

Income Redistribution



REPORT by Stefan Bach, Markus Grabka and Erik Tomasch

**Tax and Transfer System:
Considerable Redistribution Mainly Via Social Insurance** 103

INTERVIEW with Stefan Bach

»Redistribution Reduces Inequality in Household Incomes« 112

REPORT by Carsten Schroeder, C. Katharina Spieß and Johanna Storck

**Private Spending on Children's Education:
Low-Income Families Pay Relatively More** 113

Publishers

Prof. Dr. Pio Baake
Prof. Dr. Tomaso Duso
Dr. Ferdinand Fichtner
Prof. Marcel Fratzscher, Ph.D.
Prof. Dr. Peter Haan
Prof. Dr. Claudia Kemfert
Dr. Kati Krähnert
Prof. Karsten Neuhoff, Ph.D.
Prof. Dr. Jürgen Schupp
Prof. Dr. C. Katharina Spieß
Prof. Dr. Gert G. Wagner

Editors in chief

Sabine Fiedler
Dr. Kurt Geppert

Editorial staff

Renate Bogdanovic
Andreas Harasser
Sebastian Kollmann
Dr. Claudia Lambert
Dr. Anika Rasner
Dr. WolfPeter Schill

Translation

HLTW Übersetzungen GbR
team@hlw.de

Layout and Composition

eScriptum GmbH & Co KG, Berlin

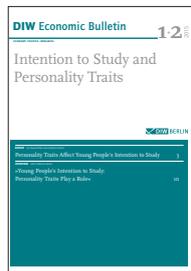
Press office

Renate Bogdanovic
Tel. +49-30-89789-249
presse@diw.de

Sale and distribution

DIW Berlin

Reprint and further distribution – including extracts – with complete reference and consignment of a specimen copy to DIW Berlin's Communication Department (kundenservice@diw.berlin) only.
Printed on 100 % recycled paper.



The DIW Economic Bulletin contains selected articles and interviews from the DIW Wochenbericht in English. As the institute's flagship publication, the DIW Wochenbericht provides an independent view on the economic development in Germany and the world, addressing the media as well as leaders in politics, business and society.

The DIW Economic Bulletin is published weekly and available as a free download from DIW Berlin's website.

THE NEWSLETTER FROM THE INSTITUTE



The DIW Newsletter in English provides the latest news, publications and events from the institute every two weeks. Furthermore we offer 'New Issue Alerts' for the DIW Economic Bulletin and the DIW Roundup.

>> Subscribe to DIW Newsletter in English at: www.diw.de/en/newsletter

NEXT WEEK IN DIW ECONOMIC BULLETIN

Aircraft Noise, Well-Being and Health

Tax and Transfer System: Considerable Redistribution Mainly Via Social Insurance

By Stefan Bach, Markus Grabka and Erik Tomasch

Overall monetary redistribution via the tax and transfer system leads to net incomes being much more evenly distributed in Germany than market income. As a result, in 2011, the Gini coefficient decreased from 0.5 for market income to 0.29 for household disposable income. The social security system has a significant share in total income redistribution by the government, making up more than half of the inequality reduction. As far as there are equivalent insurance contributions for social security benefits, there is, however, no redistribution between individuals or generations over time.

This shows that, in terms of how well public transfers are targeted, the most financially needy households are benefitting most from means-tested basic social security payments. Other public benefits such as the child benefit, however, are granted to all income groups. It was primarily the upper income brackets that benefitted from the now expired housing support for owner-occupiers (*Eigenheimzulage*).

The German tax and transfer system redistributes citizens' income effectively. Taxes and social security contributions redirect a share of generated income into government coffers, a substantial portion of which is given directly to citizens in the form of monetary government benefits. In international terms, Germany is regarded as a country with a high level of income redistribution by the government.¹ This is primarily due to its broad-based social security systems that lead to intra- and intergenerational redistribution. Social security benefits, for which equivalent insurance contributions are levied (retirement pensions from statutory pension insurance (*gesetzliche Rentenversicherung, GRV*), unemployment benefit), however, are not ultimately redistributed between individuals or generations over time.

In this study, we examine the redistributive effects of the German tax and transfer system on individual households. First, the study will show the overall economic dimensions of all social security benefits based on Germany's national accounts from 2005 to 2013.² Then, the impact of monetary social benefits on personal income distribution is analyzed using data from the Socio-Economic Panel (SOEP) study collected on behalf of DIW Berlin by TNS Infratest Sozialforschung.³

¹ See OECD, *Growing Unequal? Income Distribution and Poverty in OECD Countries* (2008); Scientific Advisory Board at the Federal Ministry of Finance, *Besteuerung von Vermögen – eine finanzwissenschaftliche Analyse* (2013); Judith Niehues, "Staatliche Umverteilung in der Europäischen Union," *IW-Trends*, no. 1 (2013); OECD *StatExtracts, Income Distribution and Poverty*, 2014.

² Here, calculations of the national accounts from May 2014 are used, prior to German national accounts being revised in line with the European System of Accounts 2010 (ESA 2010).

³ SOEP is a representative longitudinal survey of individual households conducted annually in West Germany since 1984 and in eastern Germany since 1990, see G. G. Wagner, J. Göbel, P. Krause, R. Pischner, and I. Sieber, "Das Sozio-ökonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland – Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender)," *ASTA Wirtschafts- und Sozialstatistisches Archiv*, vol. 2, no. 4 (2008): 301–328.

Government Redistribution from a Macroeconomic Perspective

Social spending plays a dominant role on the expenditure side of Germany's national budget. In 2013, monetary and non-monetary social benefits provided by the government made up 24 percent of gross domestic product (GDP), a total of 665 billion euros. This represents more than half of all government spending. Monetary social benefits alone total 16 percent of GDP or more than one-third of all government expenditure.

In Germany, taxes and social security contributions make up 90 percent of government revenues (see Table 1). In international comparison, the aggregate tax rate is rather low at 23.5 percent of GDP (2013).⁴ In contrast, social security contributions paid to the government amounting to almost 17 percent of GDP (2013) are instrumental in financing social security in Germany. Including social security contributions to private funded social security schemes (see below), social security contributions actually make up 20 percent of GDP.

In addition, Table 1 shows the direct monetary redistribution of income via social security benefits, direct taxes, social security contributions, and other transfers at the individual household level. The present study considers solely monetary redistribution and its distributional effects, rather than non-monetary social benefits, i.e., primarily public health services provided by government authorities and public health insurance.

Monetary social benefits in the national accounts include both government benefits and social security payments made by employers and private funded security systems. Overall, they increase household income by 18 percent of GDP (2013), equivalent to 490 billion euros.

The largest item is monetary social security benefits at almost 11 percent of GDP. The majority of this share is spent on public pensions, the remainder goes on wage-replacement benefits for unemployment and health insurance, and statutory accident and nursing benefits, which are included in the item "Other". Since 2005, the share of monetary social security benefits in GDP has declined by two percentage points from 12.9 percent to 10.9 percent.

Monetary social security benefits from government authorities include means-tested basic social security benefits, including housing benefits and training grants.

These also include family-related benefits, such as child benefit and parental allowance.⁵

The national accounts record the following employer-side and private funded security scheme benefits: benefits from company pension schemes, additional funded pensions (Riester pension), the civil pension scheme, pension plans for the self-employed, as well as private health and long-term care insurance. These benefits account for a good four percent of GDP.

The share of total monetary social security benefits in GDP fell slightly during the observation period 2005 to 2013. This development was largely due to the relative decline in pension spending. Unemployment benefits have also dropped considerably in line with this trend. Here, the significant decrease in unemployment since 2005 comes into play. These developments were only briefly interrupted by the impact of the financial and economic crisis of 2009/10 and the unemployment and short-time working benefits that had to be paid as a result. The disposable incomes of individual households are reduced by income tax and other direct taxes and contributions, which, most recently (2013), accounted for 9.4 percent of GDP and have increased in recent years. At the same time, total social security contributions (including employer contributions, contributions to private funded social security systems, and imputed social security contributions for civil servants) have remained constant at 20 percent of GDP, with employer-side social security contributions and those to private funded social security systems gaining in importance somewhat.

Including other paid and received transfers, which, in addition to private transfers such as life insurance payments and premiums or cross-border credit transfers, encompass other government grants and support programs or fines, the disposable income of individual households in 2013 was just under 63 percent of GDP. Notwithstanding a brief interruption by the economic crisis of 2009/10, this proportion has declined in recent years, because social security benefits (in particular, pension and unemployment insurance payments) have fallen and direct taxes have increased.

⁵ In the national accounts, child benefit is only recorded as a social security benefit to the extent that it exceeds the fictitious tax relief effect of allowances for dependent children in income tax assessment. Here, total child benefit (2013: 38.5 billion euros) is divided into family support components (18 billion euros) and a tax exemption component (20.5 billion euros), which reduces income tax revenues; see Norbert R ath i.a., "Revision der Volkswirtschaftlichen Gesamtrechnungen 2011 f ur den Zeitraum 1991 bis 2010," Federal Statistical Office, Economic and Statistics (September 2011): 862 ff.; Federal Ministry of Finance, Datensammlung zur Steuerpolitik 2013 (2011): 49.

⁴ See OECD, Revenue Statistics 1965-2013, Paris (2014).

INCOME REDISTRIBUTION

Table 1

Revenue and expenditure of general government and primary income, disposable income of households in national accounts as percent of gross domestic product (GDP)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenue and expenditure of general government									
Expenditure	46.9	45.3	43.5	44.1	48.3	47.9	45.2	44.7	44.5
Social benefits other than social transfers in kind	18.5	17.7	16.5	16.3	18.0	17.2	16.3	16.1	16.1
Social benefits in kind	7.5	7.4	7.3	7.5	8.3	8.1	7.9	8.0	8.2
Subsidies	1.1	1.1	1.0	1.0	1.2	1.2	1.0	0.9	0.9
Other	19.7	19.1	18.6	19.2	20.8	21.3	19.9	19.6	19.3
Revenue	43.6	43.7	43.7	44.0	45.2	43.7	44.3	44.8	44.7
Taxes	21.9	22.6	23.5	23.7	23.5	22.4	23.1	23.6	23.6
Taxes on products	10.8	10.8	11.3	11.2	11.8	11.3	11.5	11.4	11.3
Taxes on income, other current taxes	11.1	11.9	12.2	12.4	11.8	11.2	11.7	12.1	12.4
Social contributions	17.9	17.3	16.5	16.5	17.3	16.9	16.7	16.8	16.8
Other	3.9	3.7	3.7	3.8	4.4	4.4	4.5	4.4	4.3
Primary income of households and redistribution by social benefits of the government and private funded security systems, current taxes on income and wealth, social contributions									
Primary income	73.7	73.4	72.0	73.3	74.7	73.1	73.4	74.1	74.1
Compensation of employees	51.1	50.0	48.9	49.7	51.9	50.9	50.8	51.7	51.7
Property and entrepreneurial income	22.6	23.5	23.2	23.6	22.8	22.2	22.6	22.4	22.3
Social benefits other than social transfers in kind, received	19.8	19.0	17.7	17.6	19.9	19.1	18.1	18.0	17.9
Social security benefits of statutory social insurance	12.9	12.1	11.3	11.1	12.2	11.6	11.0	10.9	10.9
Pensions	10.2	9.8	9.4	9.4	10.0	9.6	9.3	9.2	9.1
Unemployment benefit	1.3	1.0	0.7	0.6	0.8	0.7	0.6	0.5	0.6
Cash benefits of health insurance	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
Other	1.1	1.0	0.9	0.9	1.1	1.0	0.9	0.8	0.8
Social benefits of government bodies	3.3	3.3	3.0	2.9	3.3	3.2	2.9	2.8	2.8
Social assistance	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Social assistance for unemployed	1.1	1.2	1.0	0.9	1.0	0.9	0.8	0.7	0.7
Other	1.3	1.2	1.1	1.1	1.4	1.3	1.3	1.2	1.2
Private funded social benefits and unfunded employee social benefits	3.6	3.6	3.4	3.5	4.4	4.3	4.2	4.2	4.2
Company pensions	1.3	1.3	1.2	1.3	1.3	1.3	1.2	1.2	1.2
Civil servants' pensions	2.0	1.9	1.9	1.9	2.1	2.1	2.0	2.0	2.1
Other	0.3	0.3	0.3	0.3	1.0	0.9	0.9	0.9	0.9
Current taxes on income, wealth, etc., paid	8.3	8.6	8.9	9.3	9.4	8.6	8.7	9.1	9.4
Taxes on income	8.0	8.2	8.6	9.0	9.1	8.3	8.4	8.8	9.1
Other current taxes	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Social contributions, paid	20.1	19.7	18.9	19.1	20.8	20.3	20.1	20.2	20.1
thereof: paid to private funded social benefits	2.2	2.4	2.3	2.6	3.4	3.4	3.3	3.3	3.2
Balance of other transfers paid and received	-0.1	-0.1	-0.2	-0.2	0.2	0.1	0.1	0.2	0.2
Disposable income	65.1	64.0	61.9	62.3	64.6	63.4	62.9	63.0	62.7
<i>For information:</i>									
Revenue of statutory pension insurance	10.7	10.2	10.1	10.1	10.6	10.3	10.1	10.0	9.8
thereof:									
Actual social contributions	7.0	6.8	6.8	6.8	7.2	7.0	6.9	6.9	6.7
Transfers from the government	3.6	3.4	3.3	3.2	3.4	3.3	3.1	3.1	3.0
Revenue of statutory unemployment insurance	2.4	2.3	1.8	1.6	1.5	1.8	1.5	1.5	1.3
thereof:									
Actual social contributions	2.2	2.1	1.4	1.1	1.0	1.0	1.0	1.0	1.1
Transfers from the government	0.2	0.2	0.4	0.5	0.5	0.7	0.5	0.4	0.2
Gross domestic product, billion euros	2 224	2 314	2 429	2 474	2 374	2 495	2 610	2 666	2 738

Source: Federal Statistical Office, national accounts, calculations of May 2014.

© DIW Berlin 2015

Current income tax and social contributions account for 90 percent of government revenue

Overall, around 11 percent of GDP are redistributed at individual household level through the balance of public and private transfers, direct taxes, and social securi-

ty contributions. For the most part, this is down to the government's tax and transfer system, since the transfer relationships between individual households and

Box

Income Concepts and Components

The following income components have been identified in the analysis of personal income distribution and redistribution outlined here:

- *Market income* includes all earned and capital income. This includes profits from self-employment, capital income including the rental value of owner-occupied dwellings, and compensation of employees including employer-side social security contributions.¹
- *Gross income* also includes government and private transfers. These are divided into the following:
 - *Private pensions and private transfers* comprise private pensions and company pensions as well as maintenance payments between individuals and other private transfers.²
 - *Monetary social benefits* from the government are subdivided into insurance benefits, means-tested basic social security transfers and other transfers.
 - *Insurance benefits* consist of government and private pension income and wage replacement benefits. This includes statutory pensions, civil servants' pensions, private pensions, company pensions, income replacement benefits from social security insurance and from private insurance, i.e., unemployment benefit and nursing allowance. What these benefits have in common is that, in the past, they were mostly paid for by contributions, whereas benefits from statutory social insurance are also partly financed by taxes.
 - *Other transfers* comprise government transfers not including social security. This covers family benefits, such as child and parental allowance as well as student grants, scholarships, and housing support for owner-occupiers.
 - *Means-tested basic social security transfers* incorporate basic social security benefits (unemployment benefit II, social assistance, social assistance for elderly, income support, additional child benefit, maintenance allowance) and housing benefit. These benefits are intended to secure material livelihoods and are only paid out in case of need.
- *Net income* or disposable household income is derived by deducting income tax and social security contributions from gross income.

¹ Social security contributions to private funded social security systems and imputed lied social security contributions for civil servants' have been disregarded.

² Military and community service pay is allocated to private transfers.

companies (as part of private funded security systems, or non-life insurance) or transfers from abroad carry far less weight quantitatively, and received and paid transfers are broadly balanced. Since 2005, total net redistribution has increased in relation to GDP because social security benefits have declined, while the income tax burden has risen and social security contributions have remained constant.

Impact of the Tax and Transfer System on Personal Income Distribution

The effects of the tax and transfer system on personal income distribution were analyzed on the basis of survey data from the Socio-Economic Panel (SOEP) study for the income year 2011. Only monetary transfers, not non-monetary benefits of social security or other government services were analyzed here.⁶ In the SOEP

⁶ Representing the effects of non-monetary transfers is difficult due to the challenges of quantifying these different types of transfers and attributing them to individuals. Additionally, the corresponding data in the SOEP study relating to these types of transfers is not available in full.

study, household income is recorded in a detailed form, broken down into individual components. Statements made by respondents in the 2012 SOEP study refer to the previous year's income, i.e., to 2011. To process the data, burdens from personal income tax and social security contributions are estimated using a differentiated microsimulation model based on data set information.⁷

The most significant components of monetary government benefits are recorded in the SOEP study (see Box). These are subdivided into insurance benefits, mean-tested basic security transfers, and other transfers in order to analyze the redistributive effects of the various social and economic policy functions. Social security contributions to employer-side and funded security systems and imputed social security contributions for civil servants have been disregarded.

⁷ See J. Schwarze, "Simulation German income and social security tax payments using SOEP," Cross-National Studies in Aging Program, project paper no. 19 (Syracuse, 1995).

Table 2

Income of private households and redistribution by the tax and transfer system 2011

Decile net household equivalent income	Market income ¹	Private pension and transfers ²	Monetary social benefits			Gross income	Social security contributions	Personal income tax	Net income
			Insurance benefits ³	Other transfers ⁴	Means-tested transfers ⁵				
billion euros									
1. Decile	19.9	2.7	16.7	5.5	13.0	57.0	7.5	0.1	49.4
2. Decile	43.8	2.6	29.1	6.3	6.6	86.8	17.5	1.2	68.0
3. Decile	63.3	2.6	35.9	5.2	4.0	110.0	25.0	3.4	81.6
4. Decile	87.1	3.1	32.8	5.6	2.2	129.7	32.5	6.5	90.7
5. Decile	103.5	3.3	34.0	4.9	2.1	149.2	37.3	9.7	102.2
6. Decile	142.5	3.0	26.4	5.6	1.9	178.8	47.6	16.0	115.2
7. Decile	170.6	4.3	27.7	5.0	0.7	207.7	54.7	21.9	131.1
8. Decile	203.2	4.6	30.0	4.9	1.2	245.2	62.6	31.1	151.5
9. Decile	269.4	5.2	29.9	3.9	0.5	303.9	73.4	48.1	182.5
10. Decile	447.0	13.2	33.2	4.1	1.0	495.2	76.4	113.2	305.5
Total	1 550.3	44.6	295.9	50.9	33.4	1 963.4	434.5	251.2	1 277.8
structure in percent									
1. Decile	1.3	6.1	5.7	10.8	39.0	2.9	1.7	0.0	3.9
2. Decile	2.8	5.9	9.8	12.3	19.8	4.4	4.0	0.5	5.3
3. Decile	4.1	5.8	12.1	10.2	12.1	5.6	5.8	1.3	6.4
4. Decile	5.6	7.0	11.1	11.0	6.7	6.6	7.5	2.6	7.1
5. Decile	6.7	7.4	11.5	9.7	6.4	7.6	8.6	3.8	8.0
6. Decile	9.2	6.6	8.9	10.9	5.8	9.1	11.0	6.4	9.0
7. Decile	11.0	9.6	9.4	9.7	2.2	10.6	12.6	8.7	10.3
8. Decile	13.1	10.4	10.2	9.6	3.6	12.5	14.4	12.4	11.9
9. Decile	17.4	11.7	10.1	7.6	1.5	15.5	16.9	19.1	14.3
10. Decile	28.8	29.6	11.2	8.1	3.0	25.2	17.6	45.1	23.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Income distribution measures⁶									
Gini	0.50	<i>0.49</i>	<i>0.38</i>	<i>0.37</i>		0.35	<i>0.35</i>		0.29
GE(1) (Theil)	0.46	<i>0.43</i>	<i>0.26</i>	<i>0.24</i>		0.22	<i>0.23</i>		0.16
GE(0) (mld)	0.65	<i>0.57</i>	<i>0.27</i>	<i>0.24</i>		0.21	<i>0.20</i>		0.14

1 Wage income + business income + capital income including imputed rent of owner-occupied dwelling.

2 Private pension + company pension + alimony and other transfers + military and community service pay.

3 Statutory pension + social miners insurance/civil servant/farmer/statutory accident insurance.

4 Child allowance + parental allowance + student grants and scholarships + housing support for owner-occupiers.

5 Unemployment benefit II + unemployment assistance + social assistance + housing benefit + additional child benefit + maintenance allowance.

6 Based on equivalized measurements. italic intermediate results refer to income including the foregoing transfers respectively taxes.

Source: Calculations based on wave 2012 of the Socio-Economic Panel (SOEP), Distribution v29.

Income concentration is the highest for market income.

Table 2 shows the personal income distribution and redistribution (see Box for detailed income components) from market income to gross income (including transfers) to net income (less income tax and social security contributions) by income decile. The population is arranged in ascending order according to net household equivalent income⁸ and divided into ten equal groups

(deciles). Distribution measures are additionally calculated for the individual income components.

As expected, market income has the highest concentration. The lower income deciles mostly comprise unemployed persons with no or only limited earned or capital income. Equally, 29 percent of total market income

8 For this purpose, all earned and capital income, including the rental value of owner-occupied dwellings, and all the household's government and private transfer payments are summarized for the individual households; income tax and social security contributions are then deducted from these figures. Next, a

needs-weighted per capita income is calculated for each household according to the standard international needs scale ("modified OECD scale"). Accordingly, the householder receives a needs weighting of 1, any subsequent adult each have a weighting of 0.5, while children up to 14 years are given a weighting of 0.3.

is found in the upper income decile. The (equivalized) Gini coefficient of market income is 0.50. The income share of the bottom two deciles is higher for private pensions and transfers than for market income. This is because the lower deciles are largely populated by individuals of retirement age. If private pensions and transfers are added to market income, the measured inequality is only slightly lower.

As already demonstrated, insurance-related benefits have a dominant weighting in the government's transfer system. Unlike market income, these transfers are largely evenly distributed across the needs-weighted household net income deciles; only in the lowest decile is their share below average. Due to the extensive equivalence principle in social security insurance, the amount of benefits received largely depends on contributions paid, so higher contributions mean larger pensions. However, benefits are restricted due to the contribution assessment ceiling. Accordingly, compared to market income, insurance-related social security benefits are far lower in the upper deciles than in the lower income groups. As a result of this "progressive" redistributive effect and the high volume of insurance-related social security benefits, the Gini coefficient of market income, which is higher due to insurance benefits and private pensions and transfers, decreases to 0.38.

As far as there are equivalent insurance contributions for social security benefits, there is, however, no redistribution between individuals or generations over time. Nevertheless, a significant degree of statutory social security benefits are financed through federal grants. In recent years, in fact, these grants made up just under one-third of revenue from pension insurance, and a good tenth of unemployment insurance (see Table 1). As a result, a corresponding proportion of benefits is financed by taxes and must therefore be attributed to the core areas of the tax and transfer system.⁹

Other transfers are considerably lower in volume. Since they are not means-tested, they do not trigger strong redistributive effects. They are also distributed fairly equally across the deciles, with slightly higher shares in the lower income groups and lower shares in the higher income deciles. This is mainly due to the high importance of family-related benefits among these transfers, particularly for child benefit. A high redistributive impact from top to bottom, on the other hand, can be seen in basic social security benefits granted in needy cases only. This occurs predominantly in the lowest in-

come decile and has no appreciable significance above the median income.¹⁰

Thanks to these transfers, the distribution of gross income is considerably more uniform than the distribution of market income. The Gini coefficient is reduced to 0.35. These transfers substantially increase market income in the bottom half of the income distribution. This effect is lessens as income increases. For middle income groups and above, income shares for gross income are lower than for market income.

Social security contributions and income tax reduce the disposable income of individual households. While social security contributions do not cause any appreciable redistribution as these tend to be regressive once the contribution ceiling is reached, personal income tax, in particular, is highly progressive. For this reason, higher incomes are subject to greater income tax burdens. The top decile accounts for 45 percent of total income tax revenue. Overall, the Gini coefficient is reduced to 0.29 for net income.

The redistributive effects of the tax and transfer system lead to a far more uniform distribution of net income compared to market income. While the lower income groups' income share increases up to the sixth decile, in the upper deciles it decreases progressively. In other words: the lower 60 percent of income distribution receive money on balance from the government, whereas the top 40 percent pay money to the government on balance. This does not include non-monetary transfers by the government, although their distribution impact is not likely to be fundamentally different from the effects observed here.¹¹

Additionally, our breakdown of the individual components shows that the redistributive effect of the German tax and transfer system is reduced considerably if only basic security benefits, social security contributions and income taxes are included. This is because, insurance benefits from statutory social security are especially important to the redistribution of market income. The Gini coefficient of market income extended to include corresponding insurance benefits is only 0.38, compared with

⁹ See the in-depth analysis by I. Stolz, *Einkommensumverteilung in der Bundesrepublik Deutschland. Eine theoretische und empirische Untersuchung* (Campus, 1983).

¹⁰ Shares in the upper deciles are either measurement errors or refer to individuals who only drew benefits in the previous year on a monthly pro rata basis. Additionally, a differentiation must be made between communities of dependence that are eligible for means-tested basic social security benefits and individual households, because a community of dependence may exist within an individual household, for instance an elderly person eligible for basic social security who lives in a household with his or her adult children.

¹¹ The situation is quite different with public assistance, e.g., for cultural institutions that disproportionately benefit upper income earners. The last comprehensive quantification of the various government transfers was conducted under the direction of DIW Berlin President, Hans-Jürgen Krupp, as part of the Transfer Enquete Commission (1981).

Table 3

Insurance benefits of statutory social security and civil servant pensions 2011

Decile net household equivalent income	Statutory pension ¹		Civil servant pension (own pension)	Unemployment benefit	Nursing allowance	Other ²
	Own pension	Widow/orphans pension				
billion euros						
1. Decile	13.29	2.39	2.45	0.64	0.10	0.30
2. Decile	23.28	4.18		0.67	0.36	0.52
3. Decile	28.64	4.97		0.98	0.70	0.28
4. Decile	25.58	3.84		1.23	0.40	0.75
5. Decile	27.52	3.38	2.05	0.75	0.67	0.80
6. Decile	19.63	2.26		0.54	1.26	0.69
7. Decile	17.82	2.88	4.75	0.66	0.29	1.33
8. Decile	17.41	1.72	8.63	0.89	0.56	0.84
9. Decile	14.21	1.52	11.75	0.50	0.65	1.28
10. Decile	14.98	0.82	14.98	0.75	0.50	1.13
Total	202.36	27.97	44.61	7.59	5.49	7.91
structure in percent						
1. Decile	6.6	8.6	5.5	8.4	1.9	3.7
2. Decile	11.5	14.9		8.8	6.6	6.5
3. Decile	14.2	17.8		12.8	12.7	3.6
4. Decile	12.6	13.7		16.1	7.2	9.4
5. Decile	13.6	12.1	4.6	9.8	12.1	10.1
6. Decile	9.7	8.1		7.2	23.0	8.7
7. Decile	8.8	10.3	10.7	8.6	5.3	16.8
8. Decile	8.6	6.1	19.3	11.7	10.2	10.6
9. Decile	7.0	5.4	26.3	6.6	11.9	16.2
10. Decile	7.4	2.9	33.6	9.9	9.2	14.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

1 Including social miners insurance pension and farmer pension.

2 Statutory accident insurance pension (including widows/orphans statutory accident insurance) + subsistence allowance + widows/orphans civil servant pension.

Source: Calculations based on wave 2012 of the Socio-Economic Panel (SOEP), Distribution v29.

Statutory pensions mainly paid to lower and middle class households, civil servants' pensions to high incomes.

0.50 for market income only. Total redistribution up to net income, with a Gini coefficient of 0.29, is therefore reduced by 0.12 points of the Gini coefficient, which corresponds to 58 percent based on the total redistribution of 0.21 points of the Gini coefficient from market income up to net income. The redistribution of the remaining 0.09 points of the Gini coefficient, or 42 percent of the total redistribution volume is mainly due to means-tested basic social security transfers and the progressive income tax. Other transfers and social security contributions, for their part, barely affect relative income distribution.

Civil Servants' Pensions Primarily in the Top Third of the Distribution

The structure of insurance benefits indicates that statutory pensions benefit the middle and lower half of the income distribution because older people are located primarily in these areas of the income hierarchy (see

Table 3). In contrast, civil servants' pensions are found mainly in the upper third of the income distribution. This is explained by the fact that average civil servants' pensions are considerably higher than statutory insurance pensions. Other insurance benefits, such as unemployment benefit, nursing allowance, and other additional transfers are distributed much more evenly across the entire population.

Child Benefit Widespread Throughout the Population

Child benefit is assigned to other government benefits (see Table 4). It is granted regardless of the financial means of the parents and is distributed correspondingly evenly across all income groups.¹² Conversely, the amount of parental allowance is dependent on the in-

12 The share is slightly higher in the first four deciles because there are many family households in these deciles.

Table 4

Other transfers 2011

Decile net household equivalent income	Child allowance	Parental allowance	Students grants	Housing support for owner-occupiers	Other ¹
billion euros					
1. Decile	4.15	0.31	0.88	0.07	0.10
2. Decile	4.80	0.32	0.92	0.01	0.22
3. Decile	4.02	0.35	0.66	0.13	0.04
4. Decile	4.15	0.68	0.43	0.12	0.24
5. Decile	3.77	0.50	0.16	0.24	0.24
6. Decile	3.94	0.82	0.45	0.32	0.03
7. Decile	3.48	0.62	0.51	0.22	0.12
8. Decile	3.41	0.58	0.37	0.45	0.08
9. Decile	3.02	0.30	0.18	0.36	0.04
10. Decile	3.12	0.57	0.06	0.34	0.03
Total	37.86	5.05	4.60	2.26	1.13
structure in percent					
1. Decile	11.0	6.1	19.0	3.2	8.4
2. Decile	12.7	6.2	19.9	0.5	19.2
3. Decile	10.6	7.0	14.3	5.9	3.9
4. Decile	11.0	13.4	9.4	5.1	21.2
5. Decile	10.0	10.0	3.5	10.6	21.2
6. Decile	10.4	16.2	9.8	14.1	2.6
7. Decile	9.2	12.2	11.0	9.8	10.8
8. Decile	9.0	11.6	8.0	19.8	6.7
9. Decile	8.0	5.9	3.9	15.8	3.6
10. Decile	8.2	11.4	1.2	15.3	2.3
Total	100.0	100.0	100.0	100.0	100.0

¹ Advanced child maintenance payment + widows/orhans wacvictim pension.

Source: Calculations based on wave 2012 of the Socio-Economic Panel (SOEP), Distribution v29.

© DIW Berlin 2015

Middle class households mainly benefit from the parental allowance.

come earned before the birth of a child;¹³ accordingly, the middle class profits from this benefit above average. In contrast, student grants (*Bafög*) and scholarships primarily benefit the lower half of the income distribution. For *Bafög*, this is due to means testing. The grant scheme for housing support of owner-occupiers (*Eigenheimzulage*), which expired in 2006 but which can still be drawn by entitled households for up to eight years, is found mainly in the upper half of the income distribution. Means-testing was carried out for these transfers to a limited extent only, since married couples with positive income of up to 140 000 euros (plus 30 000 euros per child) were also eligible for these grants.

¹³ Parents with a taxable income of 500 000 euros or more are no longer entitled to parental allowance.

Basic Social Security Benefits Targeted to the Needy

Means-tested basic social security benefits are only granted once the financial circumstances of the individuals or households (communities of dependence) have been suitably checked and those individuals or households are deemed eligible for social assistance. Hence, more than 40 percent of housing benefit or unemployment benefit II, for instance, is found in the first income decile (see Table 5). If we look at the first three deciles, almost 80 percent of these transfers were made to this population group. Despite the majority of social assistance and social assistance for the elderly being paid out to the lower half of the income distribution, a number of transfer recipients can also be found in the upper half. This can probably be explained by the fact that individual households may comprise various communities of dependence that do not have a direct financial obligation towards one another, such as adult children who live in the same household with needs-entitled parents.

Conclusion

Monetary and non-monetary social security benefits paid by the government made up 24 percent of GDP (2013), a total of 665 billion euros. Compared to 2005, this share has fallen by two percentage points. Since 2005, total income redistribution has increased in relation to GDP because monetary social security benefits have declined, while the income tax burden rose and social security contributions remained constant in relation to GDP.

Overall, the monetary redistributive effects of the tax and transfer system have led to a far more uniform distribution of net income compared to market income. As a result, in 2011, the (equivalence-weighted) Gini coefficient fell from 0.5 for market income to 0.29 for household disposable income. The social security system makes up a considerable share of overall government redistribution because more than half of the reduction in inequality is due to social security benefits. Although there are equivalent insurance contributions for these benefits, there is, however, ultimately no redistribution between individuals or generations over time. This does not apply to “non-contribution-backed benefits”, i.e., social security benefits for which no corresponding contributions were levied. These are financed for the most part by government grants that, in turn, are funded by general tax revenues. Overall, the redistributive effect of the German tax and transfer system is reduced considerably if only basic social security benefits, social security contributions and income taxes are included.

Government redistribution measures in the form of non-monetary transfers and indirect taxes are not included in the net incomes analyzed here. Since the latter have a regressive burden effect on current income, i.e., the lower income groups are burdened relatively more than the upper income groups,¹⁴ the redistributive impact of the tax and transfer system is reduced slightly.

In addition to the overall redistributive effect, there is also the issue of how accurately government transfers are targeted. If these only benefit the financially needy, only the lowest deciles are likely to receive these transfers. Child benefit, however, is widespread across the entire population. It was primarily the upper income groups that benefitted from the (now expired) housing support for owner-occupiers (*Eigenheimzulage*).

Attention should be focused on the aspects of accurately targeting social mobility and equal opportunities, since these objectives may not necessarily be achieved by purely monetary means. In fact, child care and the education system play an important role in increasing equal opportunities long-term, promoting upward mobility, and reducing inequality.

¹⁴ B. Beimann, R. Kambeck, T. Kasten, and L.H. Siemers, "Wer trägt den Staat? Eine Analyse von Steuer- und Abgabenlasten," RWI position, no. 43 (April 1, 2011); OECD, "The distributional effects of consumption taxes in OECD countries," OECD Tax Policy Studies, no. 22 (2011).

Stefan Bach is Research Associate in the Public Economics Department at DIW Berlin | sbach@diw.de

Markus Grabka is Research Associate in the Research Infrastructure Socio-Economic Panel (SOEP) at DIW Berlin | mgrabka@diw.de

JEL: H24, H55, D31

Keywords: Redistribution of taxes and transfers, income distribution, SOEP

Table 5

Means-tested transfers 2011

Decile net household equivalent income	Housing benefit	Social assistance	Social assistance for elderly	Unemployment benefit II + additional child benefit
billion euros				
1. Decile	0.85	0.39	0.96	10.80
2. Decile	0.53	0.23	0.41	5.42
3. Decile	0.21	0.43	0.36	3.02
4. Decile	0.14	0.18	0.52	1.41
5. Decile	0.17	} 0.99	0.52	1.08
6. Decile	} 0.13		0.55	1.06
7. Decile			0.14	0.44
8. Decile			0.48	0.54
9. Decile		} 0.90	} 0.51	
10. Decile				
Total	2.02	2.22	4.83	24.29
structure in percent				
1. Decile	41.9	17.8	19.8	44.5
2. Decile	26.1	10.5	8.4	22.3
3. Decile	10.5	19.2	7.5	12.4
4. Decile	6.7	7.9	10.8	5.8
5. Decile	8.3	} 44.6	10.7	4.4
6. Decile	} 6.6		11.5	4.4
7. Decile			2.9	1.8
8. Decile			9.9	2.2
9. Decile		} 18.6	} 2.1	
10. Decile				
Total	100.0	100.0	100.0	100.0

Source: Calculations based on wave 2012 of the Socio-Economic Panel (SOEP), Distribution v29.

© DIW Berlin 2015

Means-tested basic social security payments benefit the low income households.

Erik Tomasch is Student Assistant in the Public Economics Department at DIW Berlin | etomasch@diw.de



Dr. Stefan Bach, Research Associate
in the Public Economics Department
at DIW Berlin

SIX QUESTIONS TO STEFAN BACH

»Redistribution Reduces Inequality in Household Incomes«

1. Dr. Bach, you have analyzed the impact of Germany's tax and transfer system on income redistribution. How are incomes distributed in Germany? Market income, in other words earned or capital income, is very unevenly distributed. The distribution of gross income (market income plus transfers such as pensions) also remains relatively imbalanced. Social security contributions and income tax are yet to be deducted from this income. But since income tax, in particular, has a highly progressive impact and is increasingly paid by the wealthier members of society, the distribution of net incomes is much more homogeneous. On balance, this means that the poorest 60 percent of the population receive money from the government and the richest 40 percent pay money to the government.
2. How large is the redistributive effect of the government tax and transfer system on households? If we use the Gini coefficient as a measure of inequality, Germany has a high level of income redistribution. For market income, this measure displays a relatively high inequality value of 0.5; the corresponding value for household disposable income is as low as 0.29. What is also clear, however, is that a substantial share of this redistribution is the result of the statutory pension system. In Germany, statutory pension insurance involves employees paying contributions over the course of their working lives which they then receive back when they retire in the form of pension payments. In this sense, it is an insurance which, when calculated over a lifetime, does not result in any appreciable redistribution. If this dimension is removed from the overall redistributive effect of the government tax and transfer system, total state redistribution is reduced by approximately half.
3. What are the most important benefits in the government transfer system? From a macroeconomic perspective, statutory pension benefits account for the largest share of government social security benefits. In the long term, though, this form of insurance does not have a significant redistributive effect insofar as the population has paid contributions for these benefits in the past. However, part of pension insurance falls under what are known as non-contribution-backed benefits which do not require contributions and are consequently part of the state redistribution system. Further, basic social security, which includes basic unemployment benefit II and social assistance for elderly also have a major redistributive effect as they are funded by tax revenues.
4. What percentage of GDP is spent on government transfers each year? Government transfer payments are the biggest item in Germany's entire national budget. Every year they account for 18 percent of GDP. This includes non-monetary government benefits within the social security system, such as healthcare. This clearly shows how important social welfare is to the national economy.
5. How have social security benefits developed in recent years? Social security benefits have remained relatively constant in relation to GDP. This is linked to the dominance of pension insurance. Of course there are certain natural fluctuations over the economic cycle. However, since Germany recovered quickly from the last major economic crisis following the global financial crisis, the impact on social security benefits was minimal.
6. How well targeted are state transfers? Do they really benefit those who actually need them? Unemployment benefit II and social assistance for elderly are of course carefully tailored to ensure that they reach the poor. Needs testing is used to help achieve this. In addition, there are also transfers such as child benefit or care allowance. Whether or not these benefits always actually achieve family policy aims is disputed, however.

Interview by Erich Wittenberg

Private Spending on Children's Education: Low-Income Families Pay Relatively More

By Carsten Schroeder, C. Katharina Spieß and Johanna Storck

Education is not financed solely by the taxpayer—many institutions and activities require payment of top-up fees, at the very least. This applies for instance to education and care services for children. A household's private expenditure on education depends largely on the families' available financial resources. However, to date, very little research has been conducted on the relationship between income and expenditure on education. The present study by DIW Berlin is based on data from the Socio-Economic Panel (SOEP) study and the SOEP-related study, Families in Germany (Familien in Deutschland, FiD) for 2012. The present work analyzes private spending on various educational provisions such as child daycare services, private schools, or non-formal educational programs, i.e. sports clubs or music schools. The findings of the study indicate that, of the families who actually spend money on their children's education, it is the low-income households that use a higher share of their household budget for this purpose—this applies both to overall education expenditure and to spending on individual educational services. However, if we consider all family households in Germany, higher-income families spend more on education, both in absolute and relative terms. Furthermore, it also holds true that the younger the children, the higher the share of the household's income spent on education. More progressive fee scales could help reducing expenditure burdens of low-income families and support children to make full use of their educational potentials.

In Germany, a total of 176 billion euros was spent on education in 2011.¹ Approximately 80 percent of this was from public funding, i.e., from central, *Länder*, or local governments, and the remaining 20 percent came from private sources, i.e., individual households, companies, and private non-profit organizations. These private stakeholders contribute a particularly high share of funding for early childhood education, i.e., education and care services for children not yet in compulsory schooling (around 21 percent), and for vocational education (around 41 percent). In the school sector and in tertiary education (mainly universities), on the other hand, the share of private funding is considerably lower.²

Official statistics do not present a particularly detailed picture of private spending³ on education. Consequently, very little specific information is available about the types of spending by households and the relationships between this expenditure and different household characteristics. The present study examines these relationships focusing on households with children.

Families' Education Spending Matters

For various reasons, spending on education by households with children is of particular interest. First, it is relevant from the perspective of the economics of education. This is because spending, along with time spent with children—which also has an impact on children's individual life courses—is one of the key resources that parents invest in the education of their offspring. Second, spending on education is interesting from a family budget perspective because it represents part of the costs of having children that must be covered by fami-

¹ German Federal Ministry of Education and Research, Bildung und Forschung in Zahlen (Berlin: 2014).

² Federal Statistical Office, ed., Bildungsausgaben. Budget für Bildung, Forschung und Wissenschaft 2011/12 (Wiesbaden: 2014).

³ The expressions spendings, expenditures and costs are used interchangeably.

lies' household income and competes with alternative consumer choices.⁴

Because financial resources and preferences differ across households, not all families use private educational services to the same extent. Regional differences regarding access to and availability of education as well as public funding also have an impact on consumer behavior and the level of spending. This includes regional differences concerning income-based fee scales or complete fee exemption for certain age groups.

The present study conducted by DIW Berlin examines private spending on education from a distributional perspective. The study focuses in particular on how spending on education and its share of household income (relative expenditure on education) as well as the proportion of families using fee-based educational provisions varies across income groups. As a result of differences in financial resources, it can be assumed that certain groups are less likely to be able to use educational provisions for which they have to pay for. Further, the level of expenditure among families with the same level of usage varies because of income-based fees.

Currently, there are very few systematic studies on the distribution of expenditure on education in relation to family income. Among the rare exceptions are the analyses by the Federal Statistical Office based on the German Sample Survey of Income and Expenditures (EVS), a survey conducted every five years. Data from this survey can be used to analyze families' overall and educational expenditures on children.⁵

However, the official German education reporting mainly capture private spending on formal educational provisions which, in the field of pre-primary education, includes expenditure on daycare services for pre-schoolers (*Kindergarten*) and pre-school classes, for example. Non-formal educational provisions (music, sport, and various artistic activities) as well as informal education (including spending on care providers, e.g. family daycare) are not taken into consideration. This may be because it is not always possible to clearly identify the educational nature of these provisions. If a broader definition of educational processes is applied, however, both informal and non-formal educational provisions are relevant as well.⁶ Bearing this in mind, the present report

is based on broad spending aggregates including formal, non-formal, and informal educational provisions—and consequently goes beyond expenditure captured in the education budget in the education financial report (*Bildungsfinanzbericht*)⁷ or similar studies.

Categorization of Expenditure on Education

In order to analyze families' private monthly expenditure on education, two data sets are combined to provide a representative picture of families in Germany: the Socio-Economic Panel (SOEP) study⁸ and the SOEP-related study Families in Germany (*FiD*).⁹ Both data sets (in each case from 2012 surveys) capture spending on education for all children at the household level (see Box 1). The study includes all family households—single mothers and fathers and couple households—that have at least one child under the age of 16. The expenditure of these households on education is subdivided into six categories:

- 1) Expenditure on formal education and care services for children who are not yet in compulsory schooling. This is primarily made up of costs of attendance at child daycare facilities.
- 2) Expenditure on attendance at fee-paying schools, which essentially refers to private schools.¹⁰
- 3) Expenditure on informal educational services (such as an in-home daycare provider)
- 4) Expenditure on non-formal educational activities, such as music or sports.¹¹
- 5) Expenditure on private tuition.
- 6) Total expenditure on education; this category is the sum of the first four expenditure categories.¹²

Categories (1) to (5) can only be differentiated for the households that participated in the "Families in Germany" survey (*FiD*) so the given values are based on a smaller number of cases than category (6).¹³

⁷ Federal Statistical Office, ed., *Bildungsfinanzbericht 2014* (Wiesbaden: 2014).

⁸ G. G. Wagner, J. R. Frick, and J. Schupp, "The German Socio-Economic Panel Study (SOEP): Scope, Evolution and Enhancements," *Schmollers Jahrbuch* 127 (2007): 139-169.

⁹ M. Schröder, R. Siegers, and C. K. Spieß, "Familien in Deutschland – FiD," *Schmollers Jahrbuch, Jahrbuch of Applied Social Science Studies* 133 (2013): 595-606.

¹⁰ In 2009, the share of school students attending a private school was approximately nine percent (Federal Statistical Office, "Bildung und Kultur: Private Schulen," 11 (1.1) (Wiesbaden: 2014)). This also corresponds with our data on the share of private school students. As well as the costs incurred for private school attendance, we can also assume that some parents included lunch money in the information they provided on costs incurred for attendance at publicly-funded schools. This can be inferred on the basis of other more in-depth analyses.

¹¹ Here in particular, please refer to further explanations provided in Box 1.

¹² Due to data particularities, total expenditure does not include costs incurred for private tuition.

¹³ All data are weighted.

⁴ Studies in this field examine investment in children over time. For a recent analysis on this subject see, for example, S. Kornrich and F. Furstenberg, "Investing in Children: Changes in Parental Spending on Children," *Demography* 50 (2013): 1-23.

⁵ See, for example, Federal Statistical Office, *Konsumausgaben von Familien für Kinder* (Wiesbaden: 2014).

⁶ On this see also Autorengruppe Bildungsberichterstattung, *Bildung in Deutschland 2014* (Bielefeld: 2014).

Box 1

Capturing Data on Private Expenditure for Education in the SOEP and FiD

The representative longitudinal Socio-Economic Panel (SOEP) study and the SOEP-related sample Families in Germany (*FiD*) irregularly provide data on costs incurred for the use of educational provisions at the level of the household.¹ The present study uses recent SOEP and *FiD* data from the year 2012 that include detailed information on expenditure for education. The SOEP captures data on costs incurred by households for school and childcare services as well as their children's various extracurricular activities. For each household, the SOEP records the sum of all the costs. The *FiD* sample, however, presents a more detailed picture: first, it enables us to distinguish costs incurred by households for a child's attendance at a daycare center for infants and toddlers (*Kinderkrippe*) or for pre-schools (*Kindergarten*), at a day care centers for children

of all ages (*Kindertageseinrichtung*), or at an after-school program (*Hort*). Second, it is also possible to determine the cost of a child being cared for by someone else in the household such as family day care. Third, the sample captures whether or not fees are paid for a child's schooling and if so, the monthly costs incurred. Fourth, costs of a child's extracurricular activities are calculated - information is collected on exactly the same activities as in the SOEP. For children not yet in compulsory schooling, these comprise costs for children's sport activities, early childhood music programs, or parent-child groups.² For children already attending school, this includes possible costs for sports, music, and singing lessons or participation in environmental groups.³ The *FiD* sample also captures data on the costs of extra tuition incurred over the six months preceding the date of the survey.

¹ Both data sets also capture the household's consumer expenditure in various fields in the last year. Both surveys ask how much the household spent on "education/further training." This information was captured in the SOEP for the first—and to date only—time in 2010. See M. M. Grabka, J. Marcus, and R. Siegers, "Preparation of Data from the New SOEP Consumption Module: Editing, Imputation, and Smoothing," *DIW Data Documentation* 70 (2013). The *FiD* survey captures this information annually.

² For an analysis of participation in these activities see, for example, P.S. Schober and C.K. Spiess (2013): Early Childhood Education Activities and Care Arrangements of Disadvantaged Children in Germany, in: *Child Indicators Research* (6, 709-735).

³ For school children, the activities category also includes participation in afterschool clubs which are generally free of charge, however.

The detailed analysis only takes into account families that are reasonably likely to incur the private education expenditure under consideration. Consequently, child daycare expenditure only refers to households with at least one child not yet in compulsory education and school-related expenditure only refers to households with at least one child in compulsory schooling. For the analysis of categories (3), (4), and (6), however, all households with children under the age of 16 are relevant because expenditure in these categories could be incurred by children in any age group. Spending on education is depicted along the distribution of needs-weighted net monthly household income of the families (see Box 2). The needs weighting is carried out by taking into account the differences in income needs of different household types.

Spending on Early Education and Care Services Most Relevant

The calculations show that each family in Germany with children under the age of 16 spends an average of around 93 euros per month on education (see Table 1). However, since expenditures on education is zero for almost a quarter (23 percent) of the families, average expenditures of families who do invest money in the education

of their children are markedly higher, around 120 euros. Further calculations show that families spend most on formal early education and care services: expenditure on such services accounts for almost 60 percent of total spending. Averaged across all family households, 27 percent of total spending goes toward non-formal educational provisions, i.e., leisure activities, and seven percent on fee-paying schooling and seven percent on informal education and care.

Significant Differences between Income Groups and by Number of Children

The absolute expenditure on education varies considerably between income groups, ranging from less than 50 euros per month in the lowest income quantiles to over 200 euros in the upper quantiles (see Figure 1). This systematic increase in expenditure on education is also evident for each individual expenditure category and family type. The share of families that actually incur expenditure on education also increases with income: in the lowest quantiles, approximately half of all families invest private money in their children's education whereas in the upper quantiles, the corresponding figure is 90 percent. This does not necessarily mean,

Box 2

Methodological Approach to Analyzing Expenditure on Education by Household Income

The focus of the present study is to show the relationship between absolute and relative private expenditure on education and the needs-adjusted net monthly household income of family households. The incomes of different household types are made comparable using the Organization for Economic Co-operation and Development (OECD) equivalence scale. According to the OECD modified equivalence scale, for example, a couple with one child needs 1.8 times the income of a single-person household to secure the same material standard of living for both.¹ For the present report, in order to present the distribution of expenditure on education, all households with children were sorted in ascending order of their needs-adjusted net income and divided into 20 segments (quantiles). The analyses take into account the expenditure of families

1 In order to now make the household income comparable across the different types of households, it is divided by a household-specific equivalent scale, in our case, the modified OECD scale. This ratio is referred to as needs-adjusted income. For more on the concept of needs-weighted or equivalence-weighted income, see C. Schröder and T. Bönke, "Country inequality rankings and conversion schemes," *Economics – The Open-Access, Open-Assessment E-Journal*, vol. 6 (Kiel Institute for the World Economy, 2012): 1-43 and http://www.diw.de/de/diw_01.c.411605.de/presse/diw_glossar/aequivalenzeinkommen.html.

along these income quantiles, and the results are illustrated by means of graphs.

The following values were determined for each quantile and graphically presented: (a) the absolute amount spent on education in euros per month; (b) spending relative to net household income, irrespective of whether the families actually incur costs for education or not; (c) the share of families actually incurring costs on education, and (d) spending relative to the net household income for families with expenditure in the relevant category.² The graphical analysis is restricted to education categories that can be frequently observed.

In addition to the graphical representation, the correlation between expenditure on education and the number of children is examined using a multivariate analysis. The objective of these analyses is to examine the relationship between relative spending and various household characteristics.³

2 The average shares of costs in the individual quantiles are calculated as the average across the household-specific shares of costs.

3 Tobit and OLS models are estimated. For an explanation of the methods used, see W. Greene, *Econometric Analysis*, 7th ed. (Prentice Hall, 2008).

however, that low-income families use educational provisions less frequently: particularly in the field of child daycare, families on low incomes either pay lower fees or are completely exempted.¹⁴ Moreover, some German *Länder* grant payment exemptions for entire years, particularly in the years prior to a child starting school. Around 18 percent of families with children attending a child daycare facility analyzed in the present study reported they had incurred no expenditure for use of the said services.¹⁵ In other areas, however, the relationship between take-up and costs incurred is more direct, although establishments such as publicly-funded music schools also take social aspects into account.¹⁶

14 On this, see, for example, C. K. Spiess, E. M. Berger, and O. Groh-Samberg, "Overcoming disparities and expanding access to early childhood services in Germany: Policy Considerations and Funding Options," UNICEF Innocenti Research Centre Working Paper, IWP-2008-03, (Florence, 2008).

15 This could be connected with the income-related fee scale or the fee-exempt years provided in some federal states. Since spring 2012, at the very least the preschool year in child daycare facilities is exempt from fees in Berlin, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, and Rhineland-Palatinate. See http://www.laendermonitor.de/fileadmin/content/indikatoren/datenblaetter_2013/tab.37_lr13.jpg (last updated in February 2015).

16 See, for example, http://www.musikschulen.de/medien/doks/vdm/richtlinien-des-vdm-2011_logo.pdf (last updated in February 2015).

The relative level of expenditure also increases with income, provided that all families are considered. The picture is different if only families who spend on education are taken into account: then relative spending is higher in the lower income groups.¹⁷ While the share of expenditure on education in the lower income bracket is over 4.4 percent, this drops to around 3.4 percent in the upper income groups. A corresponding correlation is evident for all types of expenditure.

One important group for distribution analysis is "income-poor" families.¹⁸ These have the most limited financial resources available to invest in education. In fact, 44 percent of this group do not spend on education at all (non-poor families: 18 percent). Overall, they also spend

17 There is a simple explanation for these apparently contradictory patterns: if all households are considered, the relative expenditure in the lower quantiles is so low because only a below-average share of these households spends money on education. Conversely, if only households actually incurring expenditure on education are taken into account, this correlation does not exist.

18 A household is considered to be income-poor if its equivalence-weighted income is less than 60 percent of median income. On this, see C. Schröder and T. Bönke, "Country inequality rankings and conversion schemes," *Economics – The Open-Access, Open-Assessment E-Journal*, vol. 6 (Kiel Institute for the World Economy, 2012): 1-43.

Table 1

Families' Monthly Expenditures on Formal, Non-Formal, and Informal Education 2012

In Euro

	All families		Families with expenditures			N
	Mean	Standard deviation	Share in percent	Mean	Standard deviation	
Expenditures on educational services—All families						
All	92.83	142.14	77.19	120.26	151.24	5 884
1 child	66.35	104.63	70.96	93.50	113.53	2 404
2 children	119.67	165.89	84.74	141.23	171.56	2 187
3 and more children	146.59	193.74	84.43	173.61	199.41	1 293
Expenditures on early formal education and care (daycare services)—Families with at least one child of daycare age¹						
All	101.21	126.50	70.12	144.34	128.83	2 072
1 child below school age	84.83	102.57	66.53	127.50	101.84	1 242
2 children below school age	131.13	152.19	76.71	170.96	152.94	703
3 and more children below school age	132.92	196.60	76.73	173.22	208.45	127
Expenditures for private (fee-paying) schools—Families with at least one school-aged child						
All	12.03	49.26	12.85	93.66	106.13	2 599
1 school-aged child	9.97	38.12	11.67	85.48	77.68	1 344
2 school-aged children	11.92	58.40	12.82	92.99	138.52	865
3 and more school-aged children	25.58	71.81	20.49	124.84	113.41	390
Expenditures on informal education—All families						
All	7.19	50.25	3.98	180.39	179.74	3 671
1 child	4.72	41.29	3.35	140.93	179.98	1 197
2 children	8.45	51.00	4.59	184.24	157.16	1 364
3 and more children	9.82	65.84	3.89	252.28	225.86	1 110
Expenditures on non-formal education / leisure-time activities—All families						
All	28.98	60.30	56.65	51.15	72.70	3 671
1 child	16.53	42.94	44.26	37.34	58.24	1 197
2 children	29.54	52.31	62.77	47.07	59.47	1 364
3+ children	58.40	96.77	70.45	82.90	106.14	1 110
Expenditures on tutoring—Families with at least one school-aged child						
All	7.31	26.53	12.71	57.53	51.53	2 599
1 school-aged child	5.52	21.56	10.45	52.85	44.27	1 344
2 school-aged children	9.64	32.73	15.41	62.58	60.53	865
3 more school-aged children	10.94	30.88	18.14	60.32	47.94	390

¹ Only families that have no child in a "Hort", a form of after-school daycare, since Hort expenditures cannot be separated from day care expenditures in the dataset.

Source: Total expenditures on education based on FiD 4.0 and SOEP v29, wave 2012; the individual expenditure categories are based on FiD v4.0, wave 2012

© DIW Berlin 2015

On average, families spend almost 93 euros per month on their children's education.

considerably less (37 euros on average) on educational provisions than non-poor family households (107 euros).

Another group of families that is of interest for distribution analysis is those with several children. In this group, expenditure on education in the lower quantiles is almost independent of the number of children, while in the upper quantiles it increases considerably with a higher number of children (see Figure 2). This finding may be explained by both income-dependent fees and different incidences of use.

Along with income and number of children, the parents' highest educational qualification is an important determi-

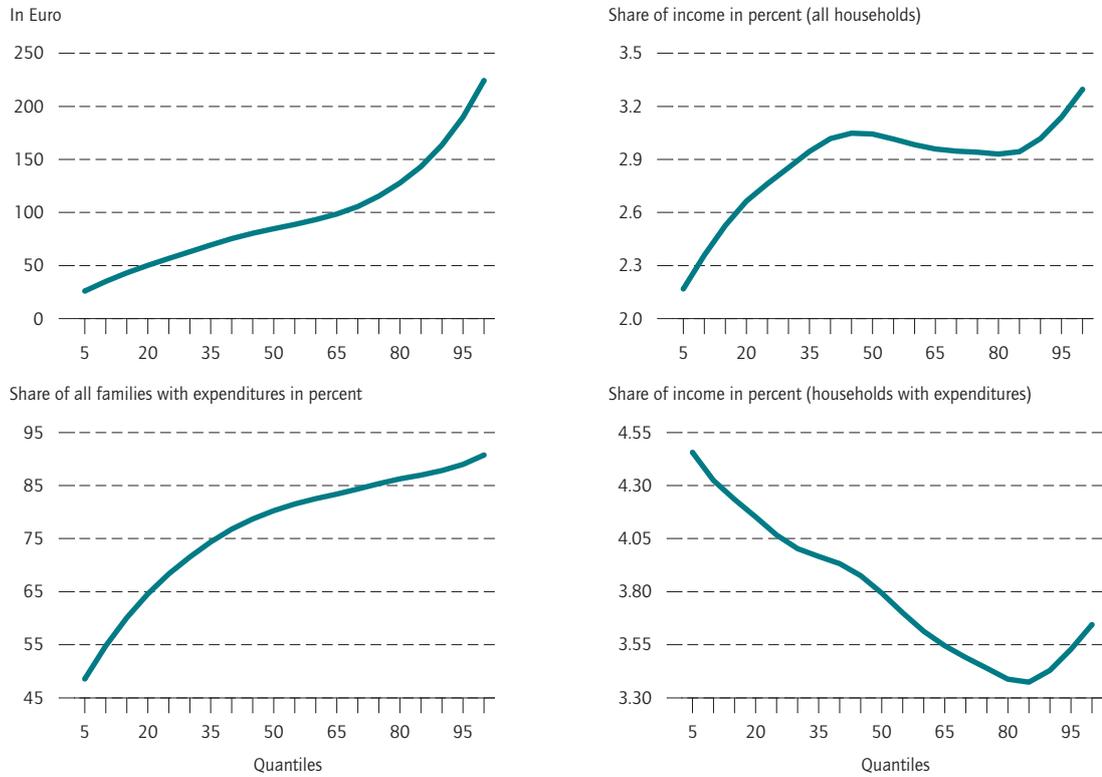
nant of expenditure on education. Families in the upper income groups in particular spend more on education if at least one parent has a university degree (see Figure 3). The impact of parental educational attainment on child-related educational expenditures can also be observed in the lower income groups, albeit to a lesser extent. The relationship is strongest for families with at least three children.

Costly Early Education and Care Services: Low-income Families Spend Relatively More

Families that actually use early education and care services spend an average of 119 euros a month on this service (see Table 2). This group also includes families

Figure 1

Families' Total Monthly Education Expenditures 2012



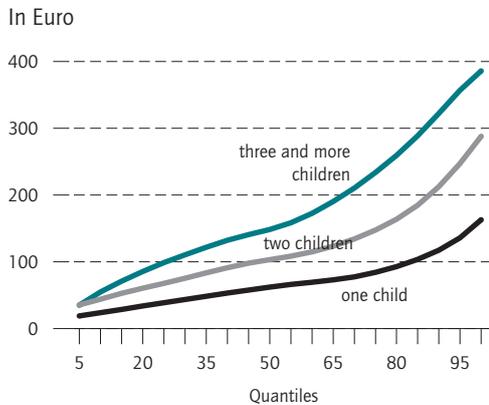
Source: FiD 4.0 and SOEP v29, wave 2012. Calculations by DIW Berlin.

© DIW Berlin 2015

Lower-income families with expenditures spend more of their income on education than higher-income families who have expenditures.

Figure 2

Families' Monthly Education Expenditures by Number of Children 2012



Source: FiD 4.0 and SOEP v29, wave 2012. Calculations by DIW Berlin.

© DIW Berlin 2015

The higher a family's income and the higher the number of children, the more they spend on education.

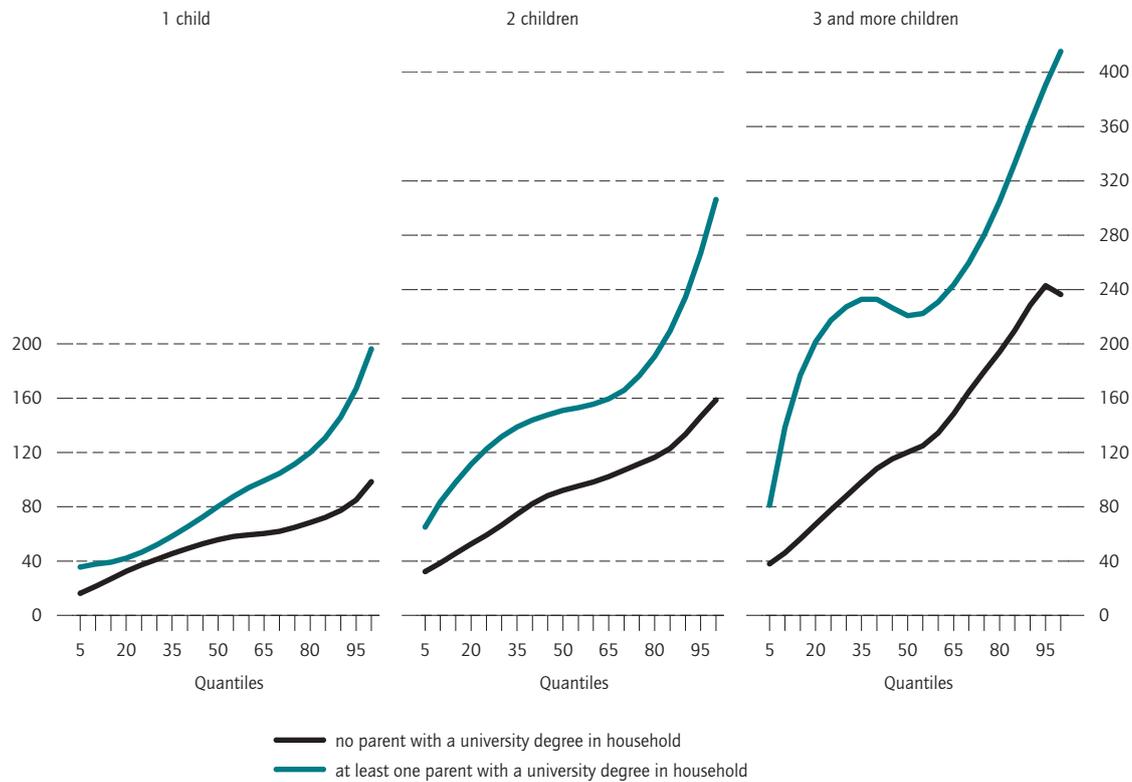
who are exempt from paying fees for such services although their children attend such an establishment. If only families spending money on early education and care services are considered, average monthly expenditure amounts to 144 euros.

In the lowest income bracket, almost 50 percent of families incur no costs for early education and care services, either because they do not use such services or because they are exempt from paying any fees. The corresponding figure for the upper income bracket is approximately ten percent of households (see Figure 4). Remarkable is the relative income share of families who incur costs for early education and care services: The lower income bracket incurs the highest relative expenditure, spending is lower (but relatively flat) across the different mid-range income groups, while spending among the ten percent of families with the highest incomes is much lower.

Figure 3

Families' Monthly Education Expenditures by Number of Children and Parental Education 2012

In Euro



Source: FiD 4.0 and SOEP v29, wave 2012. Calculations by DIW Berlin.

© DIW Berlin 2015

Even at the same income levels, university-educated parents spend more on their children's education than non-university-educated parents.

Table 2

Families' Monthly Expenditures on Early Formal Education and Care (Daycare)¹ 2012

In Euro

	All families using daycare		Families using daycare services, with expenditures			N
	Mean	Standard deviation	Share in Percent	Mean	Standard deviation	
All	119.13	129.23	82.54	144.34	128.83	1 725
1 child in daycare	101.70	99.57	81.68	124.51	96.42	1 304
2 children in daycare	195.32	186.26	86.50	225.79	182.27	386
3 and more children in daycare ²	221.62	382.84	83.23	266.28	405.80	35

1 Only families using daycare.

2 Because of the low number of cases, the results for three and more children in daycare should be interpreted with caution.

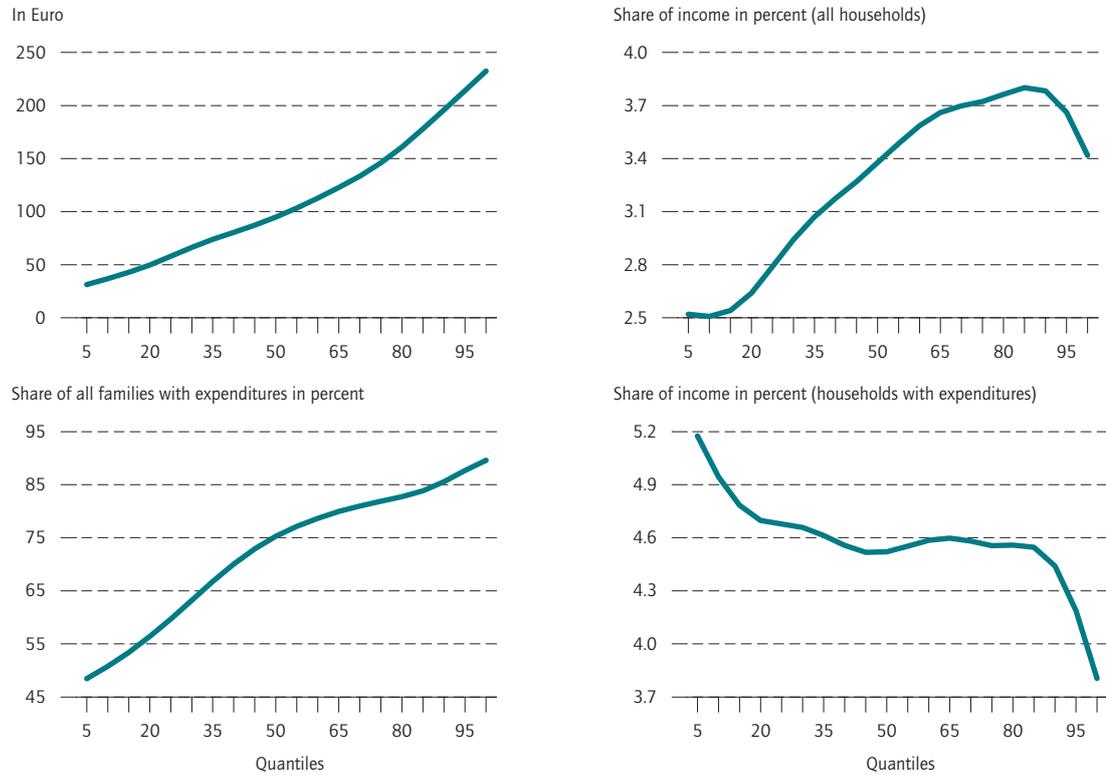
Source: FiD 4.0, wave 2012.

© DIW Berlin 2015

Around 18 percent of families with children in daycare do not have to pay anything for these services.

Figure 4

Monthly Expenditures on Early Formal Education and Childcare (Daycare) by Families with at Least One Child below School Age 2012¹



¹ Only families that have no child in a "Hort", a form of after-school daycare, since Hort expenditures cannot be separated from daycare expenditures in the dataset.

Quellen: FiD 4.0., Welle 2012; Berechnungen des DIW Berlin.

With increasing household income, the share of families that spend money on early formal education and care and the size of their expenditures increase.

Higher-Income Families More Likely to Pay for Children's Schooling

Just less than 13 percent of families with school-age children spend money on schooling (see Table 1). The share of families incurring expenditure on this is considerably higher in the upper income groups than in the lower ones: in the latter category, only around five percent of families indicate spending here, while the corresponding figure for the upper income bracket is around 25 percent.

Only four percent of families incur expenditure on informal education and care services, although they spend as much as 180 euros a month on average. The share of families who spend here increases with the level of income and amounts to almost 15 percent for the top in-

come groups. Spending relative to income, however, decreases with income (no table).¹⁹

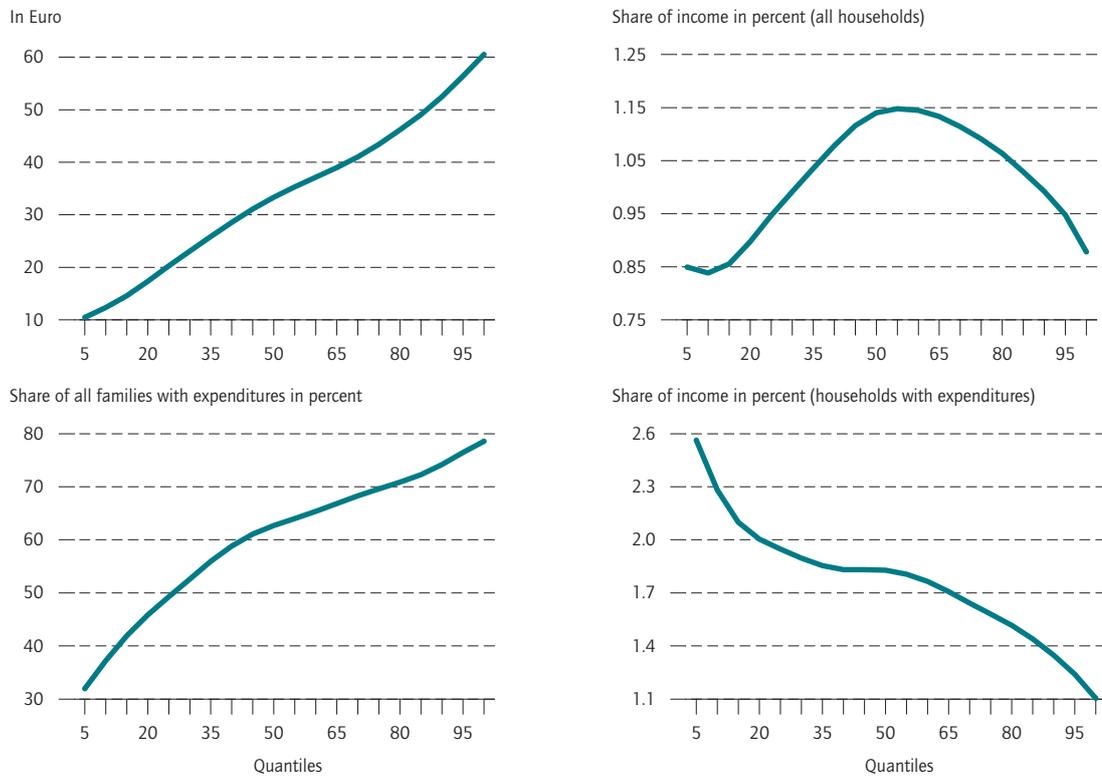
Around Half of Families Spend on Extra-Curricular Activities

Families who do in fact report expenditures for the use of non-formal educational activities outside of child daycare facilities and schools spend an average under 51 euros a month. For families with only one child, the corresponding figure is around 37 euros, although 44 percent of families with one child spend nothing at all in this area. The share of those who have such expenditures increases

¹⁹ Lower income quantiles spend an average of around nine percent of their income on this, while the corresponding figure for the upper income groups is between four and five percent.

Figure 5

Families' Monthly Expenditures on Non-Formal Education / Leisure Activities 2012



Source: FiD 4.0., wave 2012. Calculations by DIW Berlin

© DIW Berlin 2015

Higher-income families spend up to six times more on leisure activities than lower-income families.

es with income: from just under 30 percent in the bottom income groups to 80 percent in the top ones (see Figure 5). However, for these families, expenditure relative to income falls across the quantiles (from 2.5 to one percent).

If families pay for private tuition for their school-age children, this amounts to a monthly average of around 57 euros per month. The share of those having the respective expenditures increases in the mid-range income groups. If private tuition is paid for, families with low incomes spend more on these services relative to their income (see Figure 6).

Families with Young Children Spend Most on Education

Multivariate analyses which take into account the influence of other characteristics which influence education expenditures confirm that the expenditure share

for education falls with income for families who actually spend money on their children's education (see Table 3, Model 2). This also applies when the number and age of children or other household characteristics are included in the analysis. If, however, all families are considered (including those with zero expenditures), the relative expenditure on education increases with income (see Table 3, Model 1). Thus our results from the graphical analysis still hold true after controlling for other factors. Both models also show that compared to families whose youngest child is of secondary school age, families with younger children spend a higher share of their income on education. This applies in particular to families whose youngest child is eligible to use early education and care services. The share of income spent increases with the number of children. In relative terms, single-parent families spend a larger share of their income on education than couple families. This also applies to families where parents living in the household are in full-time employment. For both family types, this

Figure 6

Monthly Expenditures on Tutoring by Families with at Least One School-Aged Child 2012



Source: FiD 4.0., wave 2012. Calculations by DIW Berlin

© DIW Berlin 2015

The higher a family's income, the lower the share of income spent on tutoring.

may also be explained by the fact that they are more reliant on external education and care services.

Families with at least one parent being an academic also spend more on education. This suggests that children who are privileged in any case due to their parents' higher level of education, are also more likely to be able to benefit from higher expenditure on education than children from more educationally disadvantaged parental homes—and this still applies to children from families with the same income and where the parents exhibit the same employment behavior. However, it should be taken into account that certain groups do not have to pay for using educational provisions. This still applies in particular in the context of early education and care services.

Conclusion

Families pay considerable amounts for their children's education. This is all the more true if the concept of ed-

ucation is broadly defined and in addition to spending on formal educational provisions such as early education and care services and fee-paying schools, expenditure on informal and non-formal provisions such as in-home daycare providers or sports clubs and music lessons is also included. However, even with a broad understanding of expenditure on education, on average, across all households, spending on early education and care services accounts by far the highest share of all educational expenditure. This clearly reflects the fact that families expend considerable sums on education in a phase when they frequently have a lower income due to one parent's ability to work being limited.

If a wide definition of the concept of education is used, family households in Germany spend on average up to 3.5 percent of their monthly income on their children's education. The higher the income, the higher is this share. There are two possible causes for the relatively lower share of expenditure incurred by families with lower incomes: either they use the educational provi-

sions less or they have to pay less or nothing at all for using them due to income-based fees. Indeed, relevant studies on the use of early education and care services confirm that families with very low incomes are generally less likely to use such services.²⁰

Provided that families in the lower income groups do spend money on education, however, their relative expenditure is higher than for families with more money at their disposal. This applies to expenditure for virtually all educational provisions examined in the present analysis, and to the costs for early education and care services. Although households in the lower income bracket mostly pay income-based fees, the relative spending of households paying for such daycare services in this bracket is higher than in the upper income groups.

Another finding concerns unequal educational opportunities: families whose children inherently have better educational opportunities because at least one parent has an academic qualification, for instance, also spend more on education in relative terms.

A substantial share of expenditure on education is spent on non-formal educational provisions: there is a considerable difference in expenditure of over 50 euros between families with high and low incomes. Provided that they do have expenditure in this area, low-income families also spend more in relative terms.

In conclusion, the level of private expenditure on education varies quite considerably with family income: those with a high income are more likely to spend money on education and also tend to spend more. These patterns might offer an explanation for the often debated differences in educational success of children from different parental income groups and educational backgrounds.

²⁰ See P. Schober and C. K. Spiess, "Early Childhood Education Activities and Care Arrangements of Disadvantaged Children in Germany," Child Indicators Research 6 (2013): 709-735 or P. Schober and J. Stahl, "Childcare Trends in Germany—Increasing Socio-Economic Disparities in East and West," DIW Economic Bulletin, no. 11 (2014): 51-58.

Carsten Schroeder is Deputy Head of the Research Infrastructure Socio-Economic Panel (SOEP) at DIW Berlin | cschroeder@diw.de

C. Katharina Spieß is Head of the Department Education and Family at DIW Berlin | kspiess@diw.de

JEL: D12, D39, H4, H52, I2

Keywords: education, private expenditures, income distribution, costs for children

Table 3

Relationship between Expenditures on Education Relative to Household Income and Household Characteristics

	Model 1	Model 2
	All families	Families with expenditures
	Marginal effects ¹	Coefficients ²
Household income	1.36***	-1.27***
Household income ^ 2	-0.50***	0.20*
Household income ^ 3	0.07***	-0.02
Youngest child below school age	2.79***	2.39***
Youngest child of primary school age	1.53***	0.81***
<i>Reference: Youngest child of secondary school age</i>		
Number of children in the household	0.52***	0.44***
Lone-parent household	0.86***	1.00***
<i>Reference: Couple household</i>		
Both parents work full-time	0.53***	0.50***
<i>Reference: Only one or no parent works full-time</i>		
At least one parent with university degree	2.03***	1.67***
<i>Reference: No parent with university degree</i>		
Living in East Germany	0.38**	0.31**
<i>Reference: Living in West Germany</i>		
Constant	-1.99***	2.21***
Log likelihood	-14922.926	
N	5 915	4 638

¹ Marginal effects from a censored regression model (Tobit).

² Coefficients from a linear regression model (OLS).

Significance level: * p < 0,1; ** p < 0,05; *** p < 0,01.

Source: FiD 4.0 and SOEP v29, wave 2012.

© DIW Berlin 2015

Multivariate analyses confirm that low-income households with expenditures spend more of their income on education than higher-income households.

For an education policy aiming to develop the educational potential of all children, this is an important result. In particular, a more progressive scaling of fees for early education and care services and contributions for publicly-funded sports clubs or music schools might be a useful further step for education policy in order to alleviate the burden of expenditure on education for households with lower incomes.

Johanna Storck is Research Associate in the Department Education and Family at DIW Berlin | jstorck@diw.de