on the growing literature on experience-based learning, one can conjecture that the propensity of an investor to yield to the market timing temptation, or leave the stock market altogether, is a function of his experience. For example, an investor who experienced the stock-market rebound after the burst of the internet bubble may be less likely to sell equity holdings after experiencing crisis losses than a more recent stock market participant. Similarly, an investor's response to the Euro crisis that hit the stock market in August 2011 may depend on his stock market presence (and actions) during the financial crisis of 2008. Malmendier and Nagel (2011a), using data from the U.S. Survey of Consumer Finances, report that experienced stock market returns are positively correlated with self-reported risk tolerance, stock return expectations, and stock market participation. In another paper (Malmendier and Nagel (2011b)), the same authors report that variation in experienced inflation is positively correlated with inflation expectations elicited by the the Reuters/Michigan Survey of Consumers.

The extent to which investors have delegated their equity investments may also help explain active changes to their broad equity allocation during a stock market crisis. Odean (1998) and others report that retail investors are reluctant to part with loser stocks – stocks that have depreciated relative to the purchase price – relative to winner stocks, a tendency dubbed the disposition effect by Shefrin and Statman (1985). Analyzing a similar set of U.S. discount brokerage investors as Odean (1998), Ivkovic and Weisbenner (2009) report that investors exhibit a reverse disposition effect with respect to their mutual fund holdings; they tend to hold onto mutual fund winners and sell losers. Calvet et al. (2009) also note a greater willingness of a representative sample of Swedish investors to part with loser funds as opposed to loser stocks. One possible driver of the disposition effect observed in stock trading is the regret associated with realizing a loss. Such regret might be mitigated in the case of selling a mutual fund, since investors can shift the blame for the loss to the fund manager – especially during a crisis that damaged the reputation of many financial institutions, including mutual fund companies.

B Equity portfolio diversification

Previous studies that examine the composition of retail equity portfolios over time, such as Goetzmann and Kumar (2008) and Dorn and Huberman (2010), report that portfolio concentration tends to decrease over time as investors invest their savings in additional positions. In these papers, diversification appears to be a by-product of constructing a portfolio one asset at a time, without paying attention to the interdependence between positions. Moreover, Odean (1998) reports that retail investors tend to sell entire positions rather than rebalance part of a position into another security. The paper’s null hypothesis is thus that changes in diversification depend on the flow of money. If investors are net savers, diversification will tend to improve; if they withdraw assets, diversification will tend to worsen.

According to the first alternative hypothesis, financial crises serve to highlight portfolio risk and cause investors to better diversify during and after crisis periods. Improved diversification

during the crisis may also result from the change in Germany's tax regime described above. This tax change should have caused investors to accelerate longer-term savings decisions during the crisis of 2008. One would expect the tax change to primarily affect delegated investments, partly because the tax change triggered aggressive advertising by fund companies towards the end of 2008 and because investors are more likely to delegate their longer-term investments, if only because of institutional constraints; for example, banks typically offer automatic monthly savings plans only in mutual funds and ETFs.

The second alternative hypothesis is based on the insight that equity portfolio diversification is highly correlated with the propensity to delegate equity investments. It predicts that portfolio diversification worsens because investors lose faith in the ability of active fund managers or distrust them fulfilling their fiduciary duty. Individual investors who want to maintain or increase their equity exposure, but are unhappy with or distrust their active fund manager, have a choice between investing in passive funds or going it alone. This hypothesis would thus predict that net flows into individual stocks and ETFs increase at the expense of active mutual funds. In addition, one might expect that investors more readily sell funds with greater perceived crisis exposure, for example, because they are affiliated with large banks most affected by the crises.

III The data

The analysis is based on a sample of 40,000 self-directed brokerage customers from January 2007 to October 2011 at one of the three largest retail banks in Germany. The sample was drawn randomly from the population of clients who had a balance in their brokerage account of at least EUR 2,500 (held in cash or securities) in at least one month during the sample period, were not employees of the bank, and did not cancel all relationships with the bank during the sample period. In other words, as long as a client maintains any relationship with the bank, such as a checking account, savings account or mortgage, the data includes information on past brokerage holdings and trades even if the brokerage account has been closed during the sample

period. According to the bank, 1%-2% of existing clients completely sever their relationship by closing all accounts in a given year. To comply with data confidentiality policies, the bank does not keep the information of such clients on file.

The data includes monthly information on the value of cash (in the brokerage account, not the checking account), savings accounts, certificates of deposit, and the number and value of securities held by a particular client across all accounts in his name. Securities are uniquely identified by their international security identification number (ISIN) and include individual stocks, individual bonds, mutual funds, exchange-traded funds (ETFs), derivatives, and structured equity products. Using the Morningstar database for funds registered for sale in Germany, mutual funds and ETFs can be classified as money market, fixed income, equity, or specialized funds; the specialized fund category can be subdivided further into asset allocation (balanced), alternative, commodities, convertibles, and property funds. The brokerage records also reveal the aggregate value of purchases and the aggregate value of sales made by a given client during a given month. Transfers of securities into and out of the bank can be inferred from combining the holdings and trade data. Static client information includes age, the date on which the first brokerage account was opened, and the gender of the primary accountholder.

Figures 1 and 2 illustrate the market environment during the sample period. Although the German stock index DAX and the MSCI USA begin and end the sample period at roughly the same level, there are two periods with especially poor market returns (see Figure 1) and high volatility levels (see Figure 2) that are sustained over several months: September 2008 to March 2009 (the U.S. housing crisis) and August to October 2011 (the onset of the European sovereign debt crisis). Clearly, the two crises affect both markets similarly.

Figure 3 shows that, despite the challenging market environment, sample client holdings in cash, fixed income, and equities expand considerably during the sample period, from a total of EUR 1.5 billion in January 2007 to a total of EUR 2.3 billion at the end of October 2011. This

expansion is due to account growth (account openings outnumbering account closings), existing clients being net savers during the sample period, and the stock market rebound in 2009/10.

Throughout the sample period, the bank’s brokerage client population is growing – the representative sample grows from from 25,000 brokerage clients in January 2007 to 35,000 brokerage clients in October 2011; 15,000 clients open a brokerage account and 5,000 clients either sell or transfer all their brokerage holdings during the sample period. In January 2007, 22,000 clients have exposure to equity through individual stocks, mutual funds, or ETFs. This number increases to 33,500 by October 2011; 16,500 clients enter the stock market and 5,000 clients sell or transfer all equity holdings during the sample period. Figure 4 illustrates the fraction of existing clients exiting and entering the stock market in a given month. Stock market entry during a given month refers to an investor without existing equity positions buying (not transferring in) and holding some form of equities in the observed account at the end of that month. Stock market exit refers to an investor selling (not transferring out) all previously held equity positions. The number of stock market entries exceed the number of exits in three out of four months. The financial crises appear to prompt a disproportionate number of investors to enter *and* to exit the market, with entries clearly outnumbering exits. The largest entry spike occurs in December 2008 – presumably a reaction to the tax regime shift.

Figure 5 tracks to what extent the 25,000 brokerage clients who are present in January 2007 add and withdraw liquidity during the sample period. A client adds substantial liquidity in a given month t if the net flow across his cash, savings, and investment accounts is greater than EUR 1,000 and also greater than 10% of his total bank assets at the end of month $t - 1$, where month t flow is defined as

$$flow_t = (cash_t - cash_{t-1}) + (savings_t - savings_{t-1}) + (purchases_t - |sales_t|) > 0 \quad (1)$$

$cash_t$ and $savings_t$ refer to the value of the investor’s cash and savings accounts at the end of month t ; $purchases_t$ and $sales_t$ refer to the cumulative value of the investor’s brokerage

transactions. The fraction of clients who add substantial liquidity exceeds the fraction who withdraw liquidity during each sample month. The sample investors move funds to the bank particularly during the months of December 2007 and December 2008.

IV Equity allocation

Figure 6 illustrates the allocation of brokerage assets over time across cash and savings, fixed income, and equities. Figure 7 provides a similar illustration, but weighting investors equally in a given month. Both figures show that the overall equity allocation of the sample investors is remarkably stable. Despite the 40% drop in stock prices between September 2008 and March 2009, the equally-weighted equity allocation at the end of March 2009 essentially corresponds to its pre-crisis level of August 2008. On an equally weighted basis, the equity allocation increases during the sample period whereas the value-weighted allocation in October 2011 is roughly equal to where it started in January 2007. This can be explained by smaller accounts (including accounts opened during the sample period) tilting more aggressively towards equities over time, and especially during the crisis.

The following sections examine the sample investors' decisions to actively change their equity exposure during the sample period, with a focus on the crisis periods in 2008 and 2011. According to the hypotheses formulated in Section A, one would expect more tax-savvy investors and investors with crisis experience to have a lower propensity to sell equity or exit the stock market during the 2008 crisis. An investor's experience of 2008 crisis losses and participation in the subsequent rebound should lessen his propensity to sell equity or exit the stock market during the Euro debt crisis in 2011. Moreover, the propensity to sell equities – especially during the crisis periods that damaged the reputations of financial intermediaries – should increase in the fraction of equities held via actively managed mutual funds.

A Rebalancing

Rebalancing here refers to an investor with existing equity holdings either buying more equity or selling some (but not all) of his existing equity positions. To examine rebalancing activity more formally, we estimate a pooled regression of active changes made by investor i to his equity allocation in period t , similar to Calvet et al. (2009), as follows:

$$A_{i,t} = \alpha_0 + \beta P_{i,t} + \gamma \mathbf{X} + \epsilon_{i,t} \quad (2)$$

where P is the change in the equity allocation experienced by a buy-and-hold investor – the main explanatory variable in Calvet et al. (2009). A is the difference between the observed change in the equity allocation minus P . We consider two definitions of allocation changes: according to the first, also adopted by Calvet et al. (2009), active changes to the equity allocation can result from changes in the balance of riskless assets (e.g., through additional savings or receipts of interest and dividends) even in the absence of trading risky assets. The second definition sets active changes to the equity allocation to zero unless there is trading in risky assets. A priori, it is unclear which definition should be preferred. However, transfers of securities into or out of the observed sample accounts are not recorded as trades, but change the balance of risky assets. Since such transfers would be mistakenly classified as active changes according to the first definition, the second definition is preferred here.

Columns 1 and 2 of Table I report the results of the baseline regressions with the two definitions of allocation changes. In the specification that comes closest to Calvet et al. (2009), the coefficient on monthly passive changes is -0.43 which is quantitatively similar to the coefficient of -0.50 obtained by Calvet et al. (2009) who consider annual changes. When active changes are conditioned on risky asset trading (Column 2-5), the coefficient on passive changes is still negative and highly significant, but much smaller in absolute magnitude. This is not surprising since, by definition, active changes are uncorrelated with equity allocation changes resulting merely from changes in the riskless balance driven by the receipt of interest payments, savings,

and dissavings.

Guided by the hypotheses, we include additional portfolio and investor attributes contained in the vector \mathbf{X} . The following variables capture different aspects of the investor's past stock market experience: account tenure (the length of time the account has been open), a dummy variable that is one if the account was already open before March 2000 (that is, the investor personally witnessed the run-up and drop in prices associated with the internet bubble), and the total return of the DAX index since account opening.

We hypothesized that investors may reduce their equity held through mutual funds more aggressively, because they can shift the blame for poor performance to the fund manager. It is also possible that the financial crisis causes investors to trust financial institutions less. Both conjectures apply to investments in actively managed mutual funds, but less so to passive mutual funds and ETFs. Thus, we decompose the delegated equity share into an active and a passive component.

The regressions reported in Columns 3-5 of Table I also control for a wide range of investor, portfolio, and market attributes that could affect risk taking: investor age, gender, professional status, portfolio size, past portfolio returns in excess of the DAX, past portfolio volatility in excess of DAX volatility, whether the investor uses an automatic savings plan, and either monthly time dummies (in Column 3) or lagged DAX returns and volatility (in Columns 4 and 5). In an automatic savings plan, investors set aside a constant amount to be invested each month. Plan membership can be inferred from monthly purchase volume. An investor is classified as using a savings plan in a given month if the aggregate purchase amount that month is identical to the amount of risky assets purchased the previous or the following month. To conserve space, coefficients for these controls are not reported. As can be expected, the male and savings plan coefficients are positive and highly significant across all models. In contrast, older investors tend to actively reduce their equity holdings during the sample period, other

things equal.

To examine whether investor behavior systematically changes during crisis months, we include a dummy in Column 4 that is one during months with particularly low stock market returns and simultaneously high volatility (September 2008 - March 2009 and August 2011 - October 2011) and interact this dummy with selected regressors. To separate the potential impact of the tax regime shift, an alternative crisis definition omits December 2008 as a crisis month and adds it as a separate dummy variable in Column 5.

Across the three models reported in Columns 3-5, longer account tenure is associated with rebalancing out of equities, especially during crisis months. The effect of account tenure is not linear, however, as the coefficients on the internet bubble experience dummy (indicating particularly long-lived accounts) are significantly positive in Columns 3-5. Investors who have experienced higher DAX returns during their account tenure tend to rebalance more aggressively into equity, especially during crisis months (Columns 4 and 5). Variation in the delegated active share has the largest effect on equity rebalancing in economic terms: a one-standard increase in the delegated active share is associated with a 0.10% reduction in the equity allocation during a non-crisis month; this effect is doubled during a crisis month. In contrast, variation in the delegated passive share has no effect on rebalancing.

Across all investor-months, the active equity allocation change averages 0.17%. According to the coefficients of the crisis and December dummies reported in Columns 4 and 5 of Table I, active changes roughly double during crisis months and reach more than five times the average of normal months during December 2008.

Although the documented effects are substantial relative to the average active equity allocation change, they pale in comparison to the 8% standard deviation of the change across investor-months. The objective of the next section is to shed light on the determinants of large

active reductions in the equity allocation: stock market exits.

B Stock market exits during the 2008 and 2011 crises

Stock market exit here refers to the complete sale of existing equity holdings. These changes are of particular interest since they can be expected to hurt investor welfare ex ante. Market timers not only incur trading costs, but they also give up substantial tax benefits when selling positions established before the end of 2008.

Figure 4 shows that exit activity is particularly high in 2008 (with two spikes in January 2008 and October 2008) and 2011 (with two spikes in March 2011 and August 2011), presumably associated with the U.S. mortgage crisis and the sovereign debt crisis in Europe.

We estimate probit regressions of stock market exits, separately for 2008 exits and 2011 exits. To be included, investors need to have at least EUR 1000 invested in equities at the beginning of 2008 and 2011, respectively. A stock market exit is defined as an equity balance of less than EUR 10 at the end of the year and selling of risky assets during the year (to avoid classifying transfers of equities to another bank as exits).

In addition to the explanatory variables considered in the rebalancing regressions, we identify past market timing activity with an indicator that is one if an investor has previously sold all equity holdings. The performance of the observed market timing can simply be measured as the DAX returns during the investor's absence from the market. For example, good timing is defined as negative DAX returns during the investor's absence. One would expect past market timers to be more likely to exit again in 2008 and 2011, although experience-based learning suggests that poor past market timing decisions might offset this tendency.

The direction of the association between the level of past trading activity and the likelihood of exit is unclear. In a sense, a stock market exit requires drastic action. One might thus

expect that investors are more likely to exit if they have demonstrated a greater willingness to act in the past. On the other hand, active traders may be less subject to any emotional toll exacted by large losses.

Not surprisingly, past market timing activity is an important determinant of stock market exit, both in 2008 and in 2011. More interesting is the effect of market timing returns. Investors with poor past market timing experiences (that is, investors being absent during positive market episodes) are significantly less likely to exit in 2008 than peers for whom the DAX moves little during their absence. However, better timing experiences are also associated with a lower likelihood of exit and there is no evidence that investors learn from poor market timing regarding the decision whether to exit the market in 2011. Longer account tenure is associated with a lower exit likelihood, but is only significant for 2011. Crisis-related experience, or lack thereof, appears to be a more economically significant determinant of stock market exits. Investors who were present for the run-up and fall in stock prices around 1999/2000 are 1.3% less likely to exit in 2008, relative to an exit baseline of 5.4%. Investors who opened an account after March 2009, and are thus deemed to lack any crisis experience, are almost 2% more likely to quit in 2011 than their otherwise similar peers - almost half the exit baseline of 4.3% for 2011.

Investors who have delegated a greater fraction of their equity investments are more likely to exit the market. As conjectured, however, the effect is much stronger for active mutual fund holdings than for passive fund holdings and ETFs. A one standard deviation increase in the delegated active share has four times the marginal effect on the 2008 exit probability as a one standard deviation increase in the delegated passive share. The effect is still twice as large in 2011.

V Equity portfolio diversification

A Delegated equity share

How do financial crises affect the investors' willingness to delegate equity investment decisions and equity portfolio diversification? To examine whether trading behavior changes during the two crises, one can contrast the types of assets investors buy and sell in a given month during times of crises and during normal times. Specifically, conditional on observing investors selling a particular asset type such as individual stocks (and only individual stocks) during a given month, what types of assets do they buy during the same month?

Table III answers this question. During crisis times, investors are more likely to rebalance into individual stocks and passive funds than during non-crisis times. This tendency is seen most clearly when investors finance their purchases with cash (as opposed to the sale of another security during the same month), but is present when selling other assets as well. In contrast, active funds and certificates fall out of favor especially during crisis months, with the exception of December 2008. Many certificates resemble passive funds in that they track popular stock market indices, but, in contrast to mutual funds or ETFs, certificates constitute unsecured liabilities of the issuing banks. This feature may explain the decrease in demand, especially during times of heightened attention regarding bank defaults.

During crisis months, in particular, investors appear to trade away from active stock funds and into passive stock funds. What is the net effect of these two effects on the investors' aggregate willingness to delegate stock investment decisions? Figure 8 addresses this question by charting the value-weighted and the equally-weighted delegated share of the investors' equity portfolios. At the beginning of the sample period, stock funds represent almost 38% of the aggregate equity portfolio; the value-weighted delegated share declines to 31% by October 2011. The equally-weighted average delegated share across investors also declines during the sample period (from 48% to 40%). The difference between the two averages implies that larger

accounts tend to be more heavily invested in individual stocks. The equally-weighted average delegated share declines almost monotonically during the sample period and drops substantially during the crises of 2008 and 2011 (as well as pronounced but smaller drops during the high-volatility months of January 2008 and May 2010). These drops do not merely reflect differences between the returns of the individual stocks and the stock funds held by the sample investors. The red bars in Figure 8 show the active change in the equally-weighted average delegated share during a given month, defined as the total change during that month minus the passive change due to the differences in returns between the individual stocks and the stock funds held at the beginning of the month. Investors actively reduce the weight of stock funds in their equity portfolio during much of the sample period, but most aggressively so during the crisis months of October 2008 and August 2011.

Changes in the value-weighted delegated share generally exhibit a similar pattern, with one exception. In December 2008, the value-weighted share of stock funds goes up sharply, presumably as investors gear up for the change in the German capital gains tax regime. The absence of such a large (though temporary) increase in the equally-weighted average delegated share suggests that tax-motivated trading is concentrated in larger accounts or in accounts that mostly consist of stock funds to begin with.

Figure 9 shows that the reduced willingness to delegate equity investment decisions results in substantially more concentrated equity portfolios. Assuming that a stock fund consists of 100 equally weighted positions that do not overlap with individual stock holdings or holdings in other stock funds, the Herfindahl-Hirschmann Index of a typical equity portfolio increases from less than 8% (corresponding to equally-weighted positions in more than 12 stocks) to more than 12% (corresponding to equally-weighted positions in fewer than 8 stocks). This increase in portfolio concentration is not merely due to new accounts. Portfolios of sample investors who already hold equity in January 2007 also become more concentrated over time, with a jump in October 2008.

These results are not consistent with the null hypothesis of changes in diversification being driven by savings and dissavings. Despite investors adding liquidity to their accounts, the equivalent number of stocks in their accounts declines. The results are also contrary to the alternative hypothesis of financial crises raising investor awareness of the benefits of holding a diversified equity portfolio.

B How do financial crises affect the types of stock funds and stocks bought?

The previous sections document a surprising shift towards individual stocks over time, especially during the crises of 2008 and 2011. This section examines shifts within the class of individual stocks and within the class of stock funds. Systematic shifts within asset classes can shed light on what motivates the broader shift between asset classes; moreover, such systematic shifts may matter for portfolio performance. For example, Baker and Wurgler (2013) conjecture that the correlation between government bonds and bond-like stocks - large, mature, low-volatility, profitable, dividend-paying stocks - is driven, at least in part, by investor sentiment. If risk perception drove the observed shift between stock funds and stocks during the crisis, one might thus expect the sample investors to favor bond-like stocks.

B.1 Systematic shifts within individual stock holdings during crisis times

Table IV reports the results of regressing two measures of changes in individual stock holdings on stock characteristics as well as sector dummies and monthly time dummies. The first measure (see Columns 1 and 2 of Table IV) is defined as the number of sample investors who hold a given stock divided by the number of sample investors who hold any individual stock that period. Changes in this measure from one month to next capture the stock's changing popularity across investors, weighting each investor equally. The second measure (see Columns 3 and 4 of Table IV) is called excess weight and defined as the value of a given stock aggregated across all sample investors divided by the value of all stocks held by the sample investors, minus the market capitalization of that stock in EUR divided by the aggregate market capitalization of

all stocks held by the sample investors. Changes in the excess weight capture the changing importance of a stock in the aggregate brokerage portfolio relative to its importance in a market portfolio of sorts (the stock needs to be held by at least one sample investor to be included) - hence, investors are no longer weighted equally but in proportion to the size of their trades.

The stock characteristics range from static attributes such as firm age at the end of the sample period to dynamic attributes such as past returns, beta, and idiosyncratic volatility. Each attribute is interacted with a crisis dummy that is one during crisis months and zero otherwise. In Columns 1 and 3 of Table IV, September 2008 - March 2009 as well as August 2011 to October 2011 are considered crisis months. In Columns 2 and 4, December 2008 is omitted from the crisis month definition; given the change of the German capital gains tax regime in 2008/9, it is possible that trading in December 2008 may have been primarily tax motivated.

During the crises of 2008 and 2011, there is a clear shift across the sample investors towards larger domestic stocks, especially those included in the German blue-chip index DAX (see Columns 1 and 2 of Table IV). Other things equal, during a crisis month, the popularity of a DAX stock in the sample increases by 0.1%, which corresponds to 20 investors adding the stock to their portfolio. To put this in perspective, a sample stock is held by a total of 20 investors, on average; the median stock is held by 3 sample investors. Conditional on gaining popularity in a crisis month, the average increase in popularity is 0.01% (the median increase is 0.004%) - an order of magnitude below that of DAX stocks. DAX stocks do not become systematically more popular during non-crisis months. During crisis months, other things equal, the sample investors also tend to add other German stocks, older stocks, and larger stocks; these effects, however, are less significant and weaker in economic terms.

As reported in previous studies of the disposition effect and individual investor buying behavior, individual investors tend to favor recent losers. This tendency is more pronounced during crises. A one-standard deviation decrease in past-one month returns in excess of the

DAX, corresponding to -20%, is associated with an 8% increase in popularity (when expressed relative to the popularity of the median stock).

During the sample period, stocks with higher past idiosyncratic volatility - expressed as a fraction of DAX volatility - become more popular. This preference is stronger still during crisis months. Similarly, investors exhibit a preference for stocks with a high beta relative to the DAX, especially during times of crisis.

Taken together, these systematic shifts in popularity indicate that during a crisis investors are particularly willing to bet on visible stocks that have fared poorly during the recent past. The increasing popularity of high-volatility and high-beta stocks during the crisis is inconsistent with investors moving into stable or bond-like stocks.

The value-weighted results, reported in Columns 3 and 4 of Table IV, are weaker. For example, the importance of German stocks in the brokerage portfolio systematically declines relative to their importance in the market portfolio. This is especially true for DAX stocks during normal months; during crisis months, however, the excess weight of DAX stocks does not decline significantly. This suggests that the shift towards DAX stocks during crises is primarily driven by investors with smaller positions. The excess weight of dividend-paying stocks increases by 3% relative to non-dividend payers during the crisis. During normal months, there is no systematic tilt to dividend stocks. Like changes in popularity, changes in excess weight are also negatively correlated with past returns, especially during crisis months.

B.2 Systematic shifts within stock funds during crisis times

To contrast aggregate shifts within stock funds during the crisis and normal times, one can regress fund flows or changes in fund popularity on fund characteristics such as past returns, returns relative to peers, measures of fund risk, as well as static fund characteristics such as the nature of management (active versus passive). The novel perspective offered by this analysis

relative to existing work, e.g., by Ivkovic and Weisbenner (2009), lies in its focus on the crisis and the consideration of new fund characteristics such as a fund’s independence from other financial institutions.

Table V reports the results of regressing several measures of changes in stock fund holdings on fund characteristics as well as sector dummies and monthly time dummies. The first measure (see Columns 1 and 2 of Table V) is defined analogously to the stock popularity measure in the previous section: the number of sample investors who hold a given stock fund divided by the number of sample investors who hold any stock fund that period. The remaining measures are defined as in Ivkovic and Weisbenner (2009). Fund inflows are the number of shares bought in a given fund during a period divided by the number of shares held in that fund at the end of the previous period. Fund outflows are the number of shares sold divided by the number of shares held, and netflows are the difference between inflows and outflows.

Regressors include well-known attributes such absolute fund performance, relative fund performance dummies that reflect previously documented non-linearities in the flow-performance relation, measures of fund risk such as beta and idiosyncratic volatility, Morningstar performance rating, fund attributes such as expenses, turnover, management style (active versus passive), size, age, as well as fund objective and time fixed effects.

In the run-up to and aftermath of the 2008/9 crisis, the reputation of financial institutions has suffered and households have lost trust in financial institutions. Sapienza and Zingales have developed a financial trust index which “measures investors’ trust in the stock market, banks, mutual funds and large corporations,” using household responses to a quarterly survey since January 2009. Fluctuations in trust may help explain the observed shift between delegated and do-it-yourself investment documented in the previous section and also shifts within the stock fund portfolio. For example, one might conjecture that an erosion of trust in mutual funds will affect active managed funds more strongly than index funds. The paper considers

two other fund indicators that are likely correlated with trust: independence from a large financial institution and the stock market performance of the fund management company or an affiliated financial institution. For example, DWS Investment and Allianz Global Investors - the two largest fund families in the sample - are classified as dependent since they are investment arms of Deutsche Bank and Allianz Group, respectively; in contrast, Fidelity (the fourth largest fund family) is classified as independent. In the case of a DWS fund, the performance of Deutsche Bank relative to the DAX or other financial institutions can serve as a proxy for the change in trust.

Finally, the analysis controls for broker-specific effects by identifying funds that are promoted in a given month and funds that can be bought as part of automatic savings plans.

As in the stock flow regressions, each attribute is interacted with a crisis dummy that is one during crisis months and zero otherwise. In Columns 1 and 3 of Table V, September 2008 - March 2009 as well as August 2011 to October 2011 are considered crisis months. In the remaining columns, December 2008 is omitted from the crisis month definition to allow for the possibility of primarily tax-motivated trading.

Short-term and longer-term past returns, in absolute and relative terms, have largely the expected positive association with the different measures of active changes in stock funds. The interaction of the past one month return with the crisis dummy is significantly negative, but that doesn't necessarily mean that investors were less sensitive to poor returns during the crisis. It is also possible that investors did not add as much money during crisis months than during normal months - hence, the negative coefficient might reflect smaller aggregate inflows to the brokerage during a time of low returns. For example, a one-standard deviation increase in past one-month returns is associated with an increase in fund popularity of 10% relative to the median popularity of 0.1% (that is, the median fund is held by 0.1% of all fund investors). In contrast to changes in fund popularity, which are equally weighted across investors, flows

are particularly sensitive to extreme returns that put a fund in the top or bottom decile of its peers. For example, a top 10% performer during months t-13 to t-2 saw its net flows increase by an additional 1.5%, other things equal.

In contrast, fund risk as measured by idiosyncratic volatility and beta relative to the DAX is largely unrelated to changes in fund holdings both in- and outside the crisis.

Other things equal, there is no clear trend towards cheaper funds during the sample period, although funds with lower expense ratios appear to receive significantly more flows during crisis months (when December is excluded as a crisis month, see Columns 4 and 5 of Table V). No-load funds appear to receive more inflows across the entire sample period (see Column 5 of Table V). A comparison with Columns 1 and 2 shows that the relation between changes in fund popularity and fund costs is insignificant, suggesting that any tendency towards cheaper funds is driven by larger trades.

There is, however, a clear trend towards index funds throughout the sample period; during a given month, an index fund receives a net flow of more than 2% above that of an otherwise similar active fund. Flows into index funds are especially pronounced during December 2008. In fact, when December 2008 is omitted as a crisis month, the significantly positive interaction between the crisis and index dummies in the net flow regression (in Column 3 of Table V) turns significantly negative (in Column 4 of Table V). It is possible that these flows reflect tax-savvy traders having a preference for index funds that is unrelated to the crisis. The negative coefficient of the interaction between the index and crisis indicators in Column 4 of Table V might then reflect accelerated purchases by these investors which would have been made later in the absence of the tax change.

The positive regression coefficients on the interaction terms between crisis and fund size as well as the domestic stock fund indicator are reminiscent of the stock flow results. During

times of crisis, stock fund investors tend to be drawn to larger funds and funds that primarily invest in German stocks.

Funds classified as independent receive 1.5% more flows per month than otherwise similar funds that are affiliated with another financial institution (see Columns 3-5 of Table V). This tendency is not particularly pronounced during the crisis, however. Funds that are affiliated with a publicly listed financial institution experience an additional reduction of 1.3% in net flows during the crisis (better relative performance of that affiliate appears to alleviate this effect, but is not statistically significant). Fund independence and the status of an affiliated company is largely unrelated to changes in fund popularity (Columns 1 and 2 of Table V).

Promotion by the sample broker has a large effect on stock fund holdings, both in statistical and in economic terms. Conditional on being highlighted as a fund of the month, a fund's net flows are 85% of the previous month's holdings. Remarkably, this effect is essentially absent during the crisis. This admits two interpretations which are not mutually exclusive and challenging to distinguish with the data at hand. First, it is possible that investors pay less attention to promotions during the crisis because their attention is absorbed elsewhere. Second, the crisis may lessen the investors' willingness to listen to explicit or implicit advice. The second explanation is consistent with the observed shift towards individual stocks and also with the reduced popularity of funds that are available in savings plans (only about 120 funds are available for automatic savings plans and investors may interpret inclusion in this list as an endorsement by the broker).

C How does equity portfolio rebalancing during the crisis affect performance?

The previous sections have documented an aggregate shift away from actively managed stock funds and into individual stocks, especially during the crisis months in 2008/9. This shift is interesting, per se, and because it raises questions about portfolio performance. Clearly,

portfolio concentration has increased as a result of the shift. This section attempts to quantify the effects of equity portfolio rebalancing between September 2008 and March 2009 on the expected and realized portfolio performance from April 2009 onwards.

Table VI summarizes characteristics of investors and their portfolios grouped by the investors' different rebalancing strategies during the crisis.

Investors are considered to reduce their tendency to delegate equity investment decisions (Column 1 of Table VI) if, between the end of August 2008 and the end of March 2009, they increase the number of positions in individual stocks relative to the number of positions in equity funds.

Conversely, they have a stronger tendency to delegate if they increase the number of positions in equity funds relative to the number of positions in individual stocks.

The "constant delegation" group consists of investors who hold at least one stock fund in August 2008 and March 2009 and maintain a constant proportion of individual stock and fund positions.

The "no delegation" group consists of investors who only hold individual stocks in both August 2008 and March 2009. Single female account holders are over-represented in the "constant delegation" group, suggesting that women trade less than men across asset classes. Portfolios in this group are relatively small, with the lion's share of the equity portfolio invested in funds.

Monthly average returns before the crisis are similar across the groups (averaging -0.9% per month), with the exception of the stock-only group which has an average monthly return of -1.2% (see Panel A of Table VI). Realized portfolio volatility correlates well with the average fraction invested in individual stocks - highest in the stock-only group with 9.8% per month

and lowest in the constant-delegation group with 5.2% per month.

Panel B of Table VI contrasts the crisis performance between September 2008 and March 2009 of two sets of portfolios for each group: the actual portfolio (reflecting actual rebalancing during the period) and a portfolio that holds the end-of-August 2008 positions throughout the crisis (without any rebalancing). Perhaps not surprisingly, there is little difference in average returns across the two sets of portfolios. For investors who shift their portfolio from funds to individual stocks, however, the monthly return volatility increases from 11.9% to 13.3%. This increase is even more substantial after the crisis (see Panel C of Table VI). The monthly volatility of actual portfolios averages 7%, almost a third higher than that of the corresponding buy-and-hold portfolios. Again, the two sets of portfolios do not differ in terms of average returns.

To be included in Table VI, sample investors have to hold at least one equity position both at the beginning and at the end of the crisis. What happens to stock market participation after the crisis? Perhaps not surprisingly, the group of stock-only investors has a relatively high exit rate of 7.7% (that is, 678 of the 8,805 investors in that group sell all of their equity holdings at some point before the end of the sample period). After all, these investors earn the lowest returns both before and during the crisis. Even after the crisis, the group's average monthly return of 1.3% is similar to those of the other groups, with a much higher volatility of returns. Remarkably, however, the highest exit rate of 8.5% is found in the constant-delegation group, the group with the highest average returns and lowest return volatility during the crisis.

Panel D of Table VI reports the expected return loss of complete portfolios for the sets of actual and buy-and-hold portfolios across the four different groups (calculated following the methodology outlined in Calvet et al. (2007)). Expected return loss is the difference in expected return between the investor's portfolio and the efficient portfolio that carries the same risk as the investor's portfolio. Essentially, the expected return loss reflects 1. differences

between the Sharpe ratios of the observed risky portfolios and the Sharpe ratio of benchmark such as the MSCI World and 2. the fraction held in cash. Consistent with previous inferences, the return loss of the actual portfolios is substantially higher than that of the buy-and-hold portfolios in the group of investors who reduce their tendency to delegate. Conversely, portfolios become more efficient in the smaller group of investors who delegates a larger fraction of their investments.

VI Representativeness of the results

Due to its size and the random selection, it is reasonable to think that the sample is representative of the bank's brokerage population. Some investors will hold financial assets outside the observed accounts. For such investors, the equity allocation and diversification of the observed accounts may not be representative of their entire financial wealth. Unlike in the U.S., where most investors with a regular (taxable) brokerage account also have one or more tax-deferred accounts with substantial risky asset holdings, tax-deferred savings still play a negligible role in private retirement savings in Germany. In general, thus, there is little need for the sample investors to maintain several brokerage accounts. Moreover, there is no reason to expect that investors systematically undo observed transactions in other accounts. Because of trading costs and taxes, investors should transfer assets between brokers rather than sell them in one account and buy them in another. Since we can identify transfers of securities and do not treat them as purchases or sales, they should not drive our findings regarding asset allocation changes or stock market exits.

It is difficult to validate the results relative to the population of German individual investors since information about the population is scarce. The German Bundesbank (central bank), for example, occasionally reports asset holdings of private households, but the information is insufficient to establish a consistent time series contrasting individual stock and stock fund investments of German households. The source that comes closest to the paper's research questions is a survey commissioned annually by the association of German exchange-listed

stock corporations. Based on a representative poll, the survey estimates the number of Germans who hold individual stocks, stock funds, balanced funds, or a combination of these three asset classes. Figure 10 summarizes the survey results from 1997 to 2011. The chart shows that stock market participation, in terms of the number of investors, peaks in 2001 and has since mostly declined. In 1997, the majority of individuals had exposure to the stock market by holding only individual stocks. Between 1997 and 2008, one can observe a steady trend towards more delegated investing: the fraction of stock market participants who hold only individual stocks steadily declines from almost 60% to less than 30%. However, and consistent with the paper's results, the fraction of stock market participants who only hold stock funds has decreased every year since 2008.

One area in which the data may well not be representative of the retail investor population is new stock market entries. The sample bank may do better than its competitors in attracting new stock market participants which could explain why the number of stock market participants in the sample increases over time, whereas the survey-estimated number of German household stock market participants decreases in 2009 and 2010 before picking up in 2011.

VII Conclusion

Based on a representative sample of 40,000 customers from 2007 to 2011 at one of the largest German retail banks, this paper documents that the clients' overall equity allocation during the financial crisis is remarkably stable. Despite the 40% drop in German stock prices between September 2008 and March 2009, the equally-weighted equity allocation at the end of March 2009 essentially corresponds to its pre-crisis level of August 2008. Prior crisis experience appears to play an important role in how investors adjust their equity allocation in response to a crisis. For example, investors who witnessed the stock price collapse in the early 2000s and subsequent rebound are less likely to reduce their equity exposure or exit the stock market during the 2008 financial crisis. Similarly, the European sovereign debt crisis of 2011 appears to primarily affect clients who opened their account after March 2009, that is, after the U.S.

mortgage/credit crisis. The fraction of equity held in active funds is another important determinant of active equity allocation changes during the crisis. Other things equal, the higher the equity share delegated to active funds, the greater the chance of the investor reducing his equity positions or leaving the market altogether during a crisis (“giving up”).

The financial crisis also affects the composition of the investors’ equity portfolios. In particular, individual investors shift their equity portfolio away from actively managed funds and towards individual stocks (“going it alone”) and, to a lesser extent, passive funds and ETFs. The observed rebalancing is detrimental to portfolio performance. Investors who increase the proportion of individual stocks relative to stock funds during the crisis of 2008 end up with portfolios that are 30% riskier in terms of volatility than had they held on to their pre-crisis positions.

The financial crisis of 2008 substantially reduced the value of investor portfolios. It also seems to have shaken the investors’ confidence in the ability or trustworthiness of active fund managers. This casts some doubt on the investment industry’s ability to quickly resume the trend towards more delegated investing through actively managed products.

References

- Baker, M. and Wurgler, J. (2013). Comovement and predictability relationships between bonds and the cross-section of stocks, *Review of Asset Pricing Studies*, *forthcoming* .
- Barber, B. and Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors, *Journal of Finance* **55**(2): 773–806.
- Calvet, L., Campbell, J. and Sodini, P. (2009). Fight or flight? Portfolio rebalancing by individual investors, *Quarterly Journal of Economics* **124**(1): 301–348.
- Calvet, L. E., Campbell, J. Y. and Sodini, P. (2007). Down or out: Assessing the welfare costs of household investment mistakes, *Journal of Political Economy* **115**(5): 707–747.
- Carhart, M. M. (1997). On persistence in mutual fund performance, *Journal of Finance* **52**.
- Dorn, D. and Huberman, G. (2010). Preferred risk habitat of individual investors, *Journal of Financial Economics* **97**(1): 155–173.
- Fama, E. F. and French, K. R. (2010). Luck versus skill in the cross-section of mutual fund returns, *Journal of Finance* **65**(5): 1915–1947.
- French, K. R. (2008). The cost of active investing, *Journal of Finance* **63**(4): 1537–1573.
- Goetzmann, W. N. and Kumar, A. (2008). Equity portfolio diversification, *Review of Finance* **12**(3): 433–463. *Forthcoming*.
- Hoffmann, A. O. I., Post, T. and Pennings, J. M. E. (2013). Individual investor perceptions and behavior during the financial crisis, *Journal of Banking and Finance* **37**(1): 60–74.
- Ivkovic, Z. and Weisbenner, S. (2009). Individual investor mutual fund flows, *Journal of Financial Economics* **92**(2): 223–237.
- Malmendier, U. and Nagel, S. (2011a). Depression babies: Do macroeconomic experiences affect risk-taking?, *Quarterly Journal of Economics* **126**(1): 373–416.
- Malmendier, U. and Nagel, S. (2011b). Learning from inflation experiences, *Working paper* .
- Merkle, C. and Weber, M. (2012). Do investors put their money where their mouth is? stock market expectations and investing behavior, *Working paper* .
- Odean, T. (1998). Are investors reluctant to realize their losses?, *Journal of Finance* **53**: 1775–1798.
- Shefrin, H. and Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence, *Journal of Finance* **40**(3): 777–790.
- Weber, M. and Camerer, C. F. (1998). The disposition effect in securities trading: An experimental analysis, *Journal of Economic Behavior and Organization* **33**: 167–184.
- Weber, M., Weber, E. and Nasic, A. (2012). Who takes risks when and why: Determinants of changes in investor risk taking, *Review of Finance*, *forthcoming* .

White, H. (1980). A heteroskedasticity-consistent covariance estimator and direct test for heteroskedasticity, *Econometrica* **48**: 817–838.

Williams, R. (2000). A note on robust variance estimation for cluster-correlated data, *Biometrics* **56**: 645–646.

Figure 1: Performance of DAX 30 and MSCI USA (basis=100 as of January 1, 2007).

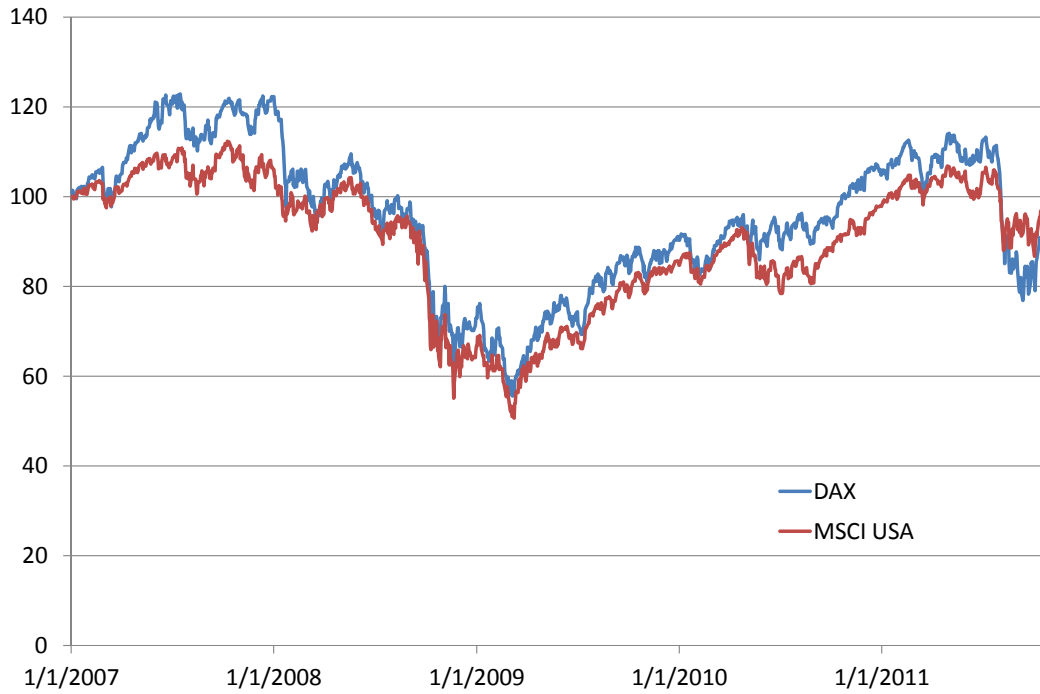


Figure 2: Volatility indices VIX (USA) and VDAX (Germany).

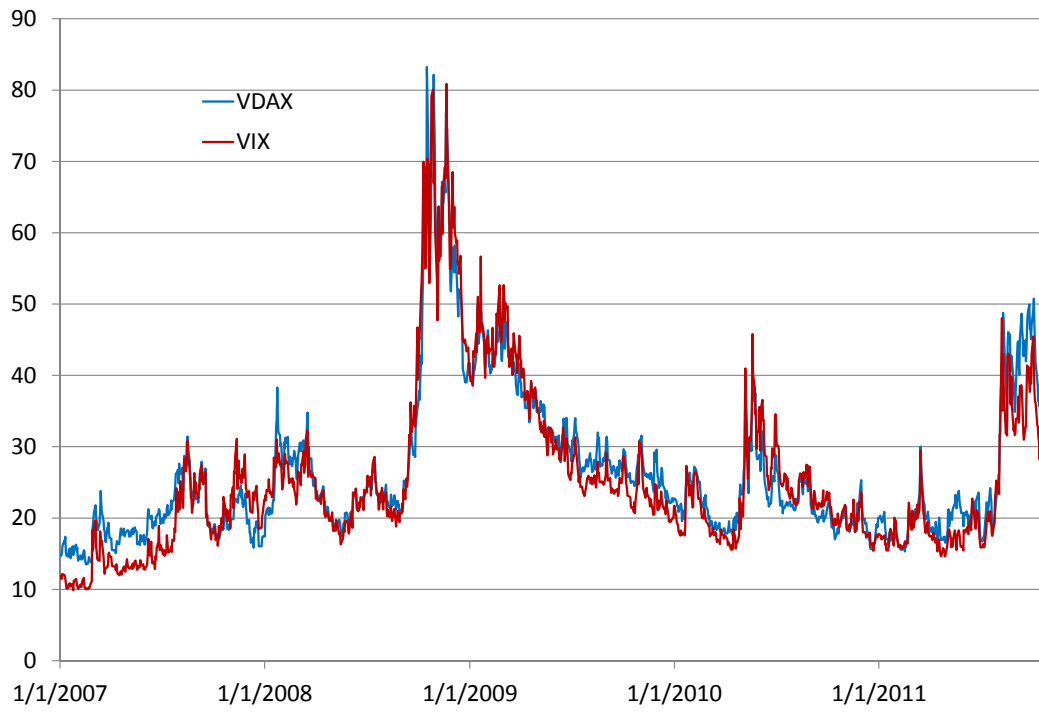


Figure 3: Absolute value of sample client holdings across asset classes.

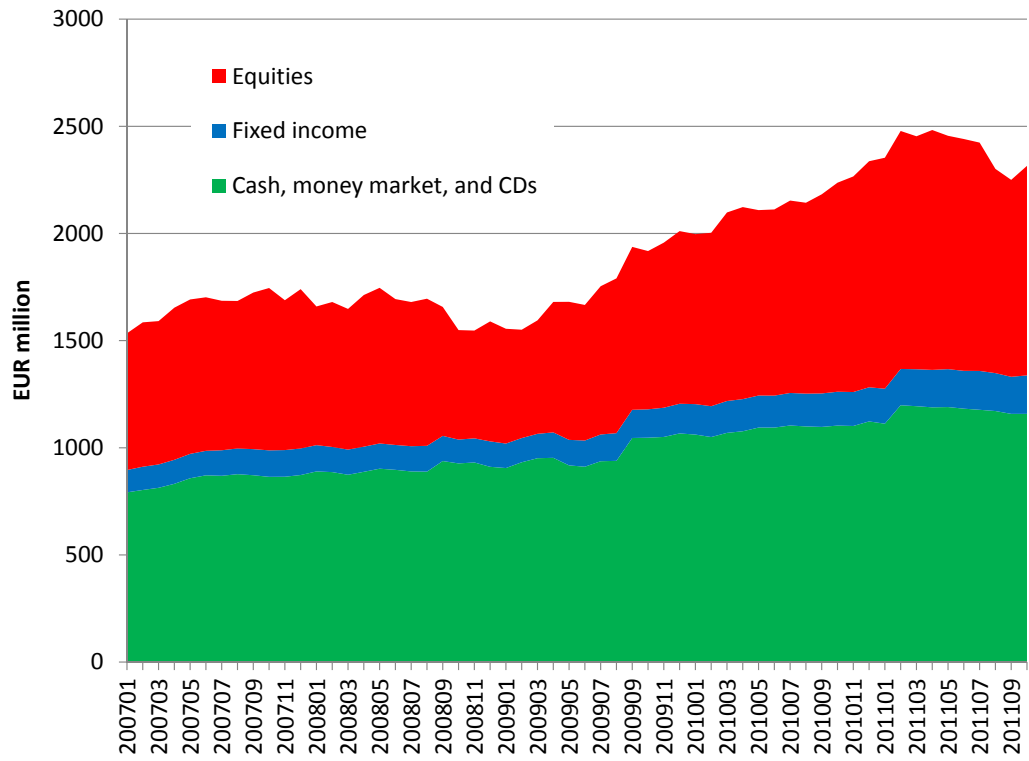


Figure 4: Fraction of existing clients, that is, clients holding equities at the end of the previous month, entering and exiting the stock market in a given month. Stock market entry during a given month refers to an investor without existing equity positions buying and holding some form of equities in the observed account at the end of that month. Stock market exit refers to an investor selling all previously held equity positions.

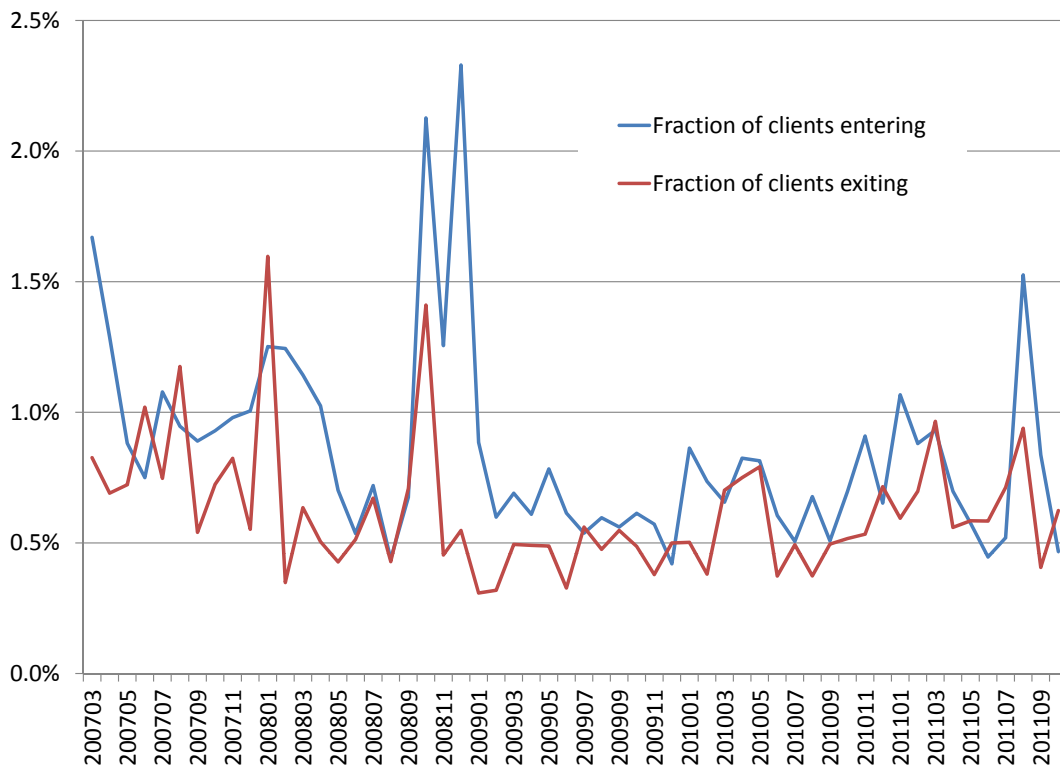


Figure 5: Fraction of existing clients adding net liquidity of EUR 1000 and at least 10% of their total past month's bank assets to or withdrawing net liquidity of EUR 1000 and at least 10% of their total past month's bank assets from their cash, savings, and investment accounts in a given month.

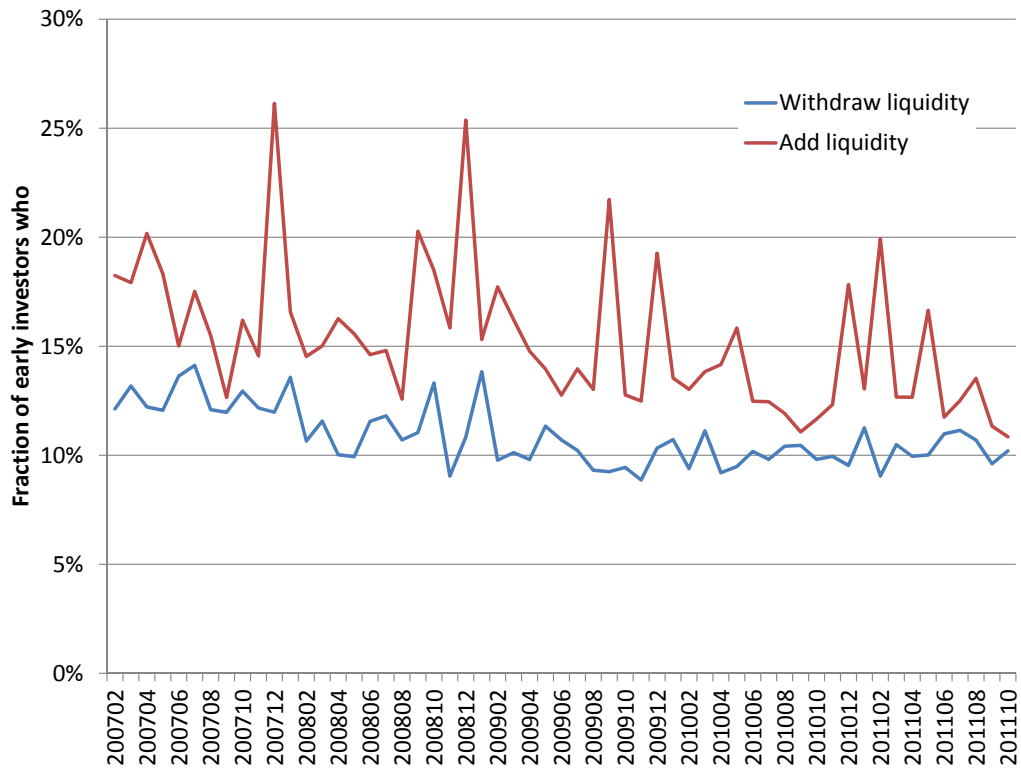


Figure 6: Sample asset allocation over time in relative terms (value-weighted across investors).

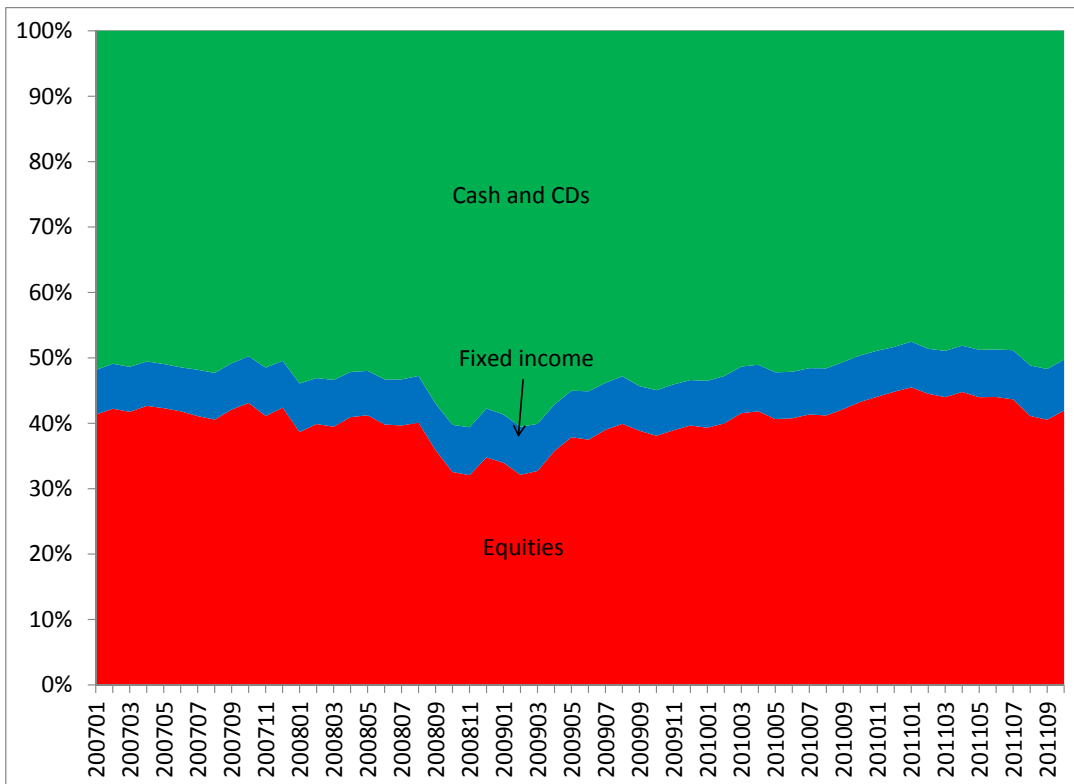


Figure 7: Sample asset allocation over time in relative terms (equally-weighted across investors).

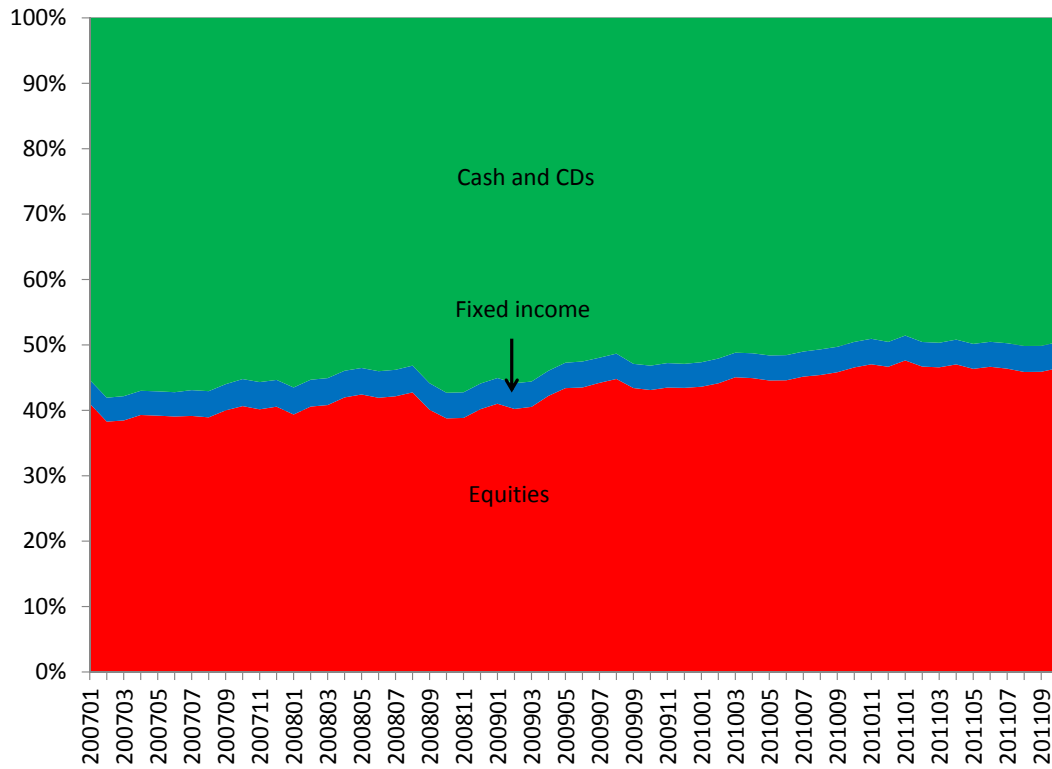


Figure 8: Equity investment delegation over time: “Delegated share VW” for a given month is the total value of the stock funds held by the sample investors divided by the total value of individual stocks and stock funds held by the sample investors at the end of that month. “Delegated share EW” for a given month is the equally-weighted average of the delegated share at the investor level, that is, the value of all stock funds held by a given investor divided by the combined value of all individual stocks and stock funds held by that investor. “Delta delegated share VW active” is the change in the delegated share VW from month $t - 1$ to t minus the passive change in the delegated share during that period (that is, the change assuming that the portfolio observed in $t - 1$ would have simply been held for a month). “Delta delegated share EW active” is the equally-weighted average of the active change in the delegated share at the investor level.

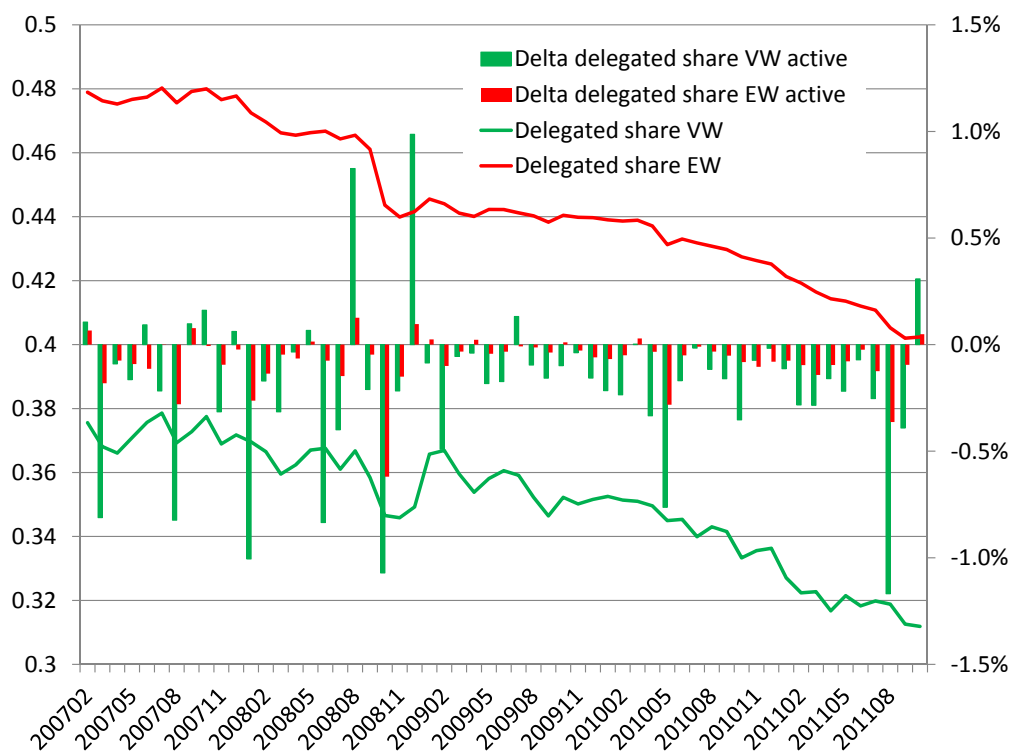


Figure 9: The Herfindahl Hirschmann Index of equity portfolio over time. The Herfindahl-Hirschmann Index is the sum of the squared portfolio weights. A stock fund is assumed to consist of 100 equally-weighted positions that do not overlap with other positions in the investor’s portfolio. “Early equity sample” refers to sample investors who hold either individual stocks or stock funds already at the beginning of the sample period, that is, January 2007.

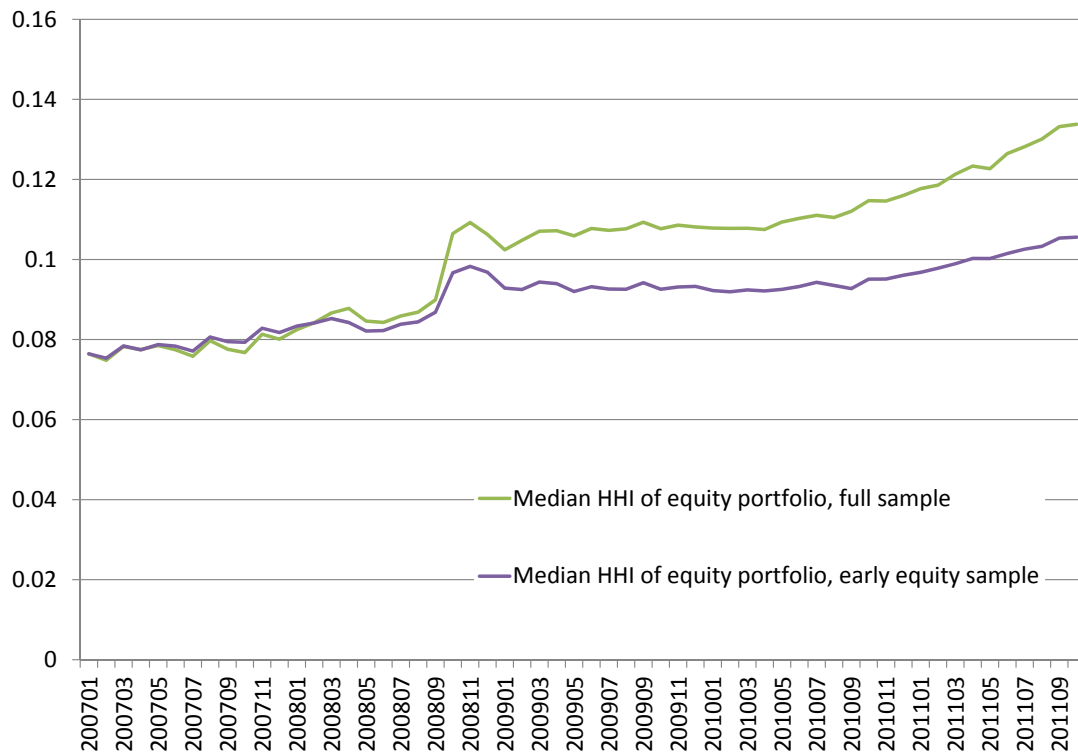


Figure 10: The number of individual stock and stock fund investors in Germany. The figure summarizes the results of a survey commissioned by the trade association of German exchange-listed stock corporations (DAI), available at [http : //www.dai.de/internet/dai/dai - 2 - 0.nsf/main/Statistiken + - + Start_E](http://www.dai.de/internet/dai/dai-2-0.nsf/main/Statistiken+-+Start_E) (last accessed on November 18, 2012).

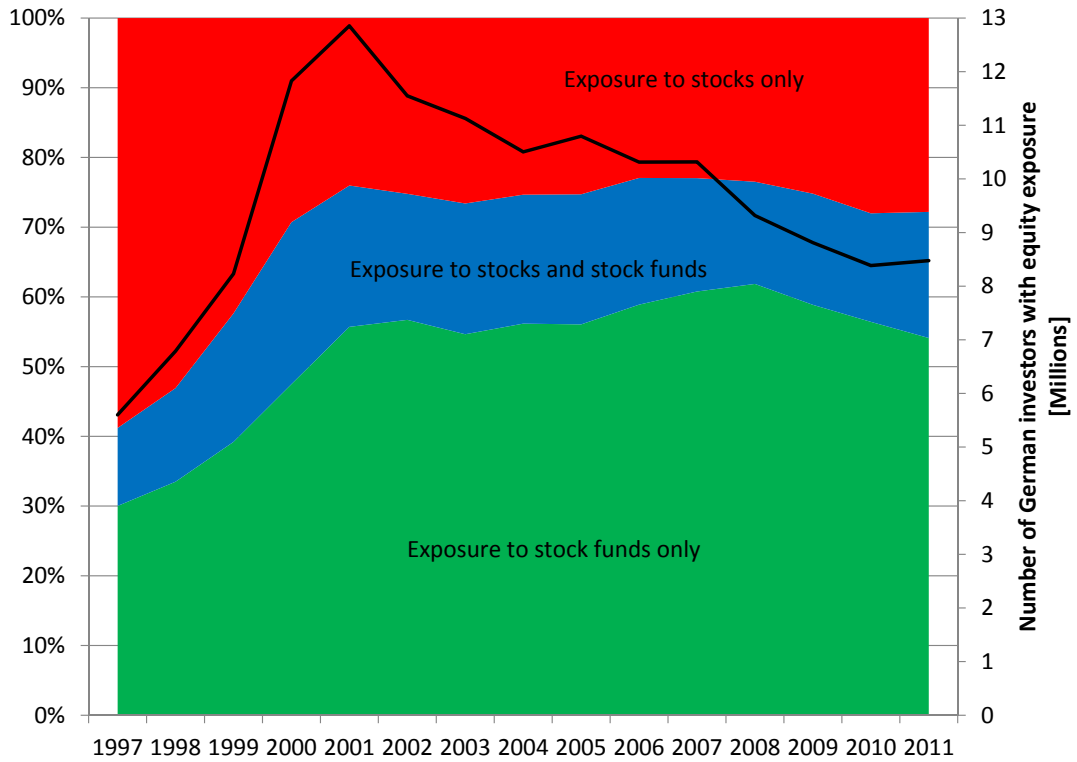


Table I: Pooled rebalancing regressions of active changes to equity allocation

Columns 1-5 report the results of pooled regressions of the sample investors' monthly active changes to their equity allocation. To be included, an investor needs to have nonzero equity holdings both at the beginning and at the end of the month. The active change in month t is the difference between the observed change in the fraction of the total account invested in equities and the passive change. The passive change is the change that would have been experienced by a buy-and-hold investor, that is, someone who simply holds on to the positions observed at the beginning of month t . Equities are individual stocks as well as mutual funds and ETFs classified by Morningstar as equity, allocation, alternative, commodities, convertibles, or property funds. Equity allocation is the value of equities divided by the value of equities plus the value of the investor's cash, savings, money market fund, fixed income fund, and individual bond holdings. For the results in Columns 2-5, the active change is set to zero if the investor does not trade any risky assets that month. Account tenure is the difference between October 2011 and the account opening date. The crisis dummy in Column 4 is one for the months of September 2008 to March 2009 and August 2011 to October 2011 and zero otherwise. The alternative crisis dummy in Column 5 is one for the months of September-November 2008, January-March 2009, and August-October 2011, and zero otherwise. The internet bubble experience dummy is one if the investor's brokerage account was opened before March 2000, the height of the internet bubble. Experienced DAX return is the compound DAX return calculated from the account opening date to the observation month. Excess portfolio volatility is the volatility of the investor's portfolio minus the volatility of the DAX. Delegated share active funds is the fraction of equity held via actively managed mutual funds. Delegated share passive funds is the fraction of equity held via passively managed mutual funds and ETFs. Demographic and socio-economic controls (whose coefficients are not reported) are investor gender, age, and professional status (white collar, civil servant, blue collar, homemaker, other). Additional unreported controls are lagged portfolio returns in excess of the DAX, lagged portfolio volatility in excess of DAX volatility, whether the investor uses an automatic savings plan, and the lagged DAX return and volatility. The coefficients and standard errors (in parentheses) are expressed in percent. Columns 2-5 report heteroskedasticity-robust standard errors with error clustering at the investor level. ***/**/* indicate that the coefficient estimates are significantly different from zero at the 1%/5%/10% level.

Table I: Pooled rebalancing regressions – continued from previous page

Dependent variable	(1)	(2)	(3)	(4)	(5)
	Active change in the equity allocation in month t				
Passive change t	-43.079*** (0.858)	-2.225*** (0.117)	-2.100*** (0.034)	-2.180*** (0.036)	-2.173*** (0.036)
Equity allocation $t - 1$	-5.322*** (0.031)	-2.910*** (0.026)	-3.025*** (0.037)	-3.033*** (0.037)	-3.031*** (0.037)
Account tenure			-0.046*** (0.003)	-0.043*** (0.003)	-0.042*** (0.003)
Account tenure x Crisis				-0.026*** (0.007)	-0.031*** (0.008)
Internet bubble experience dummy			0.116*** (0.031)	0.108*** (0.032)	0.095*** (0.032)
Internet bubble experience x Crisis				0.070 (0.067)	0.161** (0.073)
Experienced DAX returns			0.010 (0.021)	0.078*** (0.018)	0.059*** (0.019)
Experienced DAX returns x Crisis				0.178*** (0.048)	0.244*** (0.050)
Delegated share active funds $t - 1$			-0.218*** (0.018)	-0.146*** (0.018)	-0.153*** (0.019)
Delegated share active x Crisis				-0.333*** (0.042)	-0.326*** (0.045)
Delegated share passive funds $t - 1$			0.059 (0.065)	-0.003 (0.067)	0.083 (0.068)
Delegated share passive x Crisis				0.177 (0.149)	-0.255* (0.148)
Crisis dummy				0.210*** (0.067)	
Alternative crisis dummy					0.138** (0.070)
December 2008 dummy					1.000*** (0.067)
Ancillary statistics					
Number of observations	1,573,967	1,573,984	1,535,331	1,535,331	1,535,331
Standard errors clustered by household	No	No	Yes	Yes	Yes
Number of clusters	n/a	n/a	37,087	37,087	37,087
Monthly time dummies	Yes	Yes	Yes	No	No
Demographic and socio-economic controls	No	No	Yes	Yes	Yes
Portfolio controls	No	No	Yes	Yes	Yes
Lagged stock index return and volatility	No	No	No	Yes	Yes
R^2	2.2%	0.9%	1.7%	1.5%	1.5%

Table II: Probit stock market exit regressions

Columns 3-4 and 7-8 report the results of probit regressions of stock market exit during 2008 and 2011, respectively. Columns 1-2 and 5-6 report the mean and standard deviation of the corresponding explanatory variables. To be included in the regression for a given year, an investor needs to have at least EUR 1000 in equity holdings at the beginning of the year. He is considered to have exited the market if his equity holdings at the end of the year are below EUR 10 and he has sold risky assets during the year. The past market timing dummy is one if the investor has previously sold all equity holdings and had zero equity investments at the end of at least two consecutive months (during 2007 for the regression in Column 3-4 and between 2007 and 2010 for the regression in Column 7-8). Timing performance is measured as the performance of the DAX during the investor's absence. Negative DAX performance is referred to as good timing, positive DAX performance as bad timing. The mean and sd of timing returns is calculated conditional on market timing. Account tenure is measured as the distance between the account opening date and December 2007 (for Columns 3-4) and December 2010 (for Columns 7-8). The internet bubble experience dummy is one if the investor's brokerage account was opened before March 2000. The "no crisis experience" dummy is one for accounts opened after March 2009. Experienced DAX return is the compound DAX return calculated from the account opening date to December 2007 or December 2010. Portfolio volatility is the volatility of the investor's portfolio minus the volatility of the DAX during 2007 or 2010. Delegated share active funds is the fraction of equity held via actively managed mutual funds. Delegated share passive funds is the fraction of equity held via passively managed mutual funds and ETFs, as identified by Morningstar. Portfolio return is the return of the investor's portfolio minus the DAX return during 2007 or 2010. The automatic savings plan dummy is one if 3 or more months with identical purchase amounts can be observed during 2007 or 2010. Turnover during 2007 or 2010 is the minimum of aggregate purchases and aggregate sales during the year, divided by the average portfolio value during the year. Monthly trading frequency is the fraction of months with nonzero trading volume during 2007 or 2010. Account size is the total value of all the investor's accounts, that is, cash, savings, and brokerage, at the end of 2007 or 2010. Equity allocation is the value of equities divided by the value of equities plus the value of the investor's cash, savings, money market fund, fixed income fund, and individual bond holdings. Demographic and socio-economic controls (whose coefficients are not reported) are investor gender, age, and professional status (white collar, civil servant, blue collar, homemaker, other). Columns 4 and 8 report the marginal effect on the exit probability associated with a one-standard deviation increase in a continuous regressor and a 0-1 change in a dummy variable, holding the other regressors at their means. ***/**/* indicate that the coefficient estimates are significantly different from zero at the 1%/5%/10% level.

Table II: Probit stock market exit regressions – continued from previous page

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Mean	SD	2008 Coefficient	Effect	Mean	SD	2011 Coefficient	Effect
Past market timing dummy	1%		1.106*** (0.144)	23.1%	5%		0.799*** (0.063)	11.4%
Past good timing	-0.7%	1.6%	9.658 (6.082)	-4.5%	-12.1%	16.3%	0.471* (0.282)	-1.6%
Past bad timing	4.6%	4.9%	-5.894*** (2.131)	-6.9%	4.4%	8.0%	0.216 (0.535)	0.4%
Account tenure	3.6	2.7	-0.004 (0.008)	-0.1%	5.4	3.1	-0.016** (0.008)	-0.4%
Internet bubble experience	10%		-0.145** (0.072)	-1.3%	8%		-0.046 (0.078)	-0.4%
No crisis experience					10%		0.198*** (0.051)	1.9%
Experienced DAX returns	161%	45%	0.067* (0.035)	0.3%	134%	36%	0.004 (0.044)	0.0%
Portfolio volatility	21%	14%	0.636*** (0.096)	1.0%	20%	13%	0.307*** (0.082)	0.2%
Delegated share active	49%	45%	0.579*** (0.038)	3.1%	42%	44%	0.296*** (0.037)	1.2%
Delegated share passive	1%	8%	0.774*** (0.147)	0.7%	3%	15%	0.472*** (0.079)	0.6%
Portfolio return	6.1%	19.1%	0.073 (0.072)	0.1%	18.9%	23.2%	0.138*** (0.046)	0.3%
Automatic savings plan	17%		-0.507*** (0.062)	-4.1%	11%		-0.613*** (0.071)	-3.6%
Turnover	45%	313%	0.012*** (0.003)	0.4%	37%	264%	0.019*** (0.003)	0.4%
Monthly trading frequency	35%	36%	0.266*** (0.062)	1.1%	26%	34%	0.419*** (0.061)	1.4%
ln(Account size)	10.2	1.2	-0.105*** (0.014)	-1.2%	10.3	1.3	-0.160*** (0.013)	-1.4%
Equity allocation	53%	31%	-0.162*** (0.051)	-0.5%	55%	32%	-0.273*** (0.049)	-0.7%
Ancillary statistics								
Number of observations			22637				28825	
Fraction of exits			5.4%				4.3%	
Demographic and socio-economic controls			Yes				Yes	
Pseudo- R^2			5.6%				8.2%	

Table III: Transition matrix of sales and purchases during crisis and normal months

This table reports the frequency distribution of purchases across asset classes, averaged across investors selling a particular asset class (and only that asset class). It distinguishes between three time periods: normal months, crisis months (September 2008-November 2008, January 2009-March 2009, August 2011-October 2011), and December 2008. The frequencies are first calculated for each investor and time period, and then averaged across investors for each time period. For example, there are 18352 clients who sell stocks (and only stocks) during normal months. Conditional on selling stocks in given month, these clients also buy stocks in that month 26.3% of the time. During crisis months, this frequency jumps to 37.4% for the 6387 investors who sell stocks. ***/**/* indicate that the purchasing frequencies during crisis months or December 2008 are significantly different from the purchasing frequencies during normal months at the 1%/5%/10% level, assuming that observations are independent across investors, but not within investors.

Asset sold	Period	Nobs	Equity assets bought			
			Stocks	Active funds	Passive funds	Certificates
Stocks	Normal	18352	26.3%	9.5%	1.2%	1.3%
	Crisis	6387	37.4%***	8.3%***	2.0%***	1.2%
	Dec-08	1170	48.5%***	11.0%*	4.1%***	2.0%*
Active equity funds	Normal	9003	11.2%	22.5%	1.9%	1.4%
	Crisis	1900	12.7%*	21.0%	2.2%	0.9%*
	Dec-08	311	15.1%**	40.5%***	13.8%***	1.6%
Passive equity funds	Normal	1120	18.8%	16.5%	11.0%	4.3%
	Crisis	379	19.7%	15.1%	16.3%***	3.0%
	Dec-08	32	15.6%	15.6%	53.1%***	6.3%
Certificates	Normal	1568	22.9%	16.0%	4.6%	15.7%
	Crisis	604	22.7%	13.7%	4.4%	13.4%
	Dec-08	71	23.9%	14.1%	21.1%***	19.7%
Bonds	Normal	1113	19.8%	12.5%	3.2%	3.0%
	Crisis	561	20.4%	9.6%*	2.6%	2.0%
	Dec-08	68	27.9%	7.4%	8.8%**	4.4%
Bond funds	Normal	1595	9.8%	27.6%	2.1%	2.8%
	Crisis	412	10.3%	15.4%***	2.9%	1.0%
	Dec-08	69	13.0%	29.0%	11.6%***	1.4%
Options	Normal	1956	20.9%	9.8%	2.1%	4.2%
	Crisis	951	19.0%	7.2%**	3.1%	2.8%
	Dec-08	177	22.0%	10.2%	2.3%	4.0%
Cash	Normal	37858	16.8%	14.7%	1.4%	1.5%
	Crisis	29620	20.3%***	13.3%***	2.0%***	0.8%***
	Dec-08	8108	23.8%***	22.0%***	4.7%***	1.2%**

Table IV: Stock flow regressions

Columns 1-4 report coefficient estimates of pooled OLS regressions of changes in stock holdings on stock attributes. The dependent variable in Columns 1 and 2 is the change in popularity from the end of month $t - 1$ to the end of month t where the popularity of a given stock at the end of month t is the number of sample investors holding that stock divided by the number of sample investors holding any individual stock. The dependent variable in Columns 3 and 4 is the change in excess weight from the end of month $t - 1$ to the end of month t where excess weight in a given stock is the value of that stock aggregated across all sample investors divided by the value of all stocks held by the sample investors, minus the market capitalization of that stock in EUR divided by the aggregate market capitalization of all stocks held by the sample investors. In Columns 1 and 3, crisis months are September 2008 to March 2009 and August 2011 to October 2011. In Columns 2 and 4, December 2008 is omitted from the crisis month definition. “German stock” is an indicator that is one if the stock is classified as a German stock by both Datastream and FactSet. “DAX” is an indicator that is one if a given stock during a given month was part of the DAX 30, the German blue chip index (source: Deutsche Boerse). “Dividend” is an indicator that is one if a firm pays a dividend (source: Datastream). “Firm age” is the age of the firm as reported by FactSet as of December 2011. “Size” is the market capitalization reported by Datastream. “Past month excess return” is the stock’s return minus the DAX return during the previous month. “Idiosyncratic vol” is the stock’s idiosyncratic volatility calculated as the standard deviation of the residual from a regression of daily stock returns on daily DAX returns during the previous month; “beta” is the slope coefficient of that regression (source: Datastream). Volume turnover is the EUR trading volume during a given month divided by the market capitalization at the end of the month, as reported by Datastream. “Book-to-market” is the book-to-market ratio at the end of the month as reported by Datastream. Coefficient estimates for monthly time effects and sector effects (Datastream level 2 sector definitions) are not reported. All reported standard errors are robust to heteroskedasticity and allow for clustering of errors across same-stock observations (see White (1980) and Williams (2000)). ***/**/* indicate that the coefficient estimates are significantly different from zero at the 1%/5%/10% level.

Table IV: Stock flow regressions – continued from previous page

Dependent variable	Change in popularity		Change in excess weight	
Constant	-0.583** (0.243)	-0.728*** (0.246)	-0.058 (0.058)	-0.058 (0.195)
German stock	-0.008 (0.027)	0.009 (0.028)	-0.030** (0.012)	-0.026** (0.012)
German stock*Crisis month	0.163* (0.088)	0.078 (0.069)	-0.074 (0.058)	-0.113 (0.073)
DAX	-0.158 (0.820)	0.211 (0.866)	-0.600** (0.283)	-0.540* (0.325)
DAX*Crisis month	11.376*** (3.221)	10.272*** (3.154)	2.001* (1.180)	1.849 (1.244)
Dividend	-0.010 (0.022)	-0.015 (0.021)	0.009 (0.008)	0.010 (0.008)
Dividend*Crisis month	-0.051 (0.055)	-0.017 (0.049)	0.079*** (0.021)	0.078*** (0.023)
Firm age	0.001** (0.000)	0.001** (0.000)	0.000** (0.000)	0.000*** (0.000)
Firm age*Crisis month	0.002* (0.001)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)
ln(Size)	0.006 (0.005)	0.011** (0.005)	-0.002 (0.003)	-0.002 (0.003)
ln(Size)*Crisis month	0.024 (0.016)	0.003 (0.013)	-0.022 (0.016)	-0.019 (0.018)
Past month excess return	-0.042 (0.031)	-0.054* (0.031)	-0.637*** (0.042)	-0.653*** (0.043)
Past month excess return*Crisis month	-0.408*** (0.089)	-0.396*** (0.095)	-0.621*** (0.126)	-0.629*** (0.133)
ln(Idiosyncratic vol/DAX vol)	0.048*** (0.016)	0.058*** (0.016)	0.016* (0.009)	0.020** (0.009)
ln(Idiosyncratic vol/DAX vol)*Crisis month	0.149** (0.059)	0.124** (0.059)	0.058 (0.068)	0.044 (0.079)
Beta	0.009** (0.004)	0.007 (0.004)	0.000 (0.003)	0.000 (0.003)
Beta*Crisis month	0.124*** (0.032)	0.148*** (0.034)	0.080*** (0.019)	0.081*** (0.021)
Volume turnover	0.009*** (0.003)	0.007** (0.003)	0.004* (0.002)	0.005* (0.003)
Volume turnover*Crisis month	-0.038** (0.016)	-0.029* (0.015)	0.010 (0.013)	0.009 (0.015)
Book to market	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)
Book to market*Crisis month	0.000 (0.002)	-0.001 (0.002)	0.001 (0.001)	0.001 (0.001)
Ancillary statistics				
Number of observations	156045			
Number of clusters	5123			
R-squared	4.4%	3.5%	0.8%	0.8%

Table V: Stock fund flow regressions

Columns 1-6 report coefficient estimates of pooled OLS regressions of changes in stock fund holdings on stock fund attributes. To be included, a stock fund needs to be held by at least 5 investors at the beginning of a given month. The dependent variable in Columns 1 and 2 is the change in popularity from the end of month $t - 1$ to the end of month t where the popularity of a given stock fund at the end of month t is the number of sample investors holding that stock fund divided by the number of sample investors holding any stock fund that month. Fund inflows are the number of shares bought in a given fund during a period divided by the number of shares held in that fund at the end of the previous period. Fund outflows are the number of shares sold divided by the number of shares held, and netflows are the difference between inflows and outflows. In Columns 1 and 3, crisis months are September 2008 to March 2009 and August 2011 to October 2011. In the remaining columns, December 2008 is omitted from the crisis month definition. Information on fund characteristics is taken from the Morningstar database, unless otherwise noted. “Return month” is the total return of the fund during the specified period as reported by Datastream. “Return month decile X” is an indicator that is one if the fund’s return relative to its peers (funds with the same objective) is in the indicated decile of funds. “Rating” is the Morningstar rating, coded on a five point scale ranging from 0 (not rated) to 5 (5 stars). “Expense ratio” is the fund’s expense ratio. “No load” is an indicator that is one if the fund neither charges a front load nor a back-end load. “TNA” are the total net assets for the fund at the beginning of a given month. “Fund age” is the fund’s age since inception in years. “Passive” is an indicator if the fund is an index fund. “Domestic” is an indicator that is one if the fund primarily invests in German stocks. “Independent” is an indicator that is one if a manual search fails to establish a formal link between the fund and an affiliated financial institution. “Public affiliate” is an indicator that is one if the fund’s parent is publicly traded. “Affiliate excess return” is the return of the public affiliate during the previous month in excess of the DAX as reported by Datastream. “Idiosyncratic vol” is the stock fund’s idiosyncratic volatility calculated as the standard deviation of the residual from a regression of daily stock fund returns on daily DAX returns during the previous month; “beta” is the slope coefficient of that regression (source: Datastream). “Promoted” is an indicator that is one if the fund was promoted by the broker during the observation month. “Savings plan” is an indicator that is one if the fund can be used in an automatic savings plan. Coefficient estimates for monthly time effects and fund objective categories (from Morningstar) are not reported. All reported standard errors are robust to heteroskedasticity and allow for clustering of errors across same-stock fund observations (see White, 1980, and Williams, 2000). ***/**/* indicate that the coefficient estimates are significantly different from zero at the 1%/5%/10% level.

Table V: Stock fund flow regressions – continued from previous page

Dependent variable	Change in popularity		Netflow		Inflow	Outflow
Constant	-0.492 (0.781)	-1.202 (1.261)	-0.002 (0.038)	-0.003 (0.045)	0.024 (0.044)	0.027 (0.017)
Return month t-1	3.272*** (0.763)	3.238*** (0.724)	0.130*** (0.033)	0.099*** (0.036)	0.071** (0.034)	-0.028* (0.014)
Return month t-1*Crisis	-3.234*** (1.209)	-3.424*** (1.039)	-0.064 (0.062)	-0.069 (0.061)	-0.066 (0.056)	0.003 (0.027)
Return month t-1 decile 1	-0.036 (0.087)	-0.067 (0.110)	0.006 (0.006)	0.005 (0.006)	0.006 (0.006)	0.001 (0.002)
Return month t-1 decile 1*Crisis	0.093 (0.224)	0.210* (0.125)	-0.008 (0.008)	-0.009 (0.008)	-0.010 (0.007)	-0.001 (0.004)
Return month t-1 decile 10	-0.005 (0.060)	0.023 (0.064)	0.002 (0.003)	0.004 (0.003)	0.004 (0.003)	0.000 (0.001)
Return month t-1 decile 10*Crisis	0.271 (0.213)	0.125 (0.107)	0.013 (0.013)	0.001 (0.009)	0.003 (0.008)	0.002 (0.004)
Return month t-13 to t-2	1.318*** (0.369)	1.361*** (0.350)	0.043*** (0.010)	0.039*** (0.010)	0.047*** (0.010)	0.008*** (0.004)
Return month t-13 to t-2*Crisis	-0.389 (0.566)	-0.535 (0.491)	-0.045 (0.032)	-0.032 (0.022)	-0.030* (0.018)	0.002 (0.012)
Return month t-13 to t-2 decile 1	-0.251 (0.350)	-0.243 (0.334)	-0.008** (0.003)	-0.008** (0.003)	-0.006** (0.003)	0.002 (0.002)
Return month t-13 to t-2 decile 1*Crisis	0.037 (0.222)	0.014 (0.172)	0.005 (0.010)	0.003 (0.006)	0.005 (0.004)	0.001 (0.004)
Return month t-13 to t-2 decile 10	0.247** (0.123)	0.270** (0.117)	0.015*** (0.004)	0.016*** (0.004)	0.018*** (0.004)	0.002 (0.001)
Return month t-13 to t-2 decile 10*Crisis	0.085 (0.181)	-0.056 (0.158)	-0.001 (0.012)	-0.005 (0.008)	-0.004 (0.007)	0.002 (0.004)
Rating	0.052 (0.035)	0.054 (0.036)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.000)
Rating*Crisis	-0.012 (0.050)	-0.036 (0.040)	0.000 (0.003)	0.000 (0.002)	0.002 (0.002)	0.001 (0.001)
Expense ratio	1.141 (7.228)	1.525 (7.268)	0.079 (0.169)	0.157 (0.176)	0.170 (0.158)	0.013 (0.082)
Expense ratio*Crisis	15.788 (13.192)	11.933 (15.087)	0.164 (0.383)	-0.550* (0.306)	-0.581** (0.251)	-0.031 (0.169)
No load	-0.093 (0.103)	-0.088 (0.118)	0.004 (0.003)	0.005 (0.004)	0.008* (0.004)	0.003 (0.002)
No load*Crisis	-0.133 (0.228)	-0.112 (0.143)	0.012 (0.009)	0.003 (0.008)	-0.001 (0.005)	-0.004 (0.006)
ln(TNA)	-0.001 (0.036)	0.014 (0.035)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)
ln(TNA)*Crisis	0.149*** (0.049)	0.035 (0.038)	-0.001 (0.002)	0.002 (0.002)	0.002* (0.001)	0.000 (0.001)

Table V: Stock fund flow regressions – continued from previous page

Dependent variable	Change in popularity		Netflow		Inflow	Outflow
Fund age	0.006	0.006	-0.000**	-0.000**	-0.001***	-0.000***
	(0.007)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
Fund age*Crisis	-0.004	-0.001	0.000	0.000	0.000	-0.000
	(0.008)	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)
Passive	0.412**	0.501***	0.023***	0.034***	0.038***	0.005**
	(0.175)	(0.191)	(0.005)	(0.006)	(0.007)	(0.002)
Passive*Crisis	0.719**	0.141	0.039**	-0.023**	-0.020***	0.003
	(0.335)	(0.252)	(0.015)	(0.011)	(0.008)	(0.008)
Domestic	0.186	0.216	0.001	-0.001	-0.010	-0.009**
	(0.145)	(0.147)	(0.007)	(0.007)	(0.008)	(0.003)
Domestic*Crisis	0.411	0.270	0.015*	0.025***	0.018***	-0.006**
	(0.311)	(0.231)	(0.008)	(0.008)	(0.007)	(0.003)
Independent	-0.054	-0.053	0.013**	0.013**	0.015**	0.002
	(0.292)	(0.303)	(0.006)	(0.006)	(0.006)	(0.001)
Independent*Crisis	-0.074	-0.009	-0.008	-0.011	-0.009	0.002
	(0.139)	(0.139)	(0.009)	(0.008)	(0.007)	(0.004)
Public affiliate	0.026	0.026	0.005	0.006	0.007**	0.002*
	(0.098)	(0.099)	(0.004)	(0.004)	(0.004)	(0.001)
Public affiliate*Crisis	0.144	0.065	-0.011*	-0.013**	-0.013***	0.000
	(0.111)	(0.101)	(0.006)	(0.006)	(0.005)	(0.002)
Public affiliate*Crisis*Affiliate excess return	-0.507	-0.752**	0.007	0.043	-0.003	-0.047*
	(0.327)	(0.378)	(0.034)	(0.029)	(0.015)	(0.024)
Beta	-0.086	-0.094	-0.001	0.005	0.003	-0.001
	(0.119)	(0.110)	(0.004)	(0.004)	(0.004)	(0.002)
Beta*Crisis	0.013	0.021	0.042***	0.002	0.001	-0.001
	(0.150)	(0.081)	(0.015)	(0.007)	(0.006)	(0.004)
ln(Idiosyncratic vol/DAX vol)	-0.037	-0.041	0.000	0.003	0.004	0.001
	(0.088)	(0.080)	(0.005)	(0.005)	(0.005)	(0.001)
ln(Idiosyncratic vol/DAX vol)*Crisis	0.012	-0.018	0.017*	0.005	0.003	-0.001
	(0.190)	(0.136)	(0.009)	(0.006)	(0.006)	(0.002)
Promoted	47.789***	50.229***	0.848**	0.848***	0.857***	0.009
	(10.253)	(9.975)	(0.328)	(0.318)	(0.318)	(0.009)
Promoted*Crisis	3.712	-13.920	-0.526	-0.635**	-0.652**	-0.016
	(20.463)	(16.029)	(0.351)	(0.318)	(0.318)	(0.010)
Savings plan	-0.307	-0.338	0.016**	0.015**	0.015**	-0.001
	(0.460)	(0.464)	(0.007)	(0.007)	(0.007)	(0.001)
Savings plan*Crisis	-0.126	-0.359	-0.015*	-0.009	-0.012*	-0.003
	(0.306)	(0.317)	(0.008)	(0.008)	(0.007)	(0.002)
Ancillary statistics						
Number of observations			32661			
Number of clusters			933			
R-squared	17.3%	17.3%	4.4%	5.6%	5.6%	5.8%

Table VI: Active changes in delegation and portfolio performance

Sample investors are grouped into mutually exclusive categories based on changes to their delegated share – the fraction of equity held through funds – between September 2008 and March 2009; to be included, investors have to have at least one stock or stock fund position both at the beginning and at the end of the crisis of 2008/9 (that is, September 2008-March 2009). “Delegation actively reduced” refers to investors increasing the number of stocks relative to the number of stock funds in their portfolio during that period. “Delegation actively increased” corresponds to the number of stock funds increasing relative to the number of stocks held. Delegation is deemed “Constant” if investors hold at least one stock fund at the beginning of September 2008 and at the end of March 2009, but are not classified as actively reducing or increasing delegation. “None” refers to investors who only hold individual stocks both at beginning of September 2008 and at the end of March 2009. “Total portfolio value” refers to the combined value of cash and securities. “Fraction of portfolio in equity” is the value held in individual stocks and stock funds divided by the total portfolio value. “Buy-and-hold” refers to buying and holding the portfolio held before the crisis of 2008/9, that is, at the beginning of September 2008. “Fraction of exits” is the fraction of investors who have no longer any individual stock or stock fund position after March 2009 for which Datastream total return data is available. Panel D reports the average return loss – the difference in expected return between the investor’s portfolio and the efficient portfolio (a mix of German treasury securities and the MSCI World) that carries the same risk as the investor’s portfolio – for the different groups. ***/**/* indicate that the actual portfolio attributes are significantly different from the attributes of the hypothetical buy-and-hold portfolio within the same group at the 1%/5%/10% level.

	Delegation			
	Actively reduced	Constant	Actively increased	None
Number of investors	2,934	11,868	1,843	8,805
Fraction male	56%	48%	62%	58%
Fraction female	18%	26%	15%	19%
Fraction joint	25%	26%	23%	23%
Account age	7	7	7	7
Age of primary account holder	51	49	50	50
Fraction of professionals	50%	48%	52%	49%
Panel A: Pre-crisis (January 2007 - August 2008)				
Mean monthly return	-0.9%	-0.9%	-0.9%	-1.2%
Std monthly return	5.6%	5.2%	6.6%	9.8%
Total portfolio value [EUR]	78,961	46,821	78,633	49,755
Fraction of portfolio in equity	57%	52%	56%	52%
Fraction of equity in funds	64%	84%	37%	0%
Panel B: Crisis (September 2008 - March 2009)				
Mean monthly return	-6.3%	-5.9%	-6.2%	-7.4%
Std monthly return	13.3%	11.2%	13.9%	20.3%
Mean monthly return buy-and-hold	-6.2%**	-5.9%	-6.4%***	-7.5%
Std monthly return buy-and-hold	11.9%***	11.2%	14.3%*	20.1%
Total portfolio value [EUR]	68,271	42,508	72,258	42,509
Fraction of portfolio in equity	54%	47%	56%	48%
Fraction of equity in funds	47%	85%	59%	0%
Panel C: Post-crisis (April 2009 - October 2011)				
Fraction of exits	5.4%	8.5%	4.2%	7.7%
Mean monthly return	1.2%	1.3%	1.3%	1.3%
Std monthly return	7.0%	5.2%	5.9%	10.8%
Mean monthly return buy-and-hold	1.3%*	1.3%	1.3%	1.4%
Std monthly return buy-and-hold	5.3%***	5.1%***	6.5%***	10.6%
Panel D: Return loss of complete portfolios post-crisis				
Actual portfolio	1.14%	0.68%	0.96%	2.30%
Buy-and-hold portfolio	0.97%**	0.69%	1.48%***	2.49%