

## Wealth Distribution



**REPORT** by Markus M. Grabka and Christian Westermeier

Persistently High Wealth Inequality in Germany

3

**INTERVIEW** with Markus M. Grabka

»Unemployed Have Considerably Fewer Assets Than Ten Years Ago«

16

**REPORT** by Christian Zankiewicz

Pitfalls of Compound Interest Effect: Private Investors Underestimate Loss Risks of Financial Products

17

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# Persistently High Wealth Inequality in Germany

by Markus M. Grabka and Christian Westermeier

According to current analyses based on the Socio-Economic Panel Study (SOEP), the total net assets of German households in 2012 amounted to 6.3 trillion euros. Almost 28 percent of the adult population had no or even negative net wealth. On average, individual net assets in 2012 totaled over 83,000 euros, slightly more than ten years previously. The degree of wealth inequality also remained virtually unchanged. With a Gini coefficient of 0.78, Germany has a high degree of wealth inequality compared to other countries, and there is still a wide gap between western and eastern Germany almost 25 years after unification. In 2012, the average net wealth of eastern Germans was less than half that of western Germans.

In addition to their regular incomes, people's individual net wealth, the sum of all their assets, contributes separately to their individual economic welfare and their opportunities for self-realization.<sup>1</sup> When considered in microeconomic terms, individual wealth has numerous functions:<sup>2</sup> for example, investment income means additional income (income function); use of tangible assets (for instance, owner-occupied property) brings di-

rect benefits and can create latitude for personal freedom (utilization function); and drawing on assets can serve to stabilize consumption in the event of a lack of income (security function). Greater wealth can confer economic and political power (power function), serve to attain or retain high status (social mobility or status preservation function), and often also play a crucial role in raising and educating children (socialization function). Finally, wealth is important for providing security in old age and as an instrument for intergenerational transfer (bequeathing function). The particular economic and societal interest in wealth and its distribution can be derived from these many individual functions which far transcend those of regular income. The basis for the following calculations on the distribution of wealth is the longitudinal Socio-Economic Panel Study (SOEP).<sup>3</sup> The wealth situation was examined in detail in special thematic surveys in 2002, 2007, and 2012. Traditional surveys<sup>4</sup> gather data about wealth at the household level and usually distribute it evenly among the members of the household when analyzing its distribution. In contrast, the SOEP ascertains the components of wealth for all adults (from age 17 on). This also makes it possible to analyze private redistribution within households.<sup>5</sup> The SOEP surveys eight different components of wealth: (1) owner-occupied property, (2) other real estate (including undeveloped land, vacation and weekend homes, and rented real estate), (3) monetary assets (savings accounts, savings bonds and Pfandbriefe, stocks, and in-

<sup>1</sup> J. Volkert, G. Klee, R. Kleimann, U. Scheurle, and F. Schneider, *Operationalisierung der Armuts- und Reichtumsmessung* (Bonn: Federal Ministry of Health and Social Security, 2004).

<sup>2</sup> R. Hauser, „Integrierte Analyse von Einkommen und Vermögen – Forschungsstand und Ausblick,“ in *Weiterentwicklung der Reichtumsberichterstattung der Bundesregierung* (Cologne: Institut für Sozialforschung und Gesellschaftspolitik (ISG), 2007), 12–29. Expert workshop, November 29, 2006 in Berlin. Event hosted by the Federal Ministry for Labor and Social Affairs.

<sup>3</sup> SOEP is a representative, annually repeated survey of private households which has been conducted in western Germany since 1984 and in eastern Germany as well since 1990, see G. G. Wagner, J. Göbel, P. Krause, R. Pischner, and I. Sieber, „Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland – Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender),“ *AStA Wirtschafts- und Sozialstatistisches Archiv* 2, no. 4 (2008): 301–328.

<sup>4</sup> See the Federal Statistical Office's sample survey on income and expenditure or the study „Private Haushalte und ihre Finanzen (PHF)“ by the Deutsche Bundesbank.

<sup>5</sup> M. M. Grabka, J. Marcus, and E. M. Sierminska, „Wealth distribution within couples and financial decision making,“ *Review of Economics of the household* (DOI: 10.1007/s11150-013-9229-2), (2014) (forthcoming).

## Box 1

**Definition of Wealth**

An open economy's wealth is held by four "last-owner sectors."<sup>1</sup> These are the government, private non-profit organizations,<sup>2</sup> private households, and foreign countries. In Germany, the vast majority of the nation's wealth belongs to domestic households.

According to the national concept, the household assets consist of the following components: tangible assets in the form of real estate in Germany and abroad and consumable assets; the latter also includes gold, jewelry, or valuable collections. According to the definition in the national accounts, consumable assets also include

**1** The sectors that cannot own any property themselves. When a nation's wealth is calculated, the domestic concept is differentiated from the national concept. The domestic concept only includes the assets within a country, while the national concept only includes assets owned by the residents of a country. This distinction is important insofar as residents can also own property rights in foreign countries. Net foreign assets are the sum of property rights, assets, and liabilities abroad. According to the national concept, a country's wealth consists of property owned by the three domestic last-owner sectors and net foreign assets.

**2** These include, for example, churches and religious communities, clubs, associations, private foundations, political parties, or trades union.

household effects and motor vehicles.<sup>3</sup> In addition to tangible assets, household assets also include positive monetary assets in the form of receivables from the government, companies, financial institutions, and abroad. A further component is participation capital in the form of exchange traded shares or ownership rights in companies (business assets) and financial institutions in Germany and abroad. These gross assets are calculated against liabilities, such as mortgages and consumer loans. The net assets of the household sector comprise the balance of these four components.<sup>4</sup> Other types of assets, such as pension claims, human assets, environmental assets, or cultural assets are not taken into account here..

**3** The value of consumable assets in this broad definition came to 928.5 billion euros in 2012, see Federal Statistical Office, *Sektorale und Gesamtwirtschaftliche Vermögensbilanzen 1991-2012* (2013). The value of household effects and vehicles is not recorded in the SOEP. Consequently, the financial situation of households is underestimated here (see also Box 2).

**4** When national wealth is calculated, there are problems in allocating the various components of the last-owner sectors. This applies to shares in associated companies in particular. It is also difficult to fully record foreign assets held by domestic residents.

vestment certificates), (4) assets from private insurance policies (life insurance and private pension insurance, including Riester retirement plans), (5) building loan contracts, (6) business assets (ownership of individual companies and shares in joint partnerships or corporations; after deducting business liabilities), (7) non-monetary assets in the form of valuable collections, such as gold, jewelry, coins, or objets d'art, and (8) debts (consumer and mortgage loans). Other durable consumer goods, including the value of vehicles, and cash and entitlements to pension systems are not included in the survey.<sup>6</sup> Deducting liabilities from gross assets gives total net assets, which is relevant in terms of welfare economics and is usually referred to for analyses of the distribution of personal wealth (see also Box 1 for calculation of national wealth). The present report is based on a research project funded by the Hans Böckler Founda-

**6** On the relevance of assets for securing retirement-age income, see J. R. Frick and M. M. Grabka, „Alterssicherungsvermögen dämpft Ungleichheit – aber große Vermögenskonzentration bleibt bestehen,“ *Wochenbericht des DIW Berlin*, no. 3 (2010).

tion analyzing the distribution of wealth in Germany.<sup>7</sup> It expands previous analyses conducted by DIW Berlin describing the level, composition, and distribution of individual private wealth.<sup>8</sup>

### Households in Germany Had Assets of Roughly 6.3 Trillion Euros in 2012, ...

The extrapolated SOEP data result in gross wealth (excluding vehicles and household effects) of roughly 7.4 trillion euros, most of which, namely 5.1 trillion euros, was accounted for by real estate. Compared to 2002,

**7** *Vermögen in Deutschland – Status-quo-Analysen und Perspektiven* (Project number: S-2012-610-4. The project is being conducted by DIW Berlin and the Hertie School of Governance; project management: Markus M. Grabka).

**8** J. R. Frick and M. M. Grabka, „Gestiegene Vermögensungleichheit in Deutschland,“ *Wochenbericht des DIW Berlin*, no. 4 (2009). The data for 2002 and 2007 were revised for the present study. This concerns methodological improvements particularly concerning the quality of imputing missing values on the basis of longitudinal information as well as a revision of weighting (see Box 2).

Table 1

Distribution of Wealth<sup>1</sup> in Germany

	2002			2007			2012		
	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>
Gini coefficient	0.764	<b>0.776</b>	0.787	0.786	<b>0.799</b>	0.812	0.765	<b>0.780</b>	0.794
Percentile ratios									
p90/p50	13.2	<b>14.0</b>	14.8	12.5	<b>14.0</b>	15.5	11.2	<b>13.0</b>	14.8
p75/p50	6.2	<b>6.5</b>	6.9	5.5	<b>6.2</b>	6.8	5.2	<b>6.0</b>	6.8
Mean in euros	76,315	<b>79,941</b>	83,567	76,564	<b>81,089</b>	85,613	79,218	<b>83,308</b>	87,399
Percentiles in euros									
p99	706,052	<b>759,969</b>	813,885	697,366	<b>787,500</b>	877,634	747,813	<b>817,279</b>	886,744
p95	310,726	<b>323,722</b>	336,718	303,898	<b>319,731</b>	335,564	304,770	<b>323,180</b>	341,589
p90	202,074	<b>210,134</b>	218,194	198,476	<b>207,695</b>	216,913	208,303	<b>216,971</b>	225,639
p75	93,683	<b>98,130</b>	102,577	86,952	<b>91,374</b>	95,795	96,519	<b>100,000</b>	103,481
Median	14,083	<b>15,000</b>	15,917	13,353	<b>14,818</b>	16,284	14,200	<b>16,663</b>	19,126
p25	0	<b>0</b>	0	0	<b>0</b>	0	0	<b>0</b>	0
p10	0	<b>0</b>	0	0	<b>0</b>	0	0	<b>0</b>	0
p5	-2,691	<b>-1,610</b>	-529	-4,842	<b>-4,000</b>	-3,158	-4,081	<b>-3,150</b>	-2,219
p1	-23,264	<b>-20,360</b>	-17,456	-35,200	<b>-30,260</b>	-25,320	-29,556	<b>-24,100</b>	-18,644
Proportion of individuals with net assets of less than 0 euros, in percent	4.8	<b>5.2</b>	5.6	6.9	<b>7.4</b>	7.9	6.7	<b>7.4</b>	8.0
Proportion of individuals with net assets equaling 0 euros, in percent	20.0	<b>20.6</b>	21.3	18.9	<b>19.7</b>	20.5	19.3	<b>20.2</b>	21.1

<sup>1</sup> Individual net assets of individuals aged 17 or over in private households

<sup>2</sup> 95-percent confidence interval.

Statistically significant changes relative to the previous survey year are shaded gray.

Source: SOEPv29, with 0.1 percent top coding.

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Wealth inequality remains high.

the value of nominal gross assets has risen by approximately 500 billion euros. The increase is due mainly to wealth increases in owner-occupied property, and also in monetary assets.

According to the SOEP, household debts totaled around 1.1 trillion euros in 2012, consisting mostly of mortgage loans of just below one trillion euros. Therefore, the net wealth of German adults in households amounted to about 6.3 trillion euros in 2012.<sup>9</sup>

... Corresponding to 83,000 Euros per Adult

In 2012, net assets per adult (persons aged 17 or over) were roughly 83,000 euros (see Table 1 and Figure 1). The median of wealth distribution, that is, the value separating the wealthier 50 percent of the population

from the poorer half, was 17,000 euros, distinctly lower than the average—a consequence of the unequal distribution of wealth. Roughly one-fifth of all adults had no net assets—seven percent even had debts greater than their gross assets. The wealthiest tenth of the population aged 17 or over had net assets of at least 217,000 euros, and the wealthiest one percent at least 817,000 euros.<sup>10</sup> Compared with 2002, there were very few significant changes in wealth distribution. The proportion of individuals with negative net assets increased significantly between 2002 and 2007 and remained at this level through 2012.

In 2012, net assets in western Germany averaged just under 94,000 euros and was therefore more than twice as high as in eastern Germany (see Table 2). The difference is even greater for the median—21,000 euros in the western and just 8,000 euros in the eastern part of the country.

<sup>9</sup> Compared to the calculation of assets performed by the Federal Statistical Office, this shows considerably lower gross and net assets held by private households (see Box 2).

<sup>10</sup> It must be taken into account that, like other similar studies, the SOEP does not entirely cover the upper margin of the distribution of wealth, thus underestimating it, as billionaires or multi-millionaires are not or only insufficiently included in the sample, see also Box 2.

## Box 2

**Recording Assets with Surveys**

Analyses of wealth distribution based on microdata representative of the population are confronted with a number of methodological and statistical problems. They cannot allow for entitlements to statutory pension insurance to be taken into account. Accumulated pension-related claims are converted into personal earning points that do not reveal a direct reference to social security assets and are therefore rarely included in population surveys (the same applies to occupational pension entitlements). Since the majority of the working population is subject to compulsory pension insurance or has pension-related claims, for example, in the form of training or child-rearing periods, social security assets in the statutory pension scheme represent an important component in household assets. Evaluations of pension insurance data show that 91 percent of men and 87 percent of women aged 65 or over have statutory pension entitlements. (In eastern Germany, the corresponding ratios are even higher at 99 percent.)<sup>1</sup>

Other asset components also cause difficulties in population surveys. According to the concept, household effects are categorized as tangible assets and include all vehicles in the household. Since it is difficult for respondents to give an estimate of the current market value of their entire household effects, the present study only asked about tangible assets in the form of valuable collections, such as gold, jewelry, coins, or objets d'art. As a result of this limitation, tangible assets here are underestimated compared to the national accounts.

In population surveys, assets are usually recorded at the household level and represented in the form of per capita wealth.<sup>2</sup> The SOEP has a methodological feature, here, since it records the individual assets of each respondent aged 17 or over. Thus, differences between households and partnerships can be shown in a per capita comparison. The present analyses (with the exception of Table 5 and Figures 4 and 5) refer to the individual assets of people aged 17 or over<sup>3</sup>, i.e., the redistribution of wealth from

people with lots of assets to household members with few or no individual assets in a household is not taken into account.

A comparison of aggregated assets based on the SOEP and the sectoral and overall economic balance sheets of the Federal Statistical Office is complicated by a number of differences in distinctions and definitions. First, the Federal Statistical Office lumps households together with private non-profit organizations. Second, in addition to durable consumer goods, other types of assets are also included which are not recorded in the SOEP. These include cash, the value of livestock and crops, equipment, intangible fixed assets, claims against private health insurance companies, commercial loans and commercial holdings in residential buildings. Third, the SOEP records the current market value of real estate while the Federal Statistical Office uses its replacement value. But market value differs significantly from the replacement value of real estate. As a result, in 2002, net assets calculated on the basis of the SOEP totaled almost 90 percent of the figure calculated on the balance sheet of the Federal Statistical Office, but it was only 64 percent in 2012. In the case of real estate, the quantitatively most important asset component, the coverage rate fell from 110 percent to just 82 percent. Here, 73 percent of liabilities are recorded. At 33 percent, aggregate gross monetary assets are significantly underestimated in the SOEP. This is also the case in all other wealth surveys worldwide.

A comparison with the wealth survey conducted by the German Federal Bank in 2010/11 (PHF) shows that the SOEP slightly underestimated per capita net assets at 86,000 euros, compared to 95,000 euros in the PHF. It should also be taken into account here that the PHF conducts a far more detailed survey of the asset situation and thus also takes into account, for example, the value of vehicles.<sup>4</sup>

Since 2002, the SOEP has attempted to counteract the problem encountered in population surveys of not ascribing meaningful representation to higher income and assets by introducing a partial sample of "high-income households." Against the background of high inequality in personal wealth distribution, particular importance is accorded this sub-sample and the sufficiently large number

<sup>1</sup> Federal Ministry for Labour and Social Affairs, Alterssicherungsbericht 2008, 83. ([www.bmas.de/coremedia/generator/29492/proper-ty=pdf/2008\\_\\_11\\_\\_19\\_\\_alterssicherungsbericht.pdf](http://www.bmas.de/coremedia/generator/29492/proper-ty=pdf/2008__11__19__alterssicherungsbericht.pdf)).

<sup>2</sup> See, for example, results based on the income and consumption sample (EVS) from the Federal Statistical Office or the PHF study by Deutsche Bundesbank; U. Kalkreuth and H. Hermann, "The PHF: a survey on the assets and finances of households in Germany," Monatsbericht der Deutschen Bundesbank, no. 1.

<sup>3</sup> Assets held by children (under 17 years of age) are ignored as it is assumed these constitute only a very small proportion of total assets.

<sup>4</sup> Kalkreuth and Hermann, "The PHF."

Table

**Influence of the Data Revision on Asset Amounts and Distribution<sup>1</sup> in 2002 and 2007**

	2002						2007					
	SOEPv29			SOEPv24/v25			SOEPv29			SOEPv24/v25		
	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>
Gini coefficient	0.774	<b>0.786</b>	0.798	0.773	<b>0.785</b>	0.798	0.794	<b>0.807</b>	0.819	0.785	<b>0.802</b>	0.818
Percentile ratio p90/p50	13.3	<b>14.0</b>	14.7	13.1	<b>13.9</b>	14.7	12.7	<b>14.0</b>	15.3	12.6	<b>14.4</b>	16.3
Mean in euros	79,163	<b>83,783</b>	88,403	78,004	<b>82,436</b>	86,869	78,794	<b>84,257</b>	89,720	83,040	<b>89,823</b>	96,607
Percentile in euros												
p99	698,761	<b>759,969</b>	821,176	704,978	<b>757,475</b>	809,971	700,282	<b>787,500</b>	874,718	729,408	<b>822,185</b>	914,962
p95	311,660	<b>323,722</b>	335,784	299,470	<b>318,357</b>	337,245	302,437	<b>319,731</b>	337,025	312,306	<b>336,380</b>	360,453
p90	203,464	<b>210,134</b>	216,803	200,520	<b>208,306</b>	216,092	199,062	<b>207,695</b>	216,327	208,401	<b>221,503</b>	234,604
p75	94,046	<b>98,130</b>	102,214	92,694	<b>96,660</b>	100,627	87,020	<b>91,374</b>	95,727	92,965	<b>98,433</b>	103,901
Median	14,296	<b>15,000</b>	15,704	14,250	<b>15,000</b>	15,750	13,409	<b>14,818</b>	16,228	13,117	<b>15,351</b>	17,585
p25	0	<b>0</b>	0									
p10	0	<b>0</b>	0									
p5	-2,757	<b>-1,610</b>	-463	-2,959	<b>-1,881</b>	-803	-5,012	<b>-4,000</b>	-2,988	-5,484	<b>-3,900</b>	-2,316
p1	-23,683	<b>-20,360</b>	-17,037	-22,311	<b>-19,455</b>	-16,600	-36,299	<b>-30,260</b>	-24,221	-35,333	<b>-30,000</b>	-24,667

<sup>1</sup> People in households, individual assets; <sup>2</sup> 95-percent confidence interval. Source: SOEPv29, without top coding.

of cases of wealthy households in the SOEP.<sup>5</sup> In particular, the relationship between income and wealth distribution for the group of high-income earners can also be represented in more detail, since assets, asset income, and savings depend to a large extent on disposable income. Nevertheless, the problem remains that there are simply no very wealthy people in a sample such as the SOEP. In particular, this applies to billionaires and multi-millionaires. The end result is that the true extent of wealth inequality is underestimated. There are currently no external statistics available in Germany to validate this underestimation, for instance, wealth tax statistics.

Estimating fair market value in a survey is difficult, especially when the object was inherited or purchased a long time ago and respondents do not have sufficient knowledge of the current market. Also, valuing business assets is particularly difficult. In contrast to regular income, asset values can be very volatile and this further complicates their evaluation. This leads, in addition to the overall sensitivity of this issue, to increasing refusals to answer questions or a lack of information on asset-related issues.

As well as extensive checks on the consistency of individual data being conducted, all missing assets in the SOEP

are replaced using multiple imputations.<sup>6</sup> Due to the use of longitudinal data as part of repeated wealth surveys in 2002, 2007, and 2012, the quality of the imputation was better than would have been the case with a single survey.

After extrapolation and weighting factors were applied, SOEP microdata underlying these analyses give a representative picture of the population in households and thus allow conclusions to be drawn about the entire population. Members of the population in institutions (for example, in nursing homes) were not taken into account. The weighting factors correct differences in the designs of the various SOEP samples, as well as the participation behavior of respondents after the first interview. The framework data of the microcensus is adjusted to increase its compatibility with official statistics.

The asset data presented here for 2002 and 2007 deviates from those of earlier publications because repeated revisions of weighting factors were required in the SOEP in the past and the imputation procedure has since undergone a fundamental reworking. Selected key figures are shown in the table before and after revised weighting and improved imputation. There are no significant changes, i.e., the deviations between previous and revised data for 2002 and 2007 still fall within the usual fluctuation range of samples.<sup>7</sup>

<sup>5</sup> J. Schupp, J. R. Frick, J. Goebel, M. M. Grabka, O. Groh-Samberg, and G. G. Wagner, "Zur verbesserten Erfassung von Haushaltsnettoeinkommen und Vermögen in Haushaltssurveys," in T. Druyen, W. Lauterbach, and M. Grundmann (pub.), *Reichtum und Vermögen – Zur gesellschaftlichen Bedeutung der Reichtums- und Vermögensforschung* (Wiesbaden: 2009), 85-96.

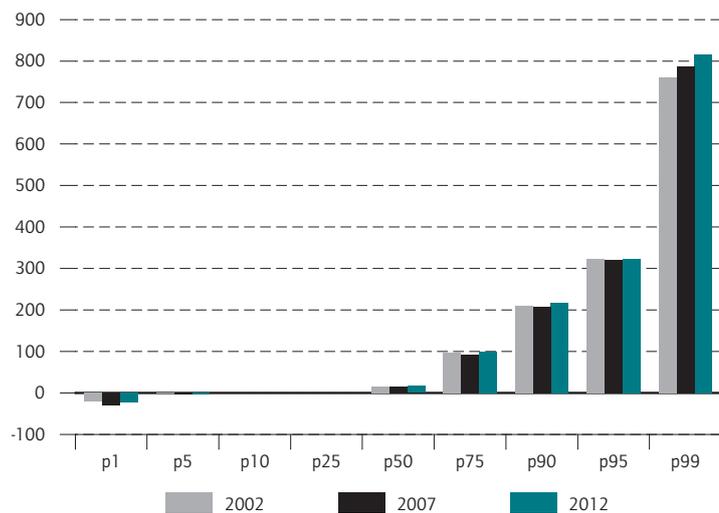
<sup>6</sup> J. R. Frick, M. M. Grabka, and J. Marcus, "Editing and Multiple Imputation of Item-Non-Response in the 2002 Wealth Module of the German Socio-Economic Panel (SOEP)," SOEPpapers on Multidisciplinary Panel Data Research at DIW Berlin, no. 18 (Berlin: 2007).

<sup>7</sup> Frick and Grabka, "Zur verbesserten Erfassung."

Figure 1

**Individual<sup>1</sup> Net Assets by Selected Percentiles in Germany  
In thousands of euros**

In thousands of euros



<sup>1</sup> Individuals aged 17 or older in private households  
Source: SOEPv29, with 0.1 percent top coding.

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Half the population has net assets of less than 17,000 euros.

In eastern Germany, individuals with net assets of 110,000 euros are among the richest ten percent of adults; in western Germany, this line is crossed at just under 240,000 euros. While average net assets did not change significantly in western Germany between 2002 and 2012, it first declined in eastern Germany and then increased distinctly between 2007 and 2012. This is due to a slight rise in the value of owner-occupied property. The recovery on the eastern German labor market may well have also played a role.

**Wealth Inequality Remains High**

The Gini coefficient is a standard measure of wealth inequality. The higher its value, the greater the measured inequality.<sup>11</sup> The coefficient for 2012 is 0.78 (see Table

<sup>11</sup> On the Gini coefficient, see also DIW Glossar, [www.diw.de/de/diw\\_01.c.413334.de/presse\\_glossar/diw\\_glossar/gini\\_koeffizient.html](http://www.diw.de/de/diw_01.c.413334.de/presse_glossar/diw_glossar/gini_koeffizient.html) (in German only). If all assets are positive, the Gini coefficient is between 0 and 1. A value of 0 means that all the individuals in the comparison hold exactly the same assets. In contrast, a value of 1 means that one person holds all the assets and all the others hold none. In fact, however, net assets may also be negative. In 2012, this was the case for just over seven percent of adults in

Germany.<sup>12</sup> This makes Germany the country with the highest wealth inequality in the euro area, followed by Austria in second place. The Gini coefficient for France is 0.68, for Italy 0.61, and for Slovakia 0.45.<sup>13</sup> Wealth inequality in the US (Gini coefficient of 0.87 for 2010) is greater than in Germany.

An alternative measure of distribution is the 90-50 decile ratio, which relates the lower bound of the wealth of the richest ten percent of the population to the median of the wealth distribution. In other words, this figure indicates the multiple of “rich” persons’ wealth in relation to the midpoint of the wealth distribution. In 2012, the wealth of the “poorest” person in the top ten percent was 13 times greater than that of the person in the middle of the distribution. A comparison of the three years under observation does not show any significant change in wealth inequality.

When interpreting these results, it must be taken into account that a sample which is representative of the population, such as the SOEP, tends to under-report people with very high wealth and consequently underestimates the degree of wealth inequality. It is safe to assume that wealth inequality has increased over the past ten years since, according to the system of national accounts, incomes from entrepreneurial activities and investment incomes have seen above-average growth compared to compensation of employees. These types of incomes are primarily concentrated in the highest decile of income recipients. Wealth is concentrated even more strongly in the top percentiles of the distribution.<sup>14</sup>

**Owner-Occupied Housing of Great Importance**

Observing net values exclusively generally conceals important structural differences, both in terms of the composition of wealth and potentially existing debt. For ex-

Germany. In extreme cases, the Gini coefficient could then take on values greater than 1.

<sup>12</sup> If based on net assets, the Gini coefficient is more than twice as high as it is if based on disposable income, see M. M. Grabka, J. Goebel, „Reduction in Income Inequality Faltering,” DIW Economic Bulletin, no. 1 (2014).

<sup>13</sup> P. Mooslechner, „Der ‚Household Finance and Consumption Survey’ des Eurosystems: Konzeption und Ergebnisse der ersten Erhebungswelle 2010.” Paper presented to the General Council of the OeNB, April 25, 2013. The fact that wealth inequality is relatively low in southern European countries may also be due to the fact that property ownership is more widespread there than in Germany. The figures published by the ECB on the level of assets in the euro area have been criticized repeatedly. The Gini coefficient as a measure of wealth inequality is not affected by this as it is independent of the levels of assets.

<sup>14</sup> S. Bach, M. Beznoska, and V. Steiner, „A Wealth Tax on the Rich to Bring down Public Debt? Revenue and Distributional Effects of a Capital Levy,” SOEPpaper, no. 397, to be published in Fiscal Studies no. 1 (2014).

Table 2

Distribution of Wealth<sup>1</sup> in Western and Eastern Germany

	2002			2007			2012		
	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>	Lower threshold <sup>2</sup>	Estimate	Upper threshold <sup>2</sup>
<b>Western Germany</b>									
Gini coefficient	0.750	<b>0.761</b>	0.771	0.771	<b>0.784</b>	0.797	0.751	<b>0.768</b>	0.786
Percentile ratios									
p90/p50	10.8	<b>11.9</b>	13.1	11.0	<b>12.7</b>	14.3	9.8	<b>11.3</b>	12.8
p75/p50	5.2	<b>5.6</b>	6.1	5.1	<b>5.8</b>	6.5	4.8	<b>5.5</b>	6.2
Mean, in euros	85,724	<b>90,004</b>	94,283	87,824	<b>93,651</b>	99,478	89,171	<b>93,790</b>	98,409
Percentiles, in euros									
p99	741,771	<b>834,853</b>	927,935	699,732	<b>897,841</b>	1,095,949	765,572	<b>876,050</b>	986,528
p95	336,483	<b>353,200</b>	369,917	345,001	<b>366,300</b>	387,599	342,559	<b>363,980</b>	385,401
p90	225,277	<b>235,700</b>	246,123	228,855	<b>239,700</b>	250,545	228,700	<b>239,300</b>	249,900
p75	106,958	<b>111,535</b>	116,111	105,004	<b>109,900</b>	114,796	109,784	<b>116,445</b>	123,106
Median	17,964	<b>19,800</b>	21,636	16,433	<b>18,910</b>	21,387	18,061	<b>21,200</b>	24,339
p25	0	<b>0</b>	0	0	<b>0</b>	0	0	<b>0</b>	0
p10	0	<b>0</b>	0	0	<b>0</b>	0	0	<b>0</b>	0
p5	-2,631	<b>-1,271</b>	89	-4,649	<b>-3,610</b>	-2,571	-4,339	<b>-3,000</b>	-1,661
p1	-22,995	<b>-19,500</b>	-16,005	-36,306	<b>-29,800</b>	-23,294	-32,691	<b>-26,380</b>	-20,069
Proportion of individuals with net assets of less than 0 euros, in percent	4.6	<b>5.0</b>	5.5	6.4	<b>7.1</b>	7.8	6.4	<b>7.1</b>	7.7
Proportion of individuals net assets equaling 0 euros, in percent	19.9	<b>20.6</b>	21.4	18.5	<b>19.3</b>	20.1	19.0	<b>19.8</b>	20.7
<b>Eastern Germany</b>									
Gini coefficient	0.757	<b>0.816</b>	0.875	0.792	<b>0.823</b>	0.854	0.767	<b>0.792</b>	0.817
Percentile ratios									
p90/p50	12.1	<b>14.10</b>	15.8	10.2	<b>12.8</b>	15.5	11.1	<b>13.8</b>	16.5
p75/p50	5.2	<b>6.0</b>	6.7	4.5	<b>5.6</b>	6.7	5.2	<b>6.2</b>	7.2
Mean, in euros	32,281	<b>36,713</b>	41,145	29,188	<b>32,007</b>	34,827	37,211	<b>41,138</b>	45,065
Percentiles, in euros									
p99	263,346	<b>341,657</b>	419,967	226,245	<b>274,704</b>	323,164	319,600	<b>399,820</b>	480,040
p95	143,744	<b>153,580</b>	163,416	122,440	<b>134,917</b>	147,393	152,386	<b>171,359</b>	190,332
p90	98,627	<b>104,938</b>	111,249	84,231	<b>91,014</b>	97,796	102,342	<b>111,580</b>	120,818
p75	40,931	<b>44,850</b>	48,769	35,083	<b>39,820</b>	44,557	45,422	<b>50,000</b>	54,578
Median	6,427	<b>7,500</b>	8,573	5,607	<b>7,100</b>	8,593	6,429	<b>8,080</b>	9,730
p25	0	<b>0</b>	0	0	<b>0</b>	0	0	<b>0</b>	0
p10	0	<b>0</b>	0	-33	<b>0</b>	33	-107	<b>0</b>	107
p5	-4,386	<b>-3,000</b>	-1,614	-6,363	<b>-4,731</b>	-3,100	-4,879	<b>-3,600</b>	-2,321
p1	-31,746	<b>-24,840</b>	-17,934	-39,458	<b>-28,120</b>	-16,782	-18,991	<b>-15,600</b>	-12,209
Proportion of individuals with net assets of less than 0 euros, in percent	5.2	<b>6.0</b>	6.8	7.3	<b>8.5</b>	9.7	7.4	<b>8.9</b>	10.3
Proportion of individuals with net assets equaling 0 euros, in percent	19.4	<b>20.7</b>	22.1	19.6	<b>21.0</b>	22.4	20.0	<b>21.9</b>	23.8

1 Individual net assets of individuals aged 17 or over in private households.

2 95-percent confidence interval.

Statistically significant changes relative to the previous survey year are shaded gray.

Source: SOEPv29, with 0.1 percent top coding.

On average, net assets in western Germany are more than twice as high as in eastern Germany.

ample, low net assets may be the result of high net assets and simultaneous high debt (for example, young families burdened with mortgages just after purchasing a home), or it might simply mean low monetary assets.

Just under half of the adult population (47 percent) had monetary assets in 2012 (savings accounts, savings bonds and Pfandbriefe, stocks, and investment certificates) or assets in the form of private insurance policies and building loan contracts (51 percent) (see Ta-

ble 3). The prevalence of private insurance policies has increased significantly since 2002. One reason for this is Riester retirement plans, introduced in early 2000.<sup>15</sup> On average, the value of these investments was approximately 29,000 euros in monetary assets and about 18,000 euros in private insurance policies. The value of monetary assets has increased by 7,000 euros or 30 percent since 2002.<sup>16</sup>

For all adults, owner-occupied property is the quantitatively most important form of wealth, at 54,000 euros. Almost 40 percent have this form of investment in their portfolios;<sup>17</sup> just one-tenth hold other types of real estate, which are clearly much less prevalent. For those with owner-occupied real estate, this accounts for approximately 141,000 euros on average. The corresponding figure for other real estate is 156,000 euros.

Liabilities have increased significantly: the proportion of Germans in debt rose from 27.5 in 2002 to just under 32 percent in 2012. This is the result of a single factor: the greater prevalence of consumer loans. The volume of these loans has declined significantly, however—from over 21,000 euros to just under 15,000 euros. In other words, smaller liabilities, for example, for purchasing articles of daily use, play a more important role.<sup>18</sup> The situation is different for mortgages on owner-occupied housing. Although the prevalence of these liabilities has not changed, their values increased by 17 percent, from 47,000 euros in 2002 to 55,000 euros in 2012. Low interest rates for financing real estate purchases are likely to have had an effect here, leading to a demand for bigger mortgages.

Only four percent of all individuals own business assets, yet they account for just below ten percent of total net assets. Accordingly, the average amount of business assets held by people owning a business was more than 190,000 euros in 2012.

Owning property and taking out mortgages are still more prevalent in western than eastern Germany. In contrast, consumer loans are significantly more com-

mon in eastern Germany. As expected, the value of owner-occupied housing was considerably lower in eastern Germany (88,000 euros) in 2012 than in western Germany (151,000 euros).<sup>19</sup> The volume of consumer loans, however, did not differ significantly, at 12,000 and 15,000 euros, respectively.

### Individual Position Regarding Wealth Strongly Dependent on Age

For western Germany, a comparison of wealth across age groups shows a distinct life-cycle pattern (see Figure 2): in 2012, the average net assets of young adults up to 25 years of age were less than 7,000 euros. After completing their education and entering the labor force, they have the opportunity to save and accumulate wealth; at the same time, the probability of inheriting or being endowed with wealth is higher. As a result, average net total assets increase markedly from age 26 on. The highest average individual net assets—just under 175,000 euros—are owned by the group aged 66 to 70. Here, the establishment of net assets in the form of real estate is particularly important as it is often paid off by retirement age. In older age, wealth is typically drawn on, resulting in a slight decline in average net wealth.

A comparison of western and eastern Germany reveals that there are no longer any significant differences in net wealth up to the age of 40. When entering the labor force, people usually have few assets, so the significant differences are in fact of little consequence. However, older cohorts in eastern Germany fall far behind the level in western Germany since their average assets total only just over 50,000 euros.<sup>20</sup> The large difference can be explained by the fact that citizens of the former German Democratic Republic have lacked opportunities to save because of a low wage level and high unemployment in eastern Germany. The differences in wealth between east and west are therefore expected to continue to exist as they carry over in the form of intergenerational transfers.

<sup>15</sup> J. Geyer, „Riester-Rente: Rezept gegen Altersarmut?“, Wochenbericht des DIW Berlin, no. 45 (2011).

<sup>16</sup> According to the Federal Statistical Office, Sektorale und Gesamtwirtschaftliche, aggregate gross monetary assets held by private households increased by 38 percent between 2002 and 2012.

<sup>17</sup> Although it is true that 53 percent of all residents of Germany lived in households with owner-occupied property in 2011, the proportion of people with owner-occupied property was only 38 percent. In many households, owner-occupied property belongs to just one household member; in particular, grown children still living with their parents are generally only „co-residents“ but not „co-owners.“

<sup>18</sup> Zero-interest financing offered by retailers likely contributed to this situation.

<sup>19</sup> The strong increase in rental and purchase prices for real estate since 2010, which has been reported on frequently, is concentrated primarily on certain metropolitan regions such as Munich or Berlin. On average, real estate prices have increased by only 1.7 percent per year in real terms, following more than ten years of declining real house prices, see J. Möbert, H. Peters, and M. Lechler, „Deutschlands Hauspreise aus internationaler und historischer Perspektive,“ Wirtschaftsdienst, no. 1 (2014): 76-78.

<sup>20</sup> It is striking that a comparison of cohorts shows that eastern Germans born in 1957 or earlier (at least 51 years of age in 2012) have not been increasing their assets over the past ten years.

Table 3

**Components of Individual<sup>1</sup> Net Assets**

	Germany									Western Germany			Eastern Germany		
	2002			2007			2012			2002	2007	2012	2002	2007	2012
	Lower <sup>2</sup>	Estimate	Upper <sup>2</sup>	Lower <sup>2</sup>	Estimate	Upper <sup>2</sup>	Lower <sup>2</sup>	Estimate	Upper <sup>2</sup>						
<b>Percentage of people owning assets in the population aged 17 or older</b>															
<b>Gross wealth</b>	69.7	70.4	71.1	73.5	7.3	75.1	75.6	76.5	77.4	70.4	74.4	76.9	70.4	73.6	74.7
Owner-occupied property	37.0	3.7	38.3	35.2	36.1	37.0	37.3	38.2	39.1	39.6	38.1	40.0	29.4	28.2	30.8
Other real estate	9.2	9.7	10.2	9.3	9.9	10.4	9.3	10.0	10.7	10.5	10.7	10.7	6.5	6.7	7.0
Financial assets	44.7	45.5	46.3	46.8	47.7	48.7	45.7	46.8	47.9	45.3	48.3	47.4	46.2	45.6	44.3
Business assets	4.1	4.4	4.7	3.6	4.0	4.5	3.9	4.2	4.5	4.5	4.1	4.3	4.0	3.7	4.0
Valuables	8.5	9.0	9.5	5.3	5.8	6.2	5.7	6.2	6.7	10.1	6.4	7.0	4.2	3.4	2.9
Insurance policies and building loan contracts	46.9	48.0	49.1	50.9	51.8	52.8	49.5	50.5	51.4	47.5	52.1	50.2	50.1	50.8	51.6
Insurance policies	-	-	-	39.0	39.7	40.5	38.1	39.1	40.1	-	39.9	38.4	-	39.0	41.9
Building loan assets	-	-	-	28.6	29.4	30.2	28.2	29.1	29.9	-	29.9	29.7	-	27.3	26.6
<b>Debt</b>	26.8	27.5	28.3	30.0	30.9	31.8	30.8	31.7	32.6	28.4	31.4	32.2	23.7	28.9	29.6
Mortgages on owner-occupied housing	17.9	18.5	19.2	16.9	17.5	18.1	17.0	17.7	18.4	19.4	18.5	18.7	14.6	13.9	13.4
Mortgages on other real estate	3.9	4.2	4.5	3.9	4.3	4.7	3.7	4.1	4.6	4.8	4.8	4.6	1.7	2.3	2.2
Consumer loans	11.2	11.7	12.3	15.6	16.4	17.2	15.8	16.4	17.1	11.5	15.9	15.5	13.0	18.4	20.1
<b>Asset components as percentages of net assets</b>															
<b>Gross wealth</b>	119			120			119			118	117	116	125	124	119
Owner-occupied property	62			59			63			62	52	57	69	61	57
Other real estate	20			21			18			21	19	17	10	8	9
Financial assets	12			15			16			12	13	14	16	16	16
Business assets	11			11			9			11	10	8	13	10	10
Valuables	2			2			1			2	1	1	3	1	1
Insurance policies and building loan contracts	11			12			11			11	11	10	14	14	13
Insurance policies	-			9			8			-	8	7	-	9	9
Building loan assets	-			3			3			-	3	3	-	5	4
<b>Debt</b>	19			20			19			18	17	16	25	24	19
Mortgages on owner-occupied housing	10			11			11			10	10	10	15	15	11
Mortgages on other real estate	5			5			4			5	5	4	3	3	3
Consumer loans	3			3			3			3	2	2	7	6	5
<b>Net assets</b>	100			100			100			100	100	100	100	100	100
<b>Assets per owner aged 17 or older (mean)</b>															
<b>Gross wealth</b>	125,921	13,504	137,087	124,284	131,525	138,765	127,338	132,596	137,855	147,755	150,592	148,368	61,426	55,001	67,287
Owner-occupied property	136,041	13,752	141,463	134,442	138,354	142,266	136,551	141,085	145,618	147,627	149,276	151,356	87,499	80,785	87,338
Other real estate	149,763	171,980	194,197	154,102	175,943	197,784	129,804	155,553	181,301	188,034	196,690	170,498	60,150	46,945	62,921
Financial assets	21,121	22,306	23,491	23,479	26,889	30,300	26,354	28,996	31,637	24,540	30,177	31,737	12,892	13,281	17,198
Business assets	135,485	212,347	289,208	157,212	222,933	288,655	147,409	191,368	235,326	231,670	251,535	208,442	118,368	98,320	118,662
Valuables	10,091	18,089	26,087	8,203	22,452	36,701	11,896	15,438	18,980	17,614	24,344	15,824	22,975	8,776	11,713
Insurance policies and building loan contracts	18,283	19,569	20,854	18,587	19,718	20,848	17,490	18,634	19,779	21,899	22,061	20,288	10,072	10,322	12,164
Insurance policies	-	-	-	17,081	18,401	19,721	15,465	16,678	17,890	-	20,761	18,375	-	8,957	10,431
Building loan assets	-	-	-	9,076	9,894	10,712	9,380	9,931	10,482	-	10,707	10,550	-	6,411	7,154
<b>Debt</b>	49,637	53,040	56,444	48,338	51,362	54,387	47,167	50,079	52,990	56,325	56,188	54,445	36,087	30,557	30,936
Mortgages on owner-occupied housing	45,006	47,412	49,817	51,625	53,635	55,646	51,947	55,314	58,681	49,119	56,290	58,166	37,675	39,840	39,256
Mortgages on other real estate	86,035	103,344	120,653	88,199	105,391	122,584	68,348	89,380	110,411	106,567	111,977	92,129	62,907	51,878	66,335
Consumer loans	17,620	21,407	25,194	13,497	14,853	16,209	12,637	14,691	16,746	21,742	15,613	15,532	20,134	12,293	12,084

1 Individual net assets of individuals aged 17 or older in private households.

2 95-percent confidence interval. Statistically significant changes relative to the previous survey year are shaded in light gray. Statistically significant changes between 2002 and 2012 are shaded in dark gray.

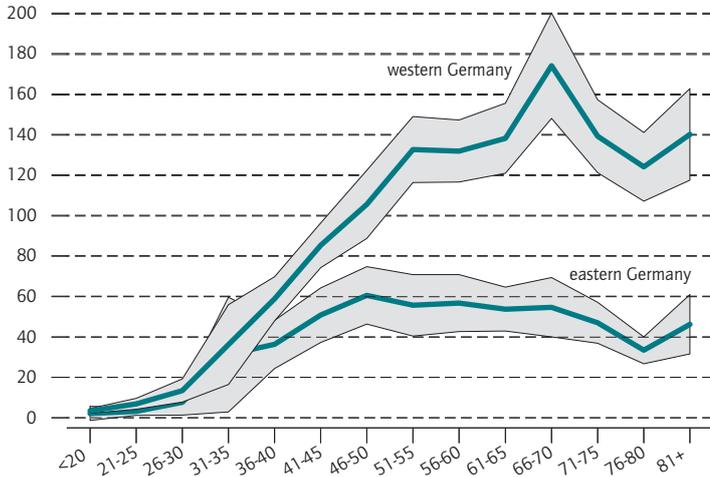
Source: SOEPv29.

The fraction of people with consumer loans has increased.

Figure 2

**Individual<sup>1</sup> Net Assets by Age Groups and Region in 2012**

In thousands of euros



<sup>1</sup> Individuals aged 17 or older in private households  
Source: SOEPv29, with 0.1 percent top coding. Gray area = 95-percent confidence region.

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Middle-aged or older eastern Germans have significantly fewer assets.

**Men Have Greater Assets than Women**

Studies on wealth typically survey only one representative of a household about the assets of all members of the household. This does not allow an analysis of gender-specific differences in assets. The SOEP is one of the few data sources surveying assets at the individual level. In 2012, men’s individual net assets averaged 97,000 euros, 27,000 euros more than women’s (see Figure 3). This equates to women having only 72 percent of the assets held by men.

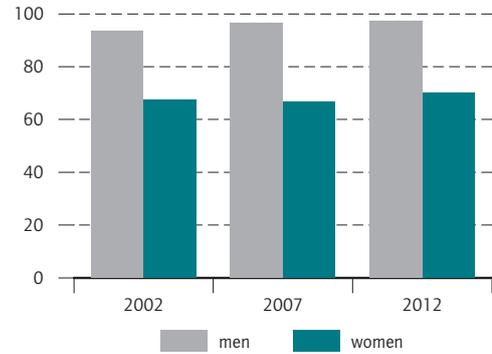
**Self-Employed Have the Highest Net Assets**

A person’s net assets grow as they climb the career ladder. There are, however, significant differences among the various groups of employees. Unskilled or semi-skilled workers and employees had assets of approximately 33,000 euros in 2012, whereas skilled workers had assets of 45,000 euros (see Table 4). Supervisors, specialists, and employees with qualified activities owned 83,000 euros, while employees with comprehensive leadership tasks attained an average individual net assets of almost 210,000 euros. At the same time, the proportion of people with assets of zero or less decreased as their career position improved.

Figure 3

**Individual<sup>1</sup> Net Assets by Gender**

In thousands of euros



<sup>1</sup> Individuals aged 17 or older in private households  
Source: SOEPv29, with 0.1 percent top coding.

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Men’s net assets are higher than women’s.

Subdivided into service grades, public officials with a low or medium grade had net assets of 80,000 euros and therefore owned as much as employees carrying out qualified activities. In contrast, public officials with a higher grade had net assets of more than 110,000 euros.

The self-employed had the highest assets of all. On the one hand, the self-employed are generally not entitled to statutory pensions and more likely to have private pension plans in the form of private insurance or real estate. On the other hand, this is due to business assets. The self-employed with no employees had net assets of slightly more than 170,000 euros, with this figure rising to just under one million euros for the self-employed with more than ten employees.

The unemployed and non-workers owned relatively few assets. Non-workers had by far the lowest assets—apart from trainees—with an average of 18,000 euros. In addition, the assets of the unemployed have fallen significantly over time; in 2002, this figure was still over 30,000 euros.<sup>21</sup> The proportion of people with assets of less than or equal to zero in 2012 was highest among the unemployed at 65 percent.

<sup>21</sup> Hartz IV legislation may have played a role here. It states that all assets up to the allowed exemption (including owner-occupied real estate) must be used up before a person can draw unemployment benefits known as Arbeitslosengeld II (paid after the first 12 to 18 months of unemployment).

Table 4

**Individual<sup>1</sup> Net Assets by Social Status in 2012**

	Lower threshold <sup>2</sup>	Mean	Upper threshold <sup>2</sup>	Median	Fraction with assets less than or equal to 0 euros	For informational purposes: structure of the population aged 17 or older
	In euros				In percent	
Apprentice, intern	5,310	<b>7,881</b>	10,452	10	49.9	7.2
Unskilled, semi-skilled workers, employees without any qualifications	27,417	<b>32,527</b>	37,637	2,000	43.8	10.6
Skilled workers, employees with low-qualification positions	39,690	<b>45,076</b>	50,462	9,858	27.6	10.6
Supervisors, specialists, employees with qualified positions	76,466	<b>83,039</b>	89,611	34,000	15.3	23.6
Employees with extensive managerial responsibilities	162,013	<b>209,096</b>	256,178	114,595	13.8	0.7
Lower- and middle-level civil servants	60,813	<b>79,776</b>	98,738	42,468	11.0	1.2
Upper-middle-level and upper-level civil servants	95,329	<b>113,810</b>	132,291	80,100	9.7	2.4
Self-employed without employees	131,671	<b>172,334</b>	212,996	50,018	19.1	3.6
Self-employed with 1 to 9 employees	266,513	<b>329,044</b>	391,576	145,124	6.5	1.8
Self-employed with 10 or more employees	551,172	<b>952,264</b>	1,353,355	504,860	3.0	0.3
Not gainfully employed	51,911	<b>61,901</b>	71,890	5,578	39.1	5.8
Unemployed	12,560	<b>17,797</b>	23,035	0	65.5	5.0
Pensioners	104,056	<b>112,163</b>	120,269	49,900	21.9	27.2
<b>Total</b>	<b>79,218</b>	<b>83,308</b>	<b>87,399</b>	<b>16,663</b>	<b>7.4</b>	<b>100.0</b>

<sup>1</sup> Individual net assets of individuals aged 17 or older in private households.

<sup>2</sup> 95-percent confidence interval.

Statistically significant changes relative to 2002 are shaded gray.

Source: SOEPv29.

The unemployed and apprentices have the fewest assets.

**Single Parents with the Lowest Assets**

To differentiate by household type in the asset analysis, the following considers the per capita household wealth instead of individual assets per adult. In 2012, single parents with two or more children were in possession of almost 21,000 euros and had the lowest volume of per capita net assets (see Table 5). If a single parent lives with only one child, his or her net assets rise to 35,000 euros, but this figure is still significantly below that of a couple household with only one child (around 63,000 euros). It is also evident in couple households that per capita wealth decreases with an increase in the number of children. In 2012, couple households with two children had slightly more than 50,000 euros, and with three or more children only 44,000 euros. In contrast, (married) couples with no children had average assets of 108,000 euros. Men living alone aged 60 or over had the highest per capita assets of 150,000 euros. It can be assumed here that many are widowers and have inherited the assets of a former spouse. The average net assets of this group of widowed men living alone was around 190,000 euros, almost 80,000 euros more than widowed older women living alone.

**The Higher the Net Income, the Greater the Assets**

Disposable income<sup>22</sup> is more evenly distributed than assets. Nevertheless, there is a close link between the two economic figures—not least due to income from capital assets, such as interest and dividends or rental income.

For all the three years monitored, there was a significant positive correlation between per capita household net income and per capita net assets (see Figure 4). While the lowest 10 percent of incomes only had average assets of nearly 20,000 euros, the corresponding figure for the ninth decile was just under 130,000 euros, and the highest ten percent of the population had almost 285,000 euros.

From 2002 to 2012, the upper income groups were able to further increase their assets. The ninth and tenth income decile showed increases in average per capita assets of more than 25,000 euros. This was also statistically significant for the ninth decile. In contrast, the

<sup>22</sup> Grabka and Goebel, "Rückgang der Einkommensungleichheit," 13–23.

Table 5

**Per Capita Net Assets<sup>1</sup> by Household Type in 2012**

	Lower th- reshold <sup>3</sup>	Mean	Upper th- reshold <sup>3</sup>	Median	Fraction with assets less than or equal to 0 euros	For informational pur- poses: structure of the population
	In euros				In percent	
1-person household, under 60, male	40,668	<b>81,349</b>	122,030	3,572	39	10.6
1-person household, aged 60 or older, male	120,821	<b>150,047</b>	179,272	48,080	25	6.5
1-person household, aged 60 or older, male, wi- dowed	146,039	<b>188,784</b>	231,529	85,138	19	2.7
1-person household, under 60, female	39,888	<b>49,030</b>	58,173	6,402	35	9.6
1-person household, aged 60 or older, female	89,451	<b>105,362</b>	121,272	26,365	26	14.2
1-person household, aged 60 or older, female, widowed	96,560	<b>110,425</b>	124,291	40,800	22	8.6
(Married) couple with no children	100,185	<b>108,028</b>	115,870	56,004	13	31.0
Single parent with one child	22,658	<b>35,038</b>	47,417	1,591	43	3.1
Single parent with two or more children	10,860	<b>20,800</b>	30,741	1,443	37	2.0
(Married) couple with one child	52,412	<b>62,579</b>	72,745	31,100	17	10.6
(Married) couple with two children	42,412	<b>50,586</b>	58,760	28,267	15	8.7
(Married) couple with three or more children	33,269	<b>44,034</b>	54,800	20,297	20	2.8
Other households	29,897	<b>54,488</b>	79,079	24,415	23	1.1
Total	79,026	<b>85,663</b>	92,301	25,200	23	100
<i>For informational purposes:</i>						
Gini coefficient	0.736	<b>0.756</b>	0.776			
P90/p50 ratio	7.6	<b>8.4</b>	9.2			

1 Individual net assets of individuals in private households.  
2 95-percent confidence interval.  
Source: SOEPv29.

(Married) couples with no children have over 108,000 euros in assets per capita.

assets of the lowest 30 percent of incomes remain unchanged during the observation period.

**Asset Poverty Decreases With Age**

One of the core functions of assets is to stabilize consumption in the event of income losses. This applies in the short term during a period of unemployment as well as in the long term, especially during the transition from work to retirement.<sup>23</sup>

Contrary to the standard developed in particular at the European level to describe relative income poverty risk,<sup>24</sup> there is still no universally accepted definition of asset poverty. By analogy to determining poverty risk through income, individuals are defined here as being threatened by relative asset poverty if they have per capita house-

hold net assets of less than 60 percent of the median of the total population.<sup>25</sup>

The proportion of adults affected by relative income poverty in 2012 was approximately 16 percent (see Figure 5). Since assets are significantly less evenly distributed than income, the ratio of those affected by relative wealth poverty was notably higher at 44 percent. In total, 12 percent are affected by both relative income and asset poverty, while four percent of the total population earn low incomes, but, at the same time, are able to rely on significant assets of their own or from other household members.

Since wealth is normally accumulated over the course of an individual's life, the proportion of those not on low incomes or having few assets increases with age. In 2012, two-thirds of households with a head of the household aged 66 to 75 were part of this group. At the same time, the proportion of those with few assets but

<sup>23</sup> It should be noted here that the various forms of investment have different liquidity so in the event of a loss of income, assets cannot always be liquidated and, in addition, assets up to the allowed exemption are taken into account for benefit claims.

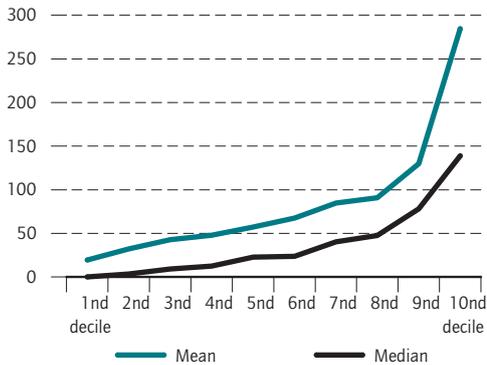
<sup>24</sup> See also Tony Atkinson, Bea Cantillon, Eric Marlier, and Brian Nolan, Social Indicators. The EU and Social Inclusion (Oxford: 2002).

<sup>25</sup> The poverty threshold for 2012 was just under 15,000 euros per capita and therefore significantly higher than using data on individual wealth. Here, the household's internal „redistribution process“ also reflects that individuals with no assets will benefit from the assets of other household members.

Figure 4

**Average Per Capita Assets<sup>1</sup> by Income Deciles in 2012**

In thousands of euros



<sup>1</sup> Income information based on the previous year's income surveyed retrospectively. Net household income of individuals in private households. Source: SOEPv29.

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The higher the net income, the higher the net assets.

not on low incomes as well as those with low incomes and few assets declined. There was a sharp contrast between 34 percent of households with a head of household aged 17 to 25 years in this category compared to only five percent of those at retirement age. For households where the head of household is older (aged 76 or over), the proportion of those with few assets increases slightly because at this age, capital transfers are often made in the form of gifts to the next generation.

**Conclusion and Outlook**

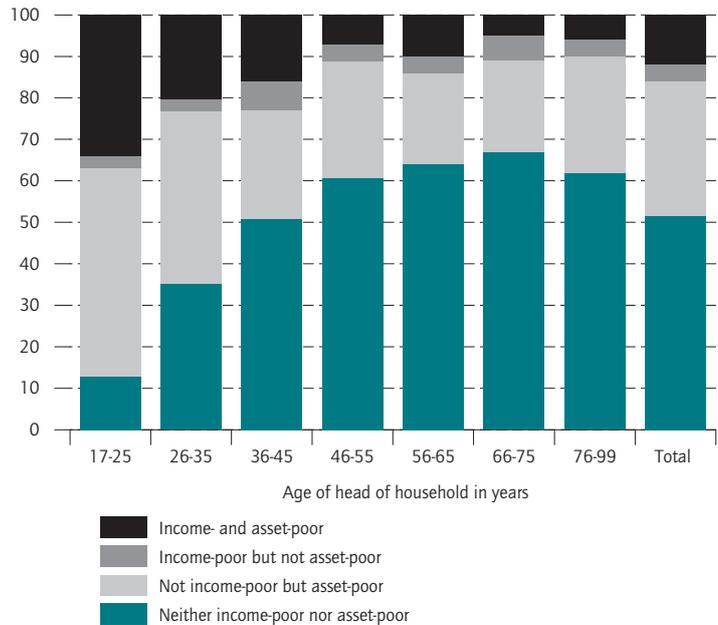
Between 2007 and 2012, individual average net assets in Germany did not increase significantly, according to the SOEP. With a Gini coefficient of 0.78, wealth inequality remained high compared to other countries.

Against a background of private pensions becoming increasingly common, the significant rise in the number of people with negative net assets is problematic. On the other hand, the proportion of people with private insurance has increased significantly since 2002. This is presumably also due to Riester retirement plans. The average asset value of private insurances (including building loan contracts) in 2012 was only approximately 19,000 euros. It remains to be seen whether the gap in pension coverage can be closed by the statutory pension scheme.

Figure 5

**Relative Income Poverty Risk and Asset Poverty Risk<sup>1</sup> by Age of Head of Household in 2012**

Percentage



<sup>1</sup> Income information based on the previous year's income surveyed retrospectively. Net household assets of individuals in private households. Source: SOEPv29.

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The proportion of income-poor and asset-poor people declines up until retirement age.

Net assets in eastern Germany are still significantly lower than in western Germany. In particular, with the increasing number of new pensioners, eastern Germans are not able to combat the increasing risk of poverty in old age with their private assets.<sup>26</sup>

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JEL: D31, I31

Keywords: Wealth inequality, wealth portfolio, SOEP

<sup>26</sup> J. Simonson, N. Kelle, L. Romeu Gordo, M. M. Grabka, A. Rasner, and C. Westermeier, "Ostdeutsche Männer um 50 müssen mit geringeren Renten rechnen," DIW Wochenbericht, no. 23 (2012): 3–13.



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## EIGHT QUESTIONS TO MARKUS M. GRABKA

# »Unemployed Have Considerably Fewer Assets Than Ten Years Ago«

1. Dr. Grabka, you have analyzed the distribution of wealth in Germany. How high are individual net assets on average? On average, in 2012, adults in Germany had net assets amounting to around 83,000 euros. These consisted of owner-occupied and other property, financial and business assets, and assets in savings and loan institutions. Mortgages and consumer loans were also considered.
2. What types of assets are the most important? The most important type of asset in Germany in quantitative terms is owner-occupied property. Although only around 38 percent of the adult population has owner-occupied property, the average value of this property is over 150,000 euros.
3. How is this wealth distributed? A standard measure used to describe wealth inequality is the Gini coefficient. The higher this coefficient, the higher the level of inequality. We have calculated a value of 0.78 for Germany.
4. How much do the top ten percent own? The ten percent comprising the wealthiest people in Germany have net assets of at least 217,000 euros. In order to belong to the top one percent of Germany's wealthiest people, you need to have assets of over 800,000 euros. Surprisingly, at the lower end of the scale, there has been an increase in the proportion of people with more debts than gross assets in recent years. They represent around seven percent of the adult population.
5. How has the distribution of wealth developed in recent years? We were not able to observe any significant

changes in wealth inequality during the period from 2002 to 2012. It should be noted that our calculations based on a random sample thus we are underestimating the true extent of wealth inequality, since exceptionally wealthy people, i.e., billionaires or multi-millionaires, are not included in this sample.

6. Has anything changed at all? In the past ten years, we have seen a rise in the proportion of people in debt. Consumer loans now play a greater role. Particularly in eastern Germany more people are taking out consumer loans. The current low interest rates, has become an attractive option for households and consequently this form of financing has become more common.
7. How big are the disparities in wealth between eastern and western Germany? It is still the case that assets in eastern Germany are significantly lower than in western Germany. For instance, western German adults in 2012 had more than about 94,000 euros of assets on average while the corresponding figure for eastern Germany is only 41,000 euros.
8. How big are the differences with respect to social status? As a rule, the higher the occupational status, the higher the personal assets. One particular group which caught our attention is the unemployed. This is the only social group that has experienced a significant loss of wealth over the past ten years. We interpret this finding as evidence of the impact of Hartz IV legislation because it is only possible for individuals to draw this government transfer payment if they have other significant assets exceeding an allowed exemption.

Interview by Erich Wittenberg.

# Pitfalls of Compound Interest Effect: Private Investors Underestimate Loss Risks of Financial Products

by Christian Zankiewicz

People are investing their life savings in financial products, for instance, to provide for their retirement and, in doing so, they are making their future financial situation almost entirely dependent on the success of these investments. The financial sector promotes numerous investment opportunities with widely varying levels of risk—from the classic private pension insurance to high-risk equity funds. To help investors select a product suitable for them and to safeguard against financial losses, policy-makers have prescribed standardized and comprehensive product leaflets and consulting protocols. But is that enough? So as not to make poor investment decisions, investors also need sufficient knowledge of the financial issues, which, for example, allow them to accurately assess the effects of compound interest on an investment and the risk of loss. This seems to be the problem area, as indicated by the results of a behavioral experiment conducted by DIW Berlin in cooperation with the Humboldt-Universität zu Berlin: most of the participants selected misunderstood the effect of compound interest—and consequently seriously underestimated the investment risk.

Compound interest is interest calculated on capitalized interest from previous periods. In the case of constant positive interest, this results in exponential asset growth. As early as the nineteenth century, the physiologist Ernst Heinrich Weber discovered that human senses perceive exponential increases in the intensity of physical stimuli, such as light intensity, as linear increases and consequently underestimate their intensity. Surprisingly, there is also evidence of this misperception with regard to exponential growth processes in financial mathematics: for example, participants in a scientific study were asked to provide the final value of a seven-percent interest rate applied over ten periods. Instead of providing the correct answer of 97-percent growth, a considerable proportion of respondents thought it was just 70 percent.<sup>1</sup> Measured according to the simplicity of the question, this is a serious misperception which is particularly relevant for budgetary decisions regarding loans, savings, or investments.

The literature on behavioral economics provides evidence that such a misconception of economic growth processes stems from what are known as heuristics: these are rules of thumb used to simplify a given task to the extent that the given individual is able to solve it more quickly, or indeed solve it at all. One heuristic relating to interest calculations is the linearization rule of thumb, according to which investors erroneously disregard the additional interest on interest from previous periods (see box).<sup>2</sup>

<sup>1</sup> V. Stango and J. Zinman, „Exponential growth bias and household finance,” *Journal of Finance* 64 (6)(2009): 2807-2849.

<sup>2</sup> See, inter alia, H. Chen and A. R. Rao, „When two plus two is not equal to four: Errors in processing multiple percentage changes,” *Journal of Consumer Research* 34(2007): 327-340 and F. Christandl and D. Fetchenhauer, „How laypeople and experts misperceive the effect of economic growth,” *Journal of Economic Psychology* 30(2009): 381-392.

## Investment Risks: A Hypothetical and a Real Example

While, given constant positive interest, a linearization of compound interest will always result in investors underestimating the future value of an investment, this behavior can lead to investors dangerously overestimating the future value of an investment in a more realistic investment environment: if the interest rate is not constantly positive but instead fluctuates at random and may become negative, it is often very difficult for small private investors in particular to estimate the risk of loss.

The hypothetical example (hence forth pension scenario) of small private investors making financial provisions for retirement with the intention of cashing in on their investment in 12 years' time illustrates this situation: the small investors are advised to make an investment which may increase in value by 70 percent within a one-year period (consequently demonstrating positive interest) but might also drop by 60 percent (thus yielding negative interest). With this investment, both developments are equally likely. Appreciation or depreciation occurs each year, independent of previous years. An effective measure to help investors make a decision for or against this investment is the maximum final return on the investment after 12 years in half of all cases: the median final value. To make their selection, small investors would have to calculate a probability distribution across the possible final investment values after 12 years based on the possible interest per annum. Even for this very simple scenario, this calculation would be extremely challenging—real investment decisions involve significantly more numerous and complex factors however.

The result of the calculation seems surprising: one sole 70-percent appreciation is nowhere near enough to offset a 60-percent depreciation. The price path therefore typically follows a downward trend. With an investment of 10,000 euros, in 50 percent of all cases, after 12 years, there is a maximum of just 989 euros of starting capital left, including interest. If the investors do not take the effects of compound interest into consideration but instead evaluate their investment according to the linearization rule of thumb, they would expect, in half of all cases, to receive a maximum of 16,000 euros on their investment after 12 years and would probably be very surprised at how little of the investment actually remains at the end. Failure to carry out the compound interest calculation could then explain the surprisingly risky behavior of many private investors in financial markets—for example, on the market for leveraged Exchange Traded Funds (ETFs) a significant proportion

is held by private investors.<sup>3</sup> Recent warnings against these products issued by financial market regulatory authorities as well as the media indicated that private investors are unable to accurately assess the risks of investing in ETFs.<sup>4</sup>

The performance of ETFs tracks a pre-fixed index such as the US stock market index, the Dow Jones, or the German equivalent, the DAX30. While the performance of a simple ETF reflects that of the stock index on which it is based, the value of a leveraged ETF changes each day of the investment by a multiple of the percentage change in the value of the stock index. Thus, for example, a triple-leveraged ETF on the DAX30 will increase by three percent in one day, provided that the DAX30 gains one percent—should the DAX30 lose one percent of its value, however, the ETF would also fall by three percent. Such fluctuations in value are similar to those in the hypothetical pension scenario with regard to the compound interest effect.

If there are only minor fluctuations in the value of the ETF, applying the linearization rule of thumb to estimate returns on the investment for shorter periods would give a result that barely deviates from the correct solution. However, if the fluctuation margin is increased—by leveraging the ETF, for example—this makes it considerably more difficult to give an accurate estimate of the value of the investment. In short, the greater the fluctuations, the stronger the impact of failing to consider the effect of compound interest on the evaluation result and the more significant the potential miscalculation resulting from applying the linearization rule of thumb.

Apart from the fluctuations, the investment period also plays a decisive role. If the performance of an investment typically demonstrates a downward trend (as is the case with the hypothetical pension scenario), the median final value falls with each additional investment period. The majority of investments are made with the intention of them being liquidated at a fixed point in time in the relatively distant future. However, private investors usually only have access to annual or monthly information on investment returns to help them make their investment decision and compare different options. If the term of the investment is several decades, failure to understand the effect of compound interest may lead to a serious miscalculation of the investment risk. The lon-

<sup>3</sup> S. Lan, C. Costandinides, S. Mercado, and B. Huang, US ETF Holder Demographics: Understanding ETF Usage (New York, Deutsche Bank: 2012).

<sup>4</sup> Barron's, [blogs.barrons.com/focusonfunds/2012/03/21/who-uses-leveraged-and-inverse-etfs-anyway/](https://blogs.barrons.com/focusonfunds/2012/03/21/who-uses-leveraged-and-inverse-etfs-anyway/), blog entry by Brendan Conway, August 16, 2012 and see also „Beware of Leveraged ETFs," Wall Street Journal, May 11, 2012.

ger the investment time horizon, the stronger the compound interest effect—and hence also the more serious the miscalculation resulting from failure to observe the aforementioned effect.<sup>5</sup>

### A Behavioral Experiment Shows That ...

One possible method for testing the effects of miscalculating compound interest is a behavioral experiment under fully controlled laboratory conditions. Compared to empirical analyses of investment decisions, this method has the advantage of enabling causal effects, i.e., the effects that are actually at the root of the decision, to be measured because in a laboratory environment all other effects that could also potentially influence investment decisions can be isolated and eliminated. Thus, a simple correlation, i.e., the possibility of two effects randomly occurring simultaneously, can almost certainly be ruled out. Experimental studies are therefore widely used in behavioral economics.

### ... Investors Ignore Compound Interest Effect, Unless They Are Reminded

Using an experimental study, DIW Berlin analyzed the impact of the investors' understanding of the compound interest calculation and of the fluctuation margin of the value of the given investment, as well as the effect of the investment horizon on their perception of the relevant investment risk. The experiment involved 128 students from the Technische Universität Berlin (TU) and a further 175 from University College London.<sup>6</sup> The study examined participants' own perceptions of the median final values of different growth processes, irrespective of the students' individual risk propensity.

In an initial experiment, the TU Berlin participants were randomly divided into two groups. The testers then presented the participants in the control group (Group 1) with the hypothetical investment in the pension scenario. By questioning the participants about their investment decisions, it was possible to determine their individual perceptions of median final values for a 10,000-euro investment.

Participants in the study group (Group 2) received more information: although the testers described the investment opportunity in detail to participants in both groups, participants in Group 2 were also told how to calculate the possible final values after two periods by adding or deducting interest—and the impact this had on the probability distribution of the possible final values after 12 periods. Any differences in investment behavior between the two groups can therefore be explained by the discrepancy in their understanding of the compound interest calculation. At the end of the experiment, participants were remunerated according to their investment decisions.<sup>7</sup>

Since the participants were repeatedly asked about their investment decisions and received a computer-simulated final value for their investment after each new round, during the course of the experiment, they had the chance to realize that, in all probability, the investment was going to make a significant loss. In the first round, 98 percent of participants in the control group (Group 1) calculated median end values of over 2,000 euros; in the fifth and final round, despite the learning opportunity, this figure was still 86 percent. In the study group (Group 2), however, 70 percent of participants already came up with the correct median final value in the first round. It should be noted that the actual median final value was 989 euros. The fact that the control group significantly overestimated the median final value is consistent with the hypothesis that participants erroneously perceived a linear growth process.

### ... the Extent of the Miscalculation Increased with Value Fluctuations and Investment Maturity

An even more significant overestimate of the median final value if there is a higher value fluctuation margin and longer term of the investment product would provide further evidence of a linear growth process being erroneously perceived. An analogous experiment at University College London examined whether this was the case. In the experiment, all participants only received descriptions of the possible investments—with no reference to the issue of compound interest. Compared to the TU Berlin experiment, some parameters of the investment opportunity in the pension scenario were changed to make it possible to better examine the impact of changes in the value fluctuation margin and the time horizon. The fundamental principles of the investment remained unaffected, however. In addi-

<sup>5</sup> For a more detailed mathematical elaboration of the effects of the use of the linearization heuristic, see L. Ensthaler, O. Nottmeyer, G. Weizsäcker, and C. Zankiewicz, „Hidden Skewness: On the Difficulty of Multiplicative Compounding Under Random Shocks,” DIW Berlin Discussion Paper 1337 (2013).

<sup>6</sup> L. Ensthaler, O. Nottmeyer, G. Weizsäcker, and C. Zankiewicz (2013), „Hidden Skewness: On the Difficulty of Multiplicative Compounding Under Random Shocks.”

<sup>7</sup> The remuneration mechanism was designed so that each participant would receive a positive minimum sum in any event.

tion, for some of the participating students, ETFs now came into play: they were presented with either a simple or a triple-leveraged ETF on the DAX30 index. This method allowed the researchers to measure differences in the perception of such real financial products when there are different value fluctuation margins. In both cases (simple and triple-leveraged ETF), the time horizon was 2,000 trading days, i.e., approximately eight years. The participants were given a clear impression of the fluctuations in DAX30 index values during the period from 1964 to 2012.<sup>8</sup> Thus, the testers provided a graphic illustration of, inter alia, the frequency distribution of the daily percentage value changes of the stock index over time. On the basis of this information, as in the first experiment, participants were able to make investment decisions which could be used to determine the individually perceived median final values of the respective ETF investment opportunity.

Finally, it was possible to compare the decisions of the various randomly assigned participants: in the case of the modified pension scenario, the group with the lower fluctuation margin and the group with the shorter time horizon were compared with the group with the higher fluctuation margin and the longer time horizon, respectively. In the ETF case, the testers only compared the groups with different fluctuation margins (simple and triple-leveraged ETFs).

In the case of the modified investment opportunity used in the pension scenario, both an increase in the fluctuation margin and an extension of the time horizon clearly resulted in a more significant overestimate of the median final value. In a comparison of a simple ETF with a triple-leveraged one for an eight-year investment period, while statistical analyses showed that there was no difference in the extent of the overestimate, at up to 70 percent, the proportion of participants overestimating the median final value was nonetheless very high in both ETF study groups (simple and triple-leveraged ETF). Based on these findings, it can be concluded that a misunderstanding of the compound interest effect can lead to a misconception about the investment risk not just in the laboratory but even for real existing financial products such as ETFs.<sup>9</sup>

<sup>8</sup> Although the DAX30 has only been calculated since 1988, for this experiment, the index was calculated back to 1964 on a daily basis.

<sup>9</sup> Additionally, the experiment retrieved information on further perception measures for the final value distribution for each investment opportunity. Both the range and the skewness of the given distributions were systematically underestimated by up to 100 percent of participants. These findings are also consistent with a linear perception of the performance of the given investment. For the relevant mathematical evidence, see L. Ensthaler, O. Nottmeyer, G. Weizsäcker, and C. Zankiewicz (2013), „Hidden Skewness: On the Difficulty of Multiplicative Compounding Under Random Shocks.

#### Box

#### Linearization Rule of Thumb

If private investors evaluate the performance of their investment according to the linearization rule of thumb, they would correctly capture the distribution of all possible random changes in value during the first period. However, for subsequent periods, the investors would consider the possible changes in value from the first period to be constant and would extend this distribution of absolute changes in value to the outstanding periods—and, in so doing, would be misunderstanding the economic growth process.

Formally, the following applies:  $\gamma_0$  signifies the starting value of the investment (for example, 10,000 euros) and  $\mu_t$  the random variable, which describes the relative changes in value over the periods  $t$  and has the same potential for realization in each period. The actual realizations of the random variables are independent of one another over the periods  $t$ . For period one, the following then applies:

$$\gamma_1 = \gamma_0 \mu_1$$

Here, a random variable is a variable whose value depends on coincidence. For the scenario of a hypothetical pension investment used in the present report, the  $\mu_t$  value would either be 1.7 (plus 70 percent in the case of positive interest) or 0.4 (minus 60 percent in the case of negative interest), with a 50-percent probability of occurrence in each case. Derived from this, the actual final value distribution of the hypothetical investment over the total number of  $T$  periods can be shown:

$$\gamma_T = \gamma_0 \prod_{t=1}^T \mu_t \quad (1)$$

Investors following the linearization rule of thumb now make the crucial error: they do not see the distribution of relative changes in value, as actually

## Conclusion

It is difficult to understand economic growth processes without financial acumen. This is all the more significant since almost everyone is faced with an investment decision, when choosing a private pension, for example, at some point in their life. The experimental study conducted by DIW Berlin shows that private investors can

intended in (1), but instead perceive the absolute changes in value from the first period as remaining constant across all t periods. Therefore, the investors erroneously believe that the value of the hypothetical investment will increase by an absolute sum of 7,000 euros or will drop in value by an absolute sum of 6,000 euros in each period, with equal probability. It would, however, actually be correct to assume equally probable relative changes in value of plus 70 percent or minus 60 percent in each period (see figure).

The random variable for the perceived absolute change in value in period t is denoted by  $\eta_t$ . The investors erroneously believe that the range of possible values for this variable is constant and independent of one another over all the periods t.

Technically, the investors therefore erroneously perceive the final value distribution after T periods as

$$\gamma_T = \gamma_0 + \sum_{t=1}^T \eta_t \quad (2)$$

and see the distribution of  $\eta_t$  as corresponding to that of  $\eta_1$ .

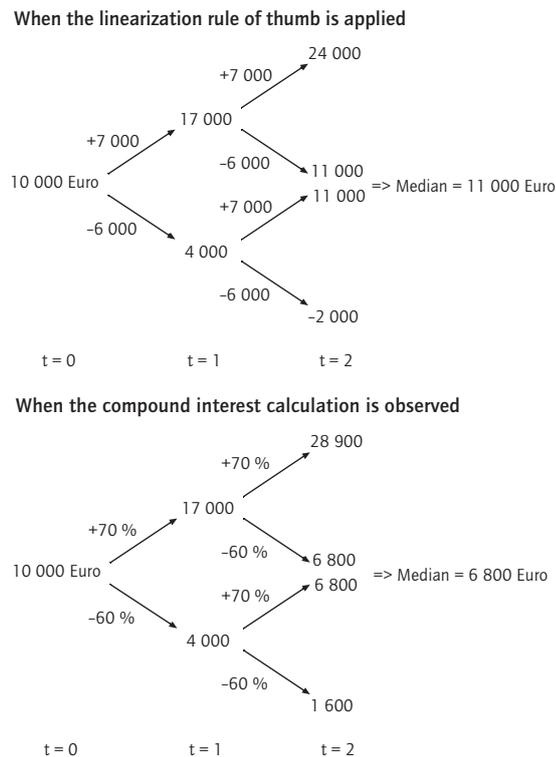
Applying the linearization rule of thumb as expressed in formula (2) therefore leads to the investors ignoring the compound interest effect, which, in turn, results in an overestimation of the median final value. As a result, with the aid of some less restrictive mathematical assumptions, it can be shown that applying the linearization rule of thumb, an increased margin of fluctuation, and a longer investment horizon lead to an even greater overestimation of the median final value.<sup>1</sup>

<sup>1</sup> Further, it was also possible to demonstrate mathematically that both the range and the skewness of the final value distribution were systematically underestimated. For the relevant mathematical evidence,

Figure

**Performance of Investment Over Two Periods**

Sample calculation with starting capital of 10,000 euros



Source: diagram by DIW Berlin.

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When investors ignore the compound interest effect, they seriously overestimate the final value of their investment.

see L. Ensthaler, O. Nottmeyer, G. Weizsäcker, and C. Zankiewicz (2013), „Hidden Skewness: On the Difficulty of Multiplicative Compounding Under Random Shocks.

in fact seriously misunderstand economic growth processes. The principal findings are consistent with the hypothesis that, in making their investment decisions, investors carry out a linearized simplification of the calculation instead of the correct compound interest calculation—which can lead to a dramatic underestimate of the loss risk. A larger fluctuation margin of the val-

ue of the given investment or a longer investment horizon can reinforce this tendency.

The results of the laboratory experiment suggest that, in many cases, just a reminder of how compound interest works may be sufficient to help small private investors make a more realistic assessment of the investment risk—particularly if investment returns potentially fluctuate.

tuate significantly. Policy-makers should therefore regulate references to the compound interest effect to be listed in product information leaflets. Further, investment advisors might be obliged to make a specific reference to this effect in individual customer consultations. The provision of realistic final value calculations for different investment horizons might also provide the investor with more clarity.

The insights from the present study are also relevant when it comes to designing German school curricula: basic mathematical and statistical knowledge acquired in school could help individuals to better evaluate economic processes in later life. Students should learn, for example, what the properties of the median value of a distribution are and how the value is calculated. Exponential growth processes should also feature more prominently in classes—whether to help students make better investment decisions, correctly assess credit offers, or independently and critically evaluate macroeconomic growth processes such as inflation and economic growth later in life.

SOEPpapers 659/2014

Stefan Bauernschuster, Oliver Falck



## Culture, Spatial Diffusion of Ideas and their Long-Lasting Imprints: Evidence from Froebel's Kindergarten Movement

We document the spatial diffusion of Friedrich Froebel's radical invention of kindergartens in 19th-century Germany. The first kindergarten was founded at Froebel's birthplace. Early spatial diffusion can be explained by cultural proximity, measured by historical dialect similarity, to Froebel's birthplace. This result is robust to the inclusion of higher order polynomials in geographic distance and similarity measures with respect to industry, geography or religion. Our findings suggest that a common cultural basis facilitates the spill-over of ideas. We further show that the contemporaneous spatial pattern of child care coverage is still correlated with cultural similarity

to Froebel's place of birth.

JEL-Classification: N33;J13;Z13

Keywords: Culture, spatial diffusion, public child care.

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Discussion Papers 1390/2014  
Dorothea Schäfer, Susan Steiner



## Financial Development and Employment: Evidence from Transition Countries

This paper studies the association between a country's level of financial development and firms' employment growth. We employ an incomplete contract model for evaluating this association. The model proposes that a high level of financial development affects the employment of firms with low managerial capital negatively, while firms with high managerial capital benefit from a more developed financial system. We test this proposition with data from the Business Environment and Enterprise Performance Survey covering transition countries in Eastern Europe and Central Asia. We use firm size as a proxy for managerial capital. Our findings confirm a non-linear effect of financial development on firm employment. Specifically, the smallest firms' edge in employment growth over large firms is dampened when the level of financial development is higher, especially in countries at medium levels of financial development.

JEL-Classification: G20;G28;G30;J30

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