

Weekly Report

Private Households Display Strong Aversion to Investment Risk

The broadest possible diversification of investments is considered an important strategy for minimizing investment risk. Most households in Germany do distribute their financial assets over several types of investment. However, investment behavior is only partially consistent with the overall readiness for risk-taking reported by heads of households. This is demonstrated by a current empirical study based on data from the Socio-Economic Panel Study (SOEP). The probability of diversification does tend to rise according to the degree of risk aversion, yet not when it comes to a "fully diversified investment basket." With a higher fear of risk, the tendency to fill a portfolio with every kind of investment falls. Clearly, households make decisions in keeping with a principle propagated by Keynes: security and liquidity come first. The readiness to invest in riskier assets rises with the number of secure investments already in place in the portfolio.

Modern finance theory considers diversification to be one of the most important determinants of the long-term growth of a financial portfolio. As early as the 1950s, the Nobel prize-winning economist Harry Markowitz demonstrated that risk could be distributed by dividing assets in different securities, such that the total risk of a portfolio became substantially lower than it would be if all assets were invested in an individual security.¹ Decisive in this regard is that the yield of the individual securities is not identical and cannot be fully correlated one with another. The price of lowered investment risk consists in accepting lower opportunities for return than in less widely diversified portfolios. According to Markowitz's portfolio theory, it would be expected that risk-averse individuals prefer more widely diversified portfolios. This report examines whether this theory holds true empirically.

The diversification behavior of private investors is not only of interest to bankers and financiers. Rather, as the latest upheavals in the financial markets confirm—and against the backdrop of the rising importance of individual retirement savings—it also has profound implications for economic and social policy.

According to the European Commission's "Markets in Financial Instruments Directive" (MiFID), providers of financial services are required to establish the risk preferences of their clients and to offer financial counseling consistent with those pre-

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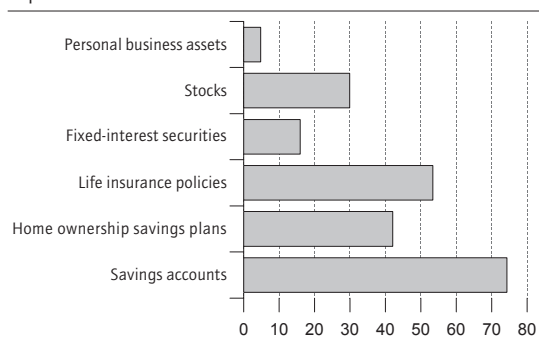
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Household finances,
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¹ Markowitz, H. M.: Portfolio Selection. *Journal of Finance* 38, 1952. 1201-16.

Figure 1

Relative frequency of investment products in portfolios of private households

in percent



N= 5,163 heads of private households.

Sources: SOEP.

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ferences.² The clients' risk preferences are determined by a kind of self-assessment. The present study addresses the question whether personal risk preferences are a deciding factor in the construction of a portfolio.³

This study is based on anonymized data from the Socio-Economic Panel Study (SOEP).⁴ For the purpose of the study, more than 5,000 heads of private households were selected. This sample group participated in surveys administered over three consecutive years (2004 to 2006) and answered all questions relevant to the study regarding their investment behavior. The longitudinal data sample from these three consecutive years was analyzed by means of a pooled multinomial non-linear estimation model. This model facilitates more consistent estimates than an analysis on the basis of cross-sectional data, as time effects can be accounted for.⁵ In 2004, a question regarding willingness to take investment risks was presented to the heads of households.⁶

² Markets and financial instruments directive 2004/39/EC of the European Parliament and the Council, dated 21 April 2004, amending directives 85/611/EEU and 93/6/EEU of the Board of Directors and directive 2000/12/EC of the European Parliament and the Council and for cancellation of directive 93/22/EEU of the Council.

³ c.f. Barasinska, N., Schäfer, D., Stephan, A.: Financial Risk Aversion and Household Asset Diversification. DIW Diskussionspapier, Number 807, 2008.

⁴ Wagner, G. G., Frick, J. R., Schupp, J.: The German Socio-Economic Panel Study (SOEP)—Scope, Evolution and Enhancements. Schmollers Jahrbuch 127(1), 2007, 139-169.

⁵ c.f. regarding estimation models Geene, W. H.: Econometric Analysis. Pearson Prentice Hall, 6th Edition, 843-845.

⁶ The question read: "One can behave in different ways in different contexts. How would you describe your readiness to take risks in relation to the following context: in investing?" The rating scale ranged from 0 (= unwilling to take risks) to 10 (= willing to take risks). For this study the coding was reversed. Since data on risk assessment regarding investment was only collected in 2004, this factor is treated as constant. These assumptions are supported, among others, in analyses by R. Barsky, M. Kimball, F. Juster, M. Shapiro: Preference Parameters and Behavioral

The financial portfolios of the polled households constituted the subject of this study.

Savings accounts were the favorite form of investment

Among the six different forms of investment identified by the SOEP, savings accounts (74%) were the definite favorite among German private households in 2004 (see Figure 1).⁷ Next came life insurance policies and home ownership savings plans (*Bausparverträge*). Fixed-interest securities and especially private business investments were by far the least commonly selected investment types.

In order to compare various forms of investment behavior, it is important to distinguish between so-called naïve and sophisticated diversification strategies.

Most households have two to three investment types in their portfolios

Naïve diversification supposes that increasing the number of different assets reduces the risks of a portfolio. In this view, diversification is simply measured by the number of different investments in a given portfolio: the greater the number, the higher the level of diversification. One hypothesis based on portfolio theory is that a larger number of different investments in a portfolio should be especially attractive to individuals who are strongly risk averse.

This diversification strategy—which is based sheerly on the number of different investments held in a portfolio—can indeed be described as a simplified approach, yet it facilitates the evaluation of investment behavior of individuals who follow simple investment strategies in their portfolio management. Such strategies are often employed, particularly by private investors.⁸

In Germany, most households (48%) hold two to three different investment products (see Figure 2). Portfolios with four or more types of investments are much less common (18%). It is noteworthy that every fifth household has a portfolio consisting of only one investment product.

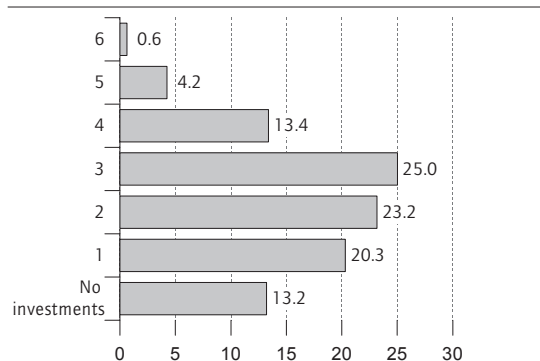
Heterogeneity: An Experimental Approach in the Health and Retirement Study, The Quarterly Journal of Economics 112(2), 1997, 537-79.

⁷ Investments in securities from non-listed companies are included in the category of private business investment. For this reason, this category is counted as a form of financial investment. Additional asset types—such as gold, jewelry and art collections—were not included in the SOEP between 2004-2006 and are therefore not considered in the present study.

⁸ Benartzi, S., Thaler, R. H.: Naïve Diversification Strategies in Defined Contribution Plans. American Economic Review, 91(1), 2001, 79-98.

Figure 2

Number of investment products in the investment portfolios of private households in percent



N=5,163 heads of private households

Sources: SOEP 2004; Calculations by DIW Berlin. **DIW Berlin 2008**

Preference for partially diversified portfolios with low risk

In making investment decisions, investors apparently do not only consider the number of investment types. Presumably, their paramount concern when selecting investment products is the level of risk, followed by—as a secondary consideration—the number of investment types.

For this reason, we also investigated the degree to which a discriminating diversification strategy might correlate with self-reported attitudes toward risk. Here it was assumed that households first evaluate the risk/return potential of individual investment options and then divide them into classes according to risk. Overall, a distinction is drawn between three asset classes: secure investments, investments with medium risk and investments with high risk.⁹ Individual investment products were assigned to one of these three risk classes (Table 1). Savings accounts and home ownership savings plans exhibit the lowest risk; life insurance policies and fixed-return securities are associated with medium risk. Stocks and personal business assets are associated with the highest risk level; both fluctuations in market value and credit risks were considered in making this classification.

Depending on the ways these three classes of investment options are mixed in a portfolio, seven portfolio types can be constructed (Table 2). If all of the investment classes from all three risk groups

⁹ In the SOEP study, inquiry regarding individual forms of investment was limited to crude categories. For example, both stocks issued by an individual company and mutual funds (with a lower expectable risk than individual stocks) may be hidden within the category "securities."

Table 1

Division of investment products into risk classes

Risk Class	Investment Product
Low risk	Savings accounts, home ownership savings plans
Medium risk	Life insurance policies Fixed-interest securities
High risk	Stocks, personal business assets

Source: Table generated by DIW Berlin.

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Table 2

Definition of portfolio types

	Degree of Diversification	Risk classes included		
		Low Risk	Medium Risk	High Risk
Portfolio Type 1	Not diversified	+	-	-
Portfolio Type 2	Not diversified	-	+	-
Portfolio Type 3	Not diversified	-	-	+
Portfolio Type 4	Partially diversified	+	+	-
Portfolio Type 5	Partially diversified	+	-	+
Portfolio Type 6	Partially diversified	-	+	+
Portfolio Type 7	Fully diversified	+	+	+

"+" signifies that at least one investment product from the specific risk class is included in the portfolio.

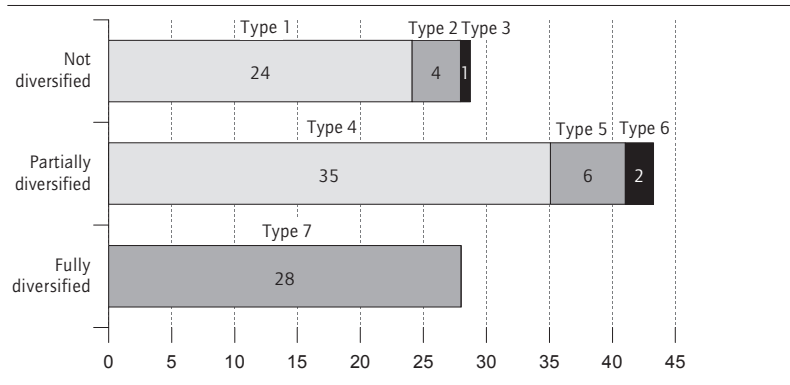
Sources: SOEP 2004; Table generated by DIW Berlin.

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are included in a portfolio, this may be called a "fully diversified portfolio." Partially diversified portfolios are far and away the most common type, consisting predominantly of low-risk investments (Figure 3). Fully diversified portfolios are preferred

Figure 3

Portfolios according to risk type and level of diversification in percent



N=5,163 heads of private households

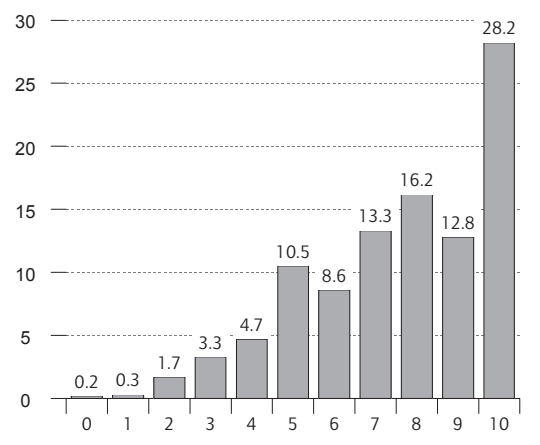
Sources: SOEP 2004; Calculations by DIW Berlin.

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Figure 4

Heads of household and degree of risk aversion

in percent



N = 5,163 heads of private households Risk aversion: 0 = very low, 10 = very high.
Sources: SOEP 2004; Calculations by DIW Berlin. **DIW Berlin 2008**

with roughly the same frequency as non-diversified portfolios.

Considering the risk-mitigating effect of diversification mentioned at the beginning of this study, one would expect that a highly risk-averse person would find a fully diversified portfolio incorporating all three risk categories more attractive than his or her less risk-averse counterpart.

Actual portfolio diversification is only partially explained by personal readiness for risk

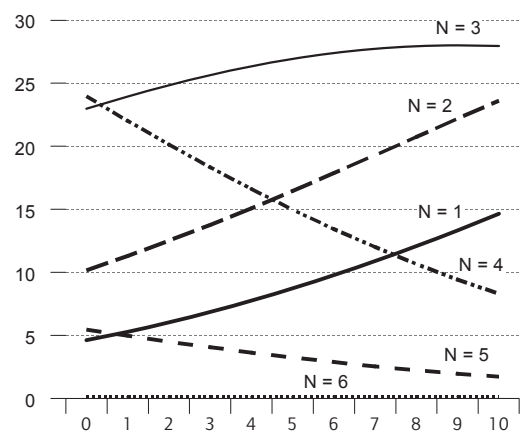
To facilitate the classification of risk readiness, individuals polled in the SOEP study were asked to rate their own willingness to take investment risks on a scale from 0 (= very willing to take risks) to 10 (= not willing to take risks) (Figure 4). Based on this subjective assessment, it is possible to ascertain how risk preferences correlate with the probability of having a particular (objective) portfolio type. Since the types of investment were investigated at the household level, only the risk preference ratings from heads of households were included in the analysis.¹⁰ In the SOEP study, the head of household was identified by means of a specific question posed to the survey participants.

¹⁰ The study is based on the assumption that the head of the household determines investment behavior.

Figure 5

Number of investment classes in portfolio by investor's risk aversion

Probability in percent



N = 5,163 heads of private households Risk aversion: 0 = very low, 10 = very high.
Sources: SOEP 2004-2006; Calculations by DIW Berlin. **DIW Berlin 2008**

By means of a pooled multinomial regression model, the correlation between risk attitudes and the diversification of investments in a household was analyzed, including consideration of relevant factors such as age, gender, education, income, home ownership and size of household.¹¹ It was shown that in the case of very elevated risk aversion, a portfolio consisting of two or three investment products was most likely (Figure 5). The probability of having a portfolio with four, five or six investment products is the lowest in this group. The situation is reversed for individuals with very low risk aversion. These individuals show a high probability of having a portfolio with three or four investment products. These findings demonstrate that there is no clear-cut association between risk aversion and the number of investment products in a portfolio.

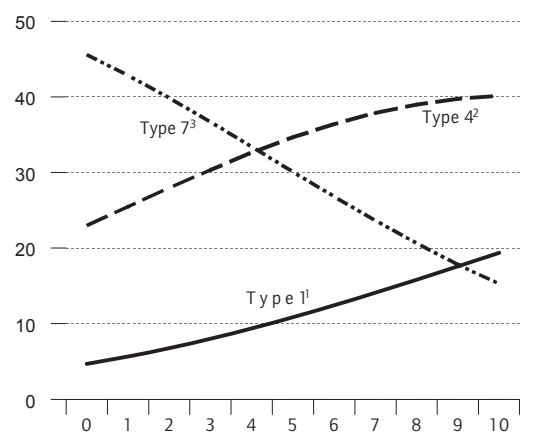
The correlation between risk aversion and portfolio risk classes was also explored (Figure 6). Here it is apparent that individuals with higher risk aversion most frequently have a partially diversified portfolio that consists of low- and medium-risk investments. Second most common in this group are non-diversified portfolios consisting exclusively of low-risk investments. A fully diversified portfolio is held most often by individuals with a high willingness to take risk (i.e., with low risk aversion). The previously formulated theoretical expectation that a highly risk averse person (in this case, a head of

¹¹ Pseudo R², the criterion that measures the quality of estimation, was calculated at 0.134. Information regarding the quantity of assets was not collected in the SOEP study between 2004–2006. This variable was thus not considered in the regression analysis.

Figure 6

Portfolio types by investor's risk aversion

Probability in percent



- 1. Non-diversified portfolio with low risk investments
- 2. Partially diversified portfolio with medium risk investments
- 3. Fully diversified portfolio including all risk classes.

Sources: SOEP 2004 to 2006; Calculations by DIW Berlin.

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household) would find a fully diversified portfolio more attractive than his or her less risk-averse counterpart could therefore not be confirmed.¹²

Willingness to make riskier investments rises in relation to higher numbers of safe investments already in the portfolio

Investment behavior might be motivated by factors other than maximization of anticipated gains. Alongside return, Keynes also considered security and liquidity as a motivation in the selection of different forms of investment.¹³ From this perspective, households tend to initially prefer secure instruments that are relatively easy to convert into liquid assets. Only after such investments have been obtained do they turn to investment categories with higher anticipated return such as stocks or bonds. In fact, in the present study it is possible to correlate readiness for higher risk investments with the number of secure investments already in the portfolio (Figure 7). In other words, the greater the number of secure investments already in hand, the greater the readiness to additionally invest in riskier vehicles with a higher expected gain.

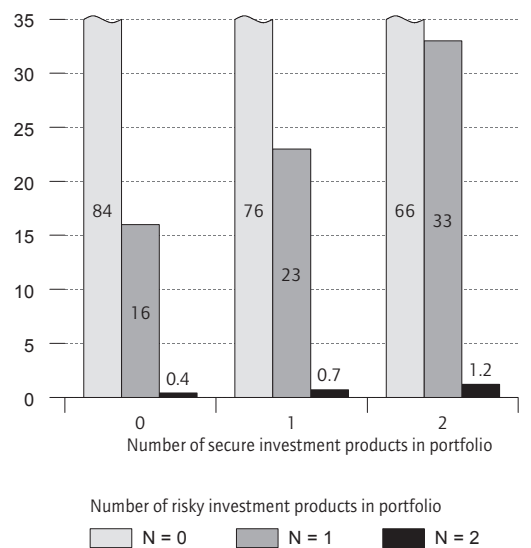
¹² It can also be shown that the desire for diversification rises with higher income or educational level or with the number of children in the household. Notably, female heads of household diversified more than males.

¹³ Keynes, J. M.: The General Theory of Employment, Interest and Money. 1936, The University of Adelaide Library Electronic Texts Collection, etext.library.adelaide.edu.au/k=keynes/john_maynard/.

Figure 7

Number of risky investment types in a portfolio depending on the number of secure investment types²

Probability in percent



N = 5,163 heads of private households

1 Stocks, including stock funds, holdings in non-listed companies and personal business assets. 2. Savings accounts and home ownership savings plans.

Sources: SOEP 2004–2006;; Calculations by DIW Berlin

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An alternative explanation for the investment behavior of private households found in this study could be that risk-averse individuals only consider types of investment that are transparent and comprehensible to them. Investment behavior could therefore be explained by an absence or deficiency of understanding in the area of finance.¹⁴ This would then lead to a failure to fully take advantage of the potential value of diversification.

Conclusion

Recent events in financial markets have clearly demonstrated that in a systemic crisis, securities belonging to the same general class may fall under equivalent downward pressure. Consequently, diversification in a number of investments belonging to the same general class does not succeed in minimizing risk. It is important to have the widest possible distribution of investments. In this way, according to portfolio theory, investors who are least willing to take risks may especially benefit from broad diversification.

¹⁴ Wagner, G. G., Leinert, J.: Konsumentensouveränität auf Vorsorgemärkten eingeschränkt. Wochenbericht des DIW Berlin, No. 30/2004.

The study presented here based upon the SOEP makes quite clear that few households in Germany hold products from all investment types in their portfolios. The favored form of diversification is to place wealth in forms of investment that are traditionally considered relatively secure, such as savings accounts, home ownership savings plans and insurance policies. Products with a higher volatility of return are chosen less frequently and often only after a portfolio already contains more secure elements.

Most risk-averse investors lean toward concentrating their portfolios in a small number of assets, mainly in secure products. While doing so they completely abandon effects of diversification and shut themselves out of possible higher investment returns. To clarify this behavior we can return to Keynes's insight that for individual households, security and liquidity are of the highest priority: readiness to purchase more risky investments rises with the number of secure items already in the portfolio.

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