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Conference Paper

Allocating Collective Expenditure: The Case of Education

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Allocating Collective Expenditure: The Case of Education*

Lukas Riedel Holger Stichnoth[†]

February 3, 2021

Preliminary and incomplete, do not quote or cite

Our conference submission has two parts. The extended abstract is based on results from the German Socio-Economic Panel (SOEP). We have recently extended the analysis to the American Community Survey (ACS). These new results are presented in a set of slides that form the second part of the submission.

Abstract

Creating distributional national accounts (DINA; e.g. Piketty, Saez, and Zucman 2018) requires the allocation of all government expenditure to individuals in order to compute their post-tax, post-transfer income. A sizeable part of government expenditure is in-kind spending, either in the form of individualized transfers (e.g., Medicare and Medicaid) or of collective consumption expenditure (e.g., education, defense, and the general legal and administrative infrastructure). Because of data limitations, the existing DINA studies allocate the collective consumption expenditure either proportionally to post-tax cash income (in which case it is distributionally neutral) or as a lump-sum transfer. In this paper we provide evidence on the way some of the collective consumption expenditure is actually distributed. We focus on public spending on education, which makes up about 5% of national income in most OECD countries. We find that, in Germany at least, education spending tends to go disproportionately to the bottom half of the post-tax cash income distribution, so the proportionality assumption adopted in the DINA literature does not work very well in the cross-section. However, this regressivity is driven by strong age effects. Moving beyond the cross-section, we find that individuals with higher lifetime earnings or better educated parents have indeed received substantially more in terms of public education spending.

Keywords: inequality, redistribution, education, in-kind transfers

JEL Codes: D31, H41, H52, I24

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Extended abstract

Motivation Creating distributional national accounts (DINA; e.g. Piketty, Saez, and Zucman 2018) requires the allocation of all government expenditure to individuals in order to compute their post-tax, post-transfer income.¹ A sizeable part of government expenditure is in-kind spending, either in the form of individualized transfers (e.g., Medicare and Medicaid) or of collective consumption expenditure (e.g., education, defense, and the general legal and administrative infrastructure).² Because of data limitations, the existing DINA studies allocate the collective consumption expenditure either proportionally to post-tax cash income (in which case it is distributionally neutral) or as a lump-sum transfer. A proportional allocation implies that, in the US in 2014, the top 10% of the post-tax income distribution receive 41% of collective expenditure, or \$44,510 per adult, compared with 18% (or \$3,927 per adult) for the bottom 50% (see Figure 1). With a lump-sum allocation, each adult would receive the same amount (\$10,909). The choice of an allocation rule has a sizeable impact on the share of national income that accrues to different parts of the distribution. In the US, the gap between the income share of the top 10% and the bottom 50% is about 10 percentage points higher with an attribution proportional to cash income than with a lump-sum attribution (see Figure 2).

Contribution In this paper we provide evidence on the way some of the collective consumption expenditure is actually distributed. We focus on public spending on education, which makes up about 5% of national income in most OECD countries. Piketty, Saez, and Zucman (2018) assign public education expenditure proportionally to post-tax cash income, but also present results from a robustness check in which they allocate the expenditure proportional to the number of kids (below age 20) who are attached to a given tax unit. We go beyond this simple check and assign expenditure based on actual attendance

¹Piketty, Saez, and Zucman (2018) create distributional national accounts for the US for both pre-tax and post-tax income. Garbinti, Goupille-Lebret, and Piketty (2018) study pre-tax inequality in France using a DINA approach, and Bozio et al. (2018) extend this to post-tax income. Using a simplified approach, Blanchet, Chancel, and Gethin (2019) create distributional national accounts for the member countries of the European Union. Piketty, Saez, and Zucman (2019) also propose a simplified DINA methodology. In a related effort, the OECD and Eurostat set up an expert group to disaggregate the household sector in the system of national accounts; see Zwiijnenburg (2019) for a comparison with the DINA approach.

²Burkhauser, Larrimore, and Simon (2012) show that the growth of median real incomes in the United States over the 1979-2007 period is 7-8 percentage points higher when the value of in-kind health benefits is included in the income measure. Piketty, Saez, and Zucman (2018) find that almost all of the real growth in the bottom 50% posttax income in the US since the 1970s is driven by in-kind health benefits. At the top of the income distribution, the impact is smaller, but still noticeable. In Auten and Splinter (2019)'s analysis, Medicare and other non-cash transfers reduce the top 1% income share by one percentage point, while government consumption (including education spending) leads to a reduction of another 0.5 percentage points.

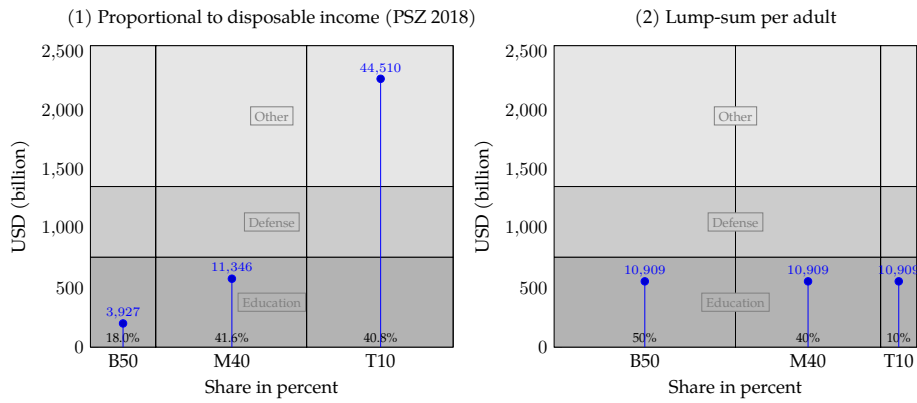


Figure 1: Two ways of allocating collective expenditure. Note: Own calculations based on Piketty, Saez, and Zucman (2018), Appendix Tables I-SA11, II-C1b.

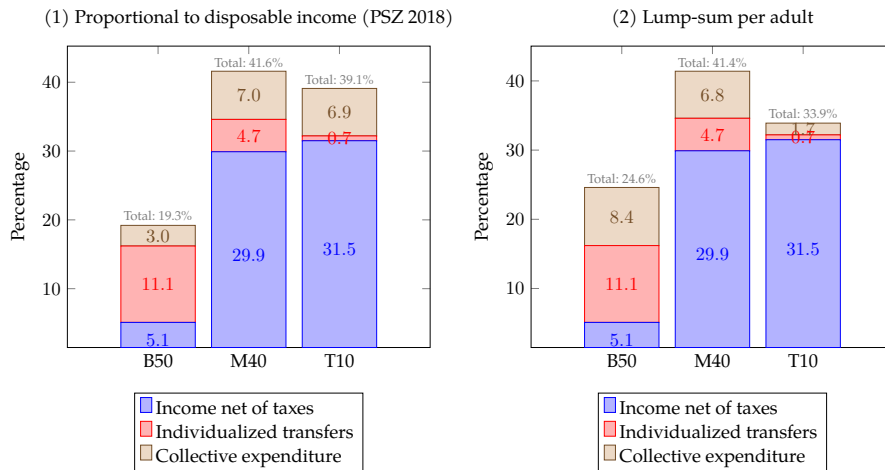


Figure 2: Allocation rules matter for total income shares. Note: Own calculations based on Piketty, Saez, and Zucman (2018), Appendix Tables I-SA11, II-C1b, II-C2, II-C3b.

of different educational institutions; we also take into account that the cost per student differs by type of institution. We first adopt a cross-sectional perspective (as in the DINA literature) and then contrast the distributional effects of public education spending in the cross-section with the effects that are found when classifying individuals based on their position in the lifetime earnings distribution (proxied for by their earnings at age 40–45) and on their parents education.

Data We study these questions in the context of Germany. Our main dataset is the 2017 wave of the German Socio-Economic Panel (SOEP), a household survey established in 1984 (Goebel et al. 2019).

Data on public spending for childcare and education is available from the German Federal Statistical Office. The differences by type of institution and by federal state are substantial (see Table 2 in the Appendix). For example, per-pupil spending in primary schools varies between €5,380 per year in North-Rhine Westphalia and €10,049 per year in Hamburg. Public expenditure per university student ranges from €5,481 per year in North-Rhine Westphalia to €8,932 per year in Thuringia.

Attribution of public education spending The SOEP has information on whether each household member currently attends a day-care center, school, or university. The German school system is organized at the level of the 16 federal states. In most states, primary school lasts four years. After these four (or, in some states, six) years, students are enrolled in one of three tracks. The highest track (*Gymnasium*) offers, after completion, direct admission to academic studies. Depending on the federal state and the year, *Gymnasium* lasts 8 or 9 years. The other two tracks only last 5 years (*Hauptschule*) or 6 years (*Realschule*) and typically prepare students for vocational training. Parents can choose the track in which they would like to enroll their child, but typically follow the recommendation of the primary school. Tertiary education is divided between universities and technical colleges (*Fachhochschulen*). Most of these institutions are public and raise only a small nominal fee. Private universities play a very small role in Germany and are excluded from the analysis.

Table 1 shows the number of students and the annual expenditure for each school type. We compare our own numbers from our sample (grossed up using the weights provided by the data producer) with the numbers from the Federal Statistical Office. The expenditure data is also compared with the figures reported in the national education accounts, a satellite account linked to the System of National Accounts. In our data, we observe about 3.8 million children age 0–6 in formal childcare. The number is very close to the 3.6 million reported

Table 1: Attendance of educational institutions: validation of SOEP numbers based on official statistics

	(1) SOEP Indi. (millions)	(2) SOEP HH. (millions)	(3) SOEP HH. (%)	(4) Destatis Indi. (millions)
Childcare	3.796	2.787	6.80	3.644
Primary school	2.472	2.154	5.26	2.796
Lower sec. school (“Hauptschule”)	0.331	0.276	0.67	0.387
Lower sec. school (“Realschule”)	1.317	1.061	2.59	0.816
Lower sec. school (“Gesamtschule”)	0.673	0.578	1.41	1.106
Higher sec. school (“Gymnasium”)	2.129	1.655	4.04	2.226
University/Technical college	2.866	1.766	4.31	2.845
Sum	13.585	10.277	18.00	13.820

Note: Own calculations based on the SOEP. Destatis = German Federal Statistical Office. HH = Households. Indi. = Individuals. Sec. = secondary.

by the Federal Statistical office. These children live in 2.8 million households, or 6.8% of all households. Overall, our survey-based numbers are very close to the numbers reported by the Federal Statistical Office. We find a total of 13.6 million individuals attending formal childcare, schools, or universities. The difference with the number reported by the Federal Statistical Office is less than 2%. For each type of institution, the difference is also typically below 5%.³

Results We find that, in Germany at least, the proportionality assumption adopted by Piketty, Saez, and Zucman (2018) and some of the other recent DINA studies for assigning collective consumption expenditure does not work very well in the cross-section. As Figure 3, shows, education spending tends to go disproportionately to the bottom half of the post-tax cash income distribution. This regressivity is strongly driven by age effects, as families with school-age children and especially university students who have left the parental household tend to receive the bulk of public education spending.

This regressive pattern is reinforced when looking not at the euro amounts received by the households, but at the ratio of education transfers over disposable income (Figure 4). In such relative terms, public in-kind spending on education reaches more than a quarter of disposable household in the bottom decile. The shares decline monotonically with income; for the richest 10% of

³The only exceptions are the “middle” secondary tracks (Realschule and Gesamtschule), where we hit the sum of the two numbers, but not the individual components. However, per-pupil expenditure is fairly similar for both school types, so the exact repartition between the two does not matter much for our analysis.

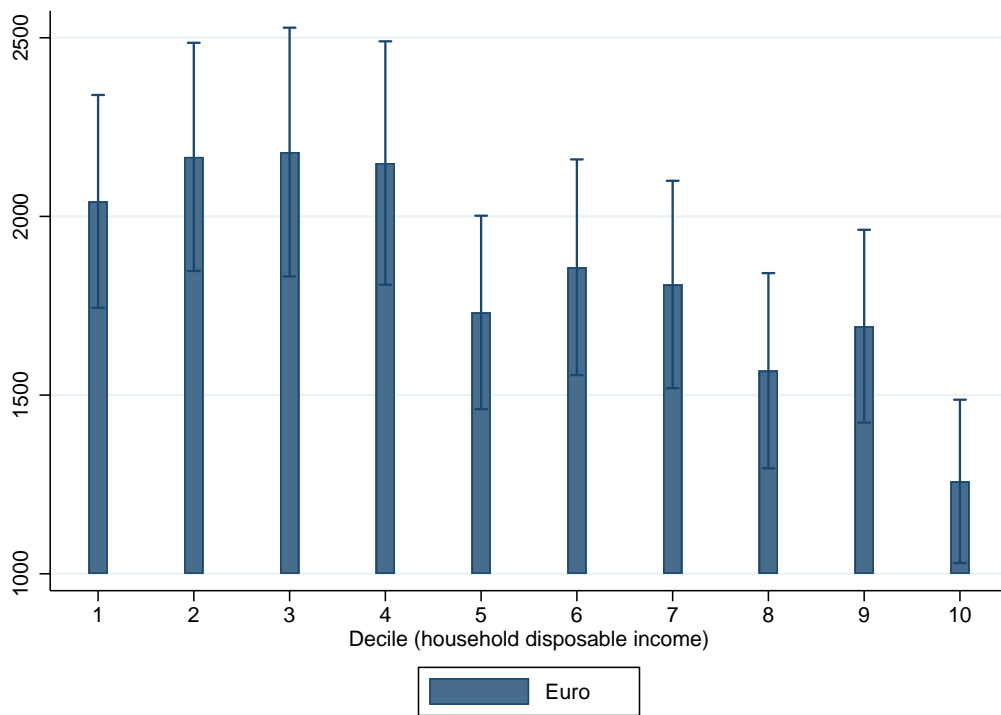


Figure 3: Education in EUR: childcare + school + university

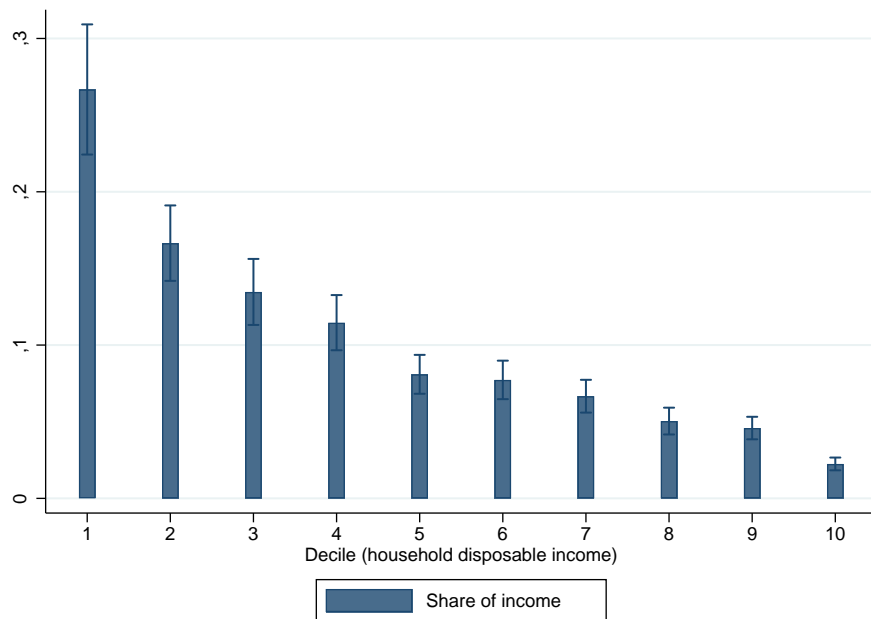


Figure 4: Education in %: childcare + school + university

households, the share is only about 2%.

From a lifecycle perspective, the picture looks very different (Figure 5). We study individuals age 40–45; at this age, current earnings are highly correlated with lifetime earnings (Bönke, Corneo, and Lüthen 2015). We find that men age 40–45 who are in the top decile of the earnings distribution tend to have received almost €39,000 more in terms of public education spending than men in the bottom decile. For women, the difference is even more pronounced (€44,000).

Finally, we adopt an intergenerational perspective and study how the value of public education spending differs by parents' education and occupation. Adults age 40–45 whose mothers attended the highest tier of Germany's three-tier system of secondary schools received about €30,000 more than children with mothers from the lowest tier. The difference in the value of education spending between children of mothers who completed college and children of mothers who did not complete any occupational training is of a similar magnitude (Figure 6). Distinguishing by the education of the father leads to differences that are a little smaller, but still sizeable.

Outlook The paper is still work in progress. We still need to translate the cross-sectional results from the household level to the individual level (adults age 20 and older) to make them comparable to the analysis by Piketty, Saez,

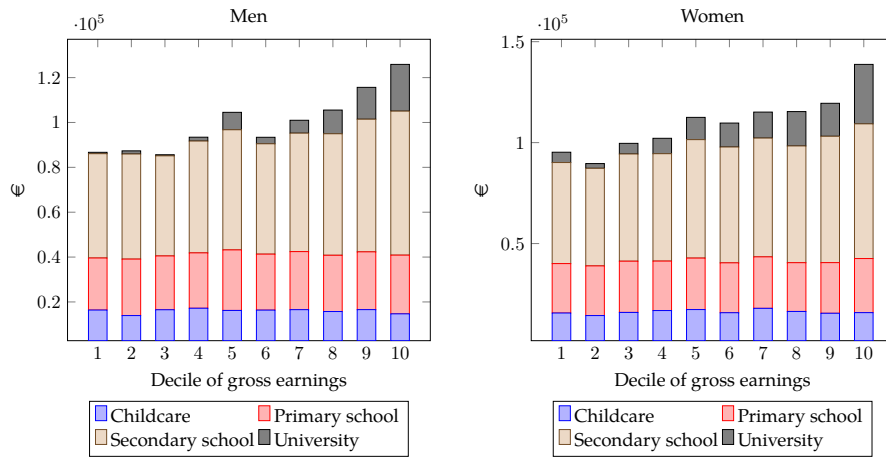


Figure 5: Individuals with higher earnings have received more public education spending. Note: Own calculations based on SOEP v.34 (2017). Individuals age 40–45.

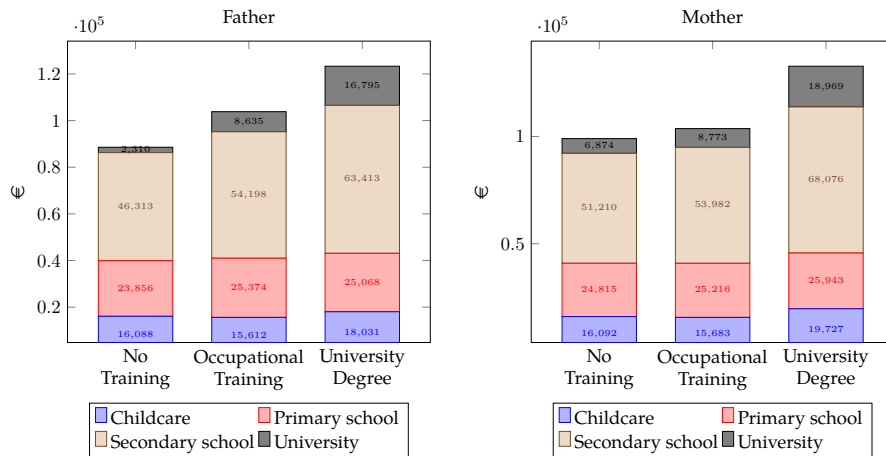


Figure 6: Individuals with better educated parents have received more public education spending. Note: Own calculations based on SOEP v.34 (2017). Individuals age 40–45.

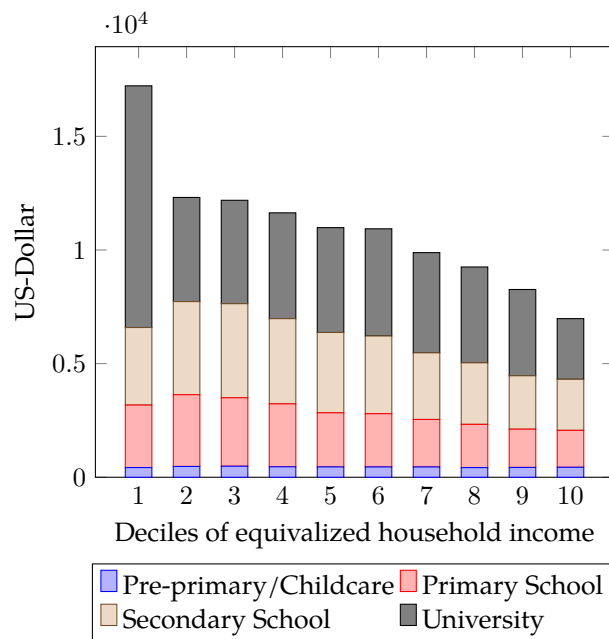


Figure 7: Education spending in the United States allocated based on actual attendance. Own calculation using the ACS 2017.

and Zucman (2018) and the other recent DINA papers.

Further, we work on bringing the analysis so far carried out for Germany to the United States. This step uses microdata from the American Community Survey that provides information on current attendance in childcare, schools and universities of all household members. With additional information on educational attainment we also look at education transfers from a lifecycle perspective⁴. First analyses confirm the overall pattern found for Germany: in a cross-sectional analysis education transfers in the US disproportionately go to the lower part of the income distribution (see figure 7). When however looking at the lifecycle we find that – as better education usually results in higher earnings – the upper part of the income distribution profits from higher education transfers over a longer period of time.

⁴This involves assuming that the rank correlation between current and lifetime income that is the highest for individuals aged 40 to 45 in Germany (Bönke, Corneo, and Lüthen 2015) follows a similar pattern in the US. Even though the ACS does not provide information on lifetime income we still can test if results change when choosing an other age range. This does not seem to be the case, giving us confidence in the validity of our analysis.

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Appendix

Table 2: Average public per-student spending (€) by federal state for the year 2017.

	Childcare	Primary school	Hauptschule	Realschule	Gesamtschule	Gymnasium	University
Schleswig-Holstein	6,962	5,684			7,613	7,004	6,395
Hamburg	9,982	10,049			10,861	9,034	8,120
Lower-Saxony	6,312	6,496		6,496	7,816	7,917	8,222
Bremen	10,163	6,598			8,932	6,699	5,989
North-Rhine Westphalia	9,169	5,380	8,425	5,481	7,613	7,308	5,481
Hesse	7,792	6,192		7,105	7,816	7,816	6,496
Rhineland-Palatinate	8,457	6,293			7,714	7,308	5,684
Baden-Württemberg	7,268	5,887	8,831	6,699	7,511	8,323	7,917
Bavaria	6,540	7,308	10,353	8,425		10,353	7,410
Saarland	6,835	6,699			7,410	7,816	7,816
Berlin	10,399	7,613			11,977	10,353	6,801
Brandenburg	5,188	5,684			8,932	7,511	7,308
Mecklenburg-Vorpommern	4,137	5,887			8,120	7,816	7,207
Saxony	4,556	5,887			7,917	8,120	8,323
Saxony-Anhalt	5,147	6,192			8,932	7,816	7,816
Thuringia	6,548	6,902			9,541	9,338	8,932

Note: Not all federal states provide all lower secondary school forms.

Allocating Collective Expenditure: The Case of Education

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Motivation (I)

- ▶ Starting point: Distributional National Accounts (DINA)

Piketty, Saez, Zucman (PSZ, 2018), Saez, Zucman (2020), Saez, Zucman (forthc.): US; Garbinti Goupille-Lebret, Piketty (2018) and Bozio Garbinti, Goupille-Lebret, Guillot, Piketty (2018): France; Blanchet, Chancel and Gethin (2019): EU; Jestl and List (2020): Austria; Bach, Bartels and Neef (in progress): Germany; Escobar, Hammar, Waldenström, Zucman (in progress): Sweden; Related effort by OECD/Eurostat to disaggregate the household sector in the SNA: Fesseau and Mattonetti (2013), Zwijnenburg, Bournot and Giovanelli (2017).

- ▶ Distributional analysis consistent with the System of National Accounts (SNA)

- ▶ Advantage: comprehensive framework to study growth and inequality which is consistent with macroeconomic data
- ▶ Disadvantage: involves a large number of assumptions

Motivation (II)

We study one part of the DINA methodology:

- ▶ DINA requires assigning **all** government expenditure to individuals
- ▶ This includes **collective expenditure**/in-kind spending
 - ▶ PSZ (2018) assign collective expenditure based on **assumptions**
- ▶ Guiding questions for this project:
 - ▶ What are the **consequences** of these assumptions?
 - ▶ Is it possible to **improve** upon them?
- ▶ Focus on education:
 - ▶ Important part of government spending ($\approx 4\text{--}5\%$ of GDP in OECD countries)
 - ▶ Short *and* long run implications for inequality

Part I

Collective Expenditure and How Piketty, Saez, Zucman Approach It

Decomposition of Transfer Income

- ▶ 50% **individualized**
- ▶ 50% **collective expenditure**
- ▶ 75% of government expenditure is **in kind**
- ▶ Contrary to PSZ (2018) we treat education as individualized in-kind spending

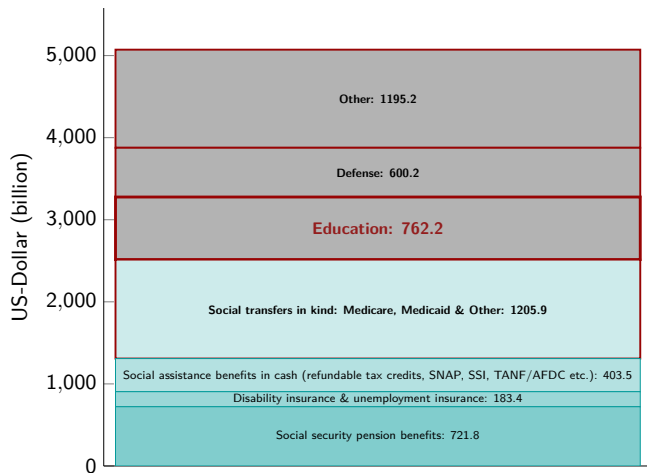


Figure 1: Categories and amount of transfer income in 2014. Own calculations based on PSZ (2018): Appendix Table I-SA11.

How to Allocate Collective Expenditure?

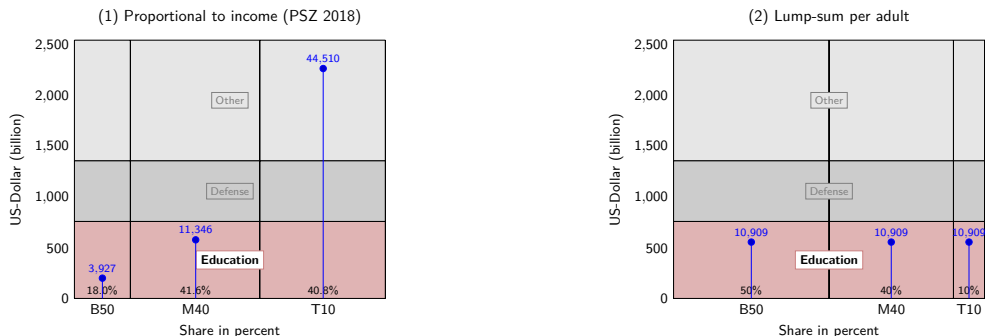


Figure 2: Different ways of allocating collective expenditure. Own calculations based on PSZ (2018), appendix tables I-SA11, II-C1b.

PSZ (2018) choose a **proportional** allocation (1):

- ▶ Generates large differences in **per-capita value**: the top 0.01% receive \$ 4 million per capita in collective expenditure with proportional allocation
- ▶ Inequality exclusively driven by income; **no redistribution** via collective expenditure

Allocation Rules Matter: Shares of *National* Income

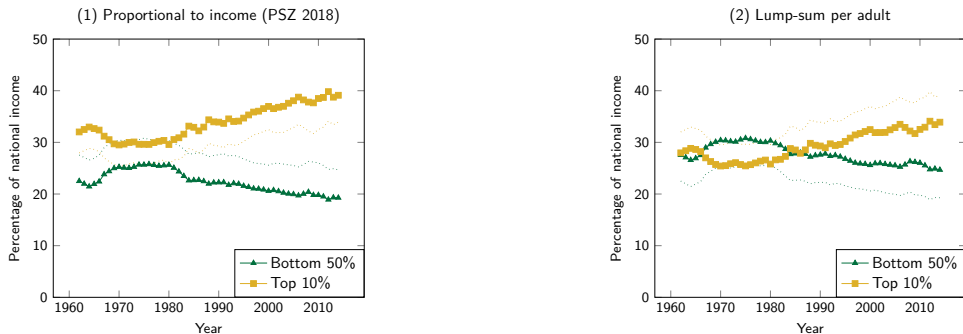


Figure 3: Trends of total income shares. Own calculations based on PSZ (2018): Appendix Tables I-SA11, II-C1b, II-C2, II-C3b.

- ▶ Lump-sum allocation shifts each line by about 5 pp in opposite directions
⇒ reduces **difference Bottom 50-Top 10** by about 10 pp
 - ▶ Proportional: 19.3%/39.1%
 - ▶ Lump-sum: 24.6%/33.9%

Allocation Rules Matter: Ratio of *Average* Incomes

Ratios of average incomes **T10/B50** in 2014:

- ▶ Proportional allocation: **10.1**
- ▶ Lump-sum allocation: **6.9**

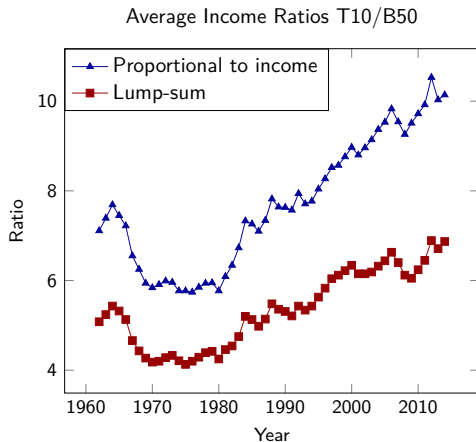


Figure 4: Trends of average income shares. Own calculations based on PSZ (2018): Appendix Tables I-SA11, II-C1b, II-C2, II-C3b.

Part II

How Collective Expenditure for Education is Actually Distributed

- ▶ Inequality is sensitive to PSZ's assumptions on allocating collective expenditure
- ▶ We show how one can improve upon these assumptions
 - ▶ Focus today: **education expenditure** in the United States
Extensions to other public in-kind spending possible: health, culture, social housing
 - ▶ **Actual distribution** of expenditure
 - ▶ Education treated as individualized transfer rather than as collective consumption
 - ▶ We adopt three perspectives:
 - ▶ In the **cross-section** (by current income, as in DINA) education spending decrease with income
 - ▶ People with higher **lifetime income** received more public education spending
 - ▶ **Intergenerational perspective**: Children of better educated parents receive more public education spending

Cross-Section: Method

- ▶ Basic ingredients:
 - ▶ Household micro-data including income and current attendance in education
 - ▶ Data on education expenditure per student and education level

- ▶ Procedure:
 - ▶ For each education level calculate number of students/users per households
 - ▶ Transfers per household = expenditure per student \times students per household

- ▶ Appropriate data is available for almost all countries; this approach does not add a large degree of complexity to the DINA approach

Cross-Section: Data

- ▶ American Community Survey, 2017
 - ▶ 3.2 M individuals in 1.4 M households
 - ▶ Median household income: \$ 57 K (pre-tax)
 - ▶ Includes info on education currently attended

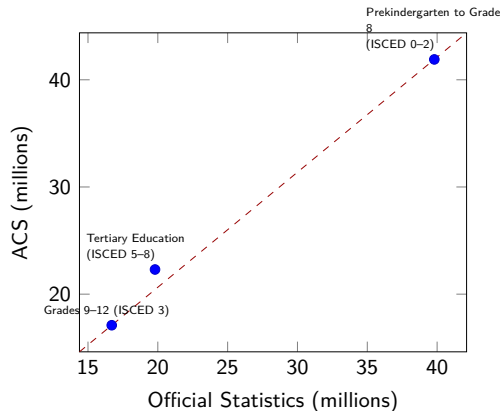


Figure 5: Attendance in educational institutions. Own calculations with ACS 2017 vs. official statistics (National Center for Education Statistics).

▶ Annual Expenditure per Student (Details)

Cross-Section: Data

- ▶ American Community Survey, 2017
 - ▶ 3.2 M individuals in 1.4 M households
 - ▶ Median household income: \$ 57 K (pre-tax)
 - ▶ Includes info on education currently attended
- ▶ Data on annual expenditure per student from the OECD, 2017
 - ▶ Primary school: \$ 12 K
 - ▶ Tertiary education: \$ 31 K

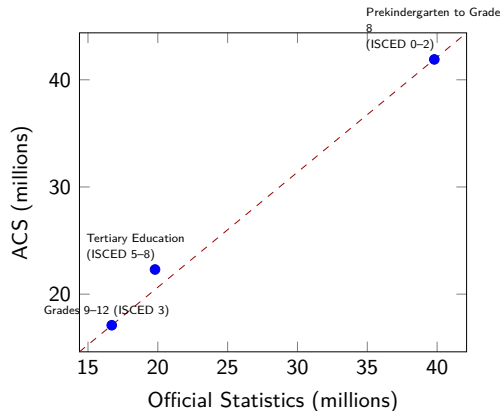
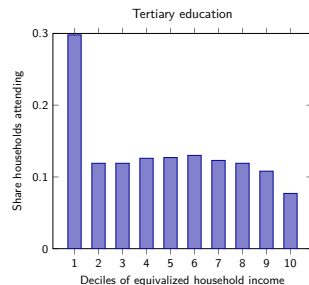
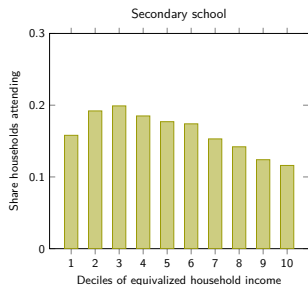
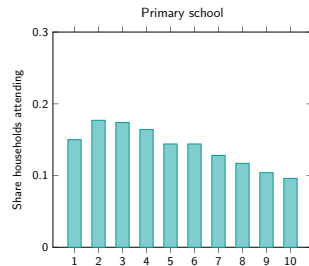
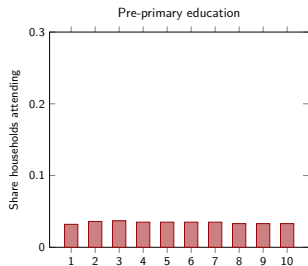


Figure 5: Attendance in educational institutions. Own calculations with ACS 2017 vs. official statistics (National Center for Education Statistics).

▶ Annual Expenditure per Student (Details)

Cross-Section: Attendance in Education by Income

- ▶ Shares of households with at least one member in pre-primary, primary, secondary and tertiary education
- ▶ Heterogeneous utilization across income distribution



Cross-Section: Bottom 50% Receive More Education Spending

- ▶ Most transfers from education go to **lower half** of the income distribution
- ▶ Average transfers received by
 - ▶ Bottom 50%: \$ 13 K
 - ▶ Middle 40%: \$ 10 K
 - ▶ Top 10%: \$ 7 K
- ▶ Reduction of Gini coefficient from
 - ▶ 0.46 (income) to
 - ▶ 0.42 (income + education spending)

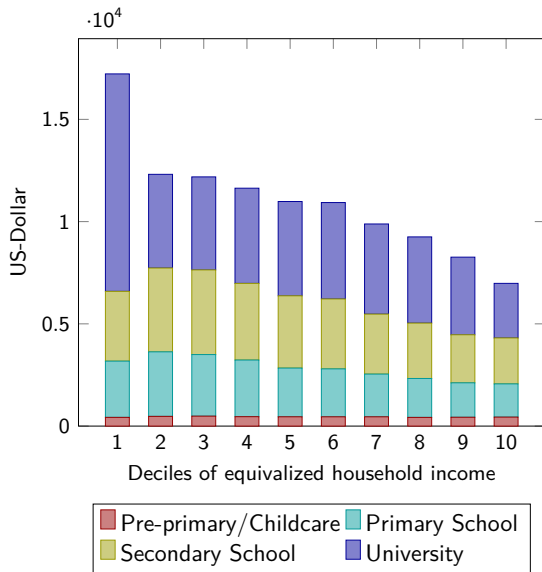


Figure 6: Education spending allocated based on actual attendance. Own calculation using the ACS 2017.

Cross-Section: Comparison of Allocation Methods

Distributions differ substantially:

- ▶ Clearly not proportional
- ▶ Lump-sum fits 2nd–7th decile

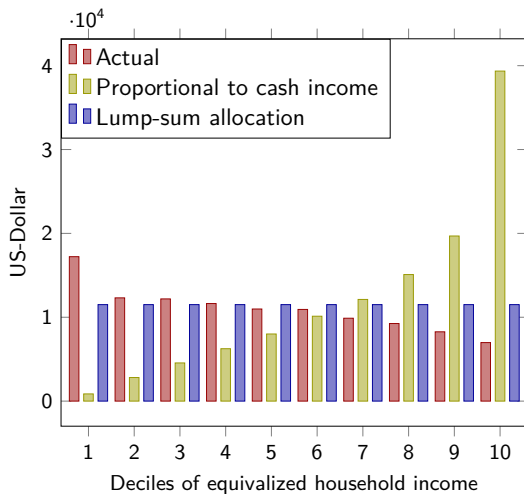


Figure 7: Education spending allocated based on actual attendance, proportional to income and as lump-sum. Own calculation using the ACS 2017.

Cross-Section: Comparison of Income Concepts

- ▶ Our approach looks at the **household** level
 - ▶ Income weighted with OECD scale
 - ▶ Accounts for differences in size and age composition
- ▶ PSZ's analysis is at the **person** level
 - ▶ Only adults (age ≥ 20)
 - ▶ Transfer income (\forall household members) split equally

Cross-Section: Comparison of Income Concepts

- ▶ Our approach looks at the **household** level
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 - ▶ Accounts for differences in size and age composition
- ▶ PSZ's analysis is at the **person** level
 - ▶ Only adults (age ≥ 20)
 - ▶ Transfer income (\forall household members) split equally
- ▶ Sensitivity check
 - ▶ Some mass shifted to upper part of the distribution
 - ▶ Tertiary education still concentrated at the bottom

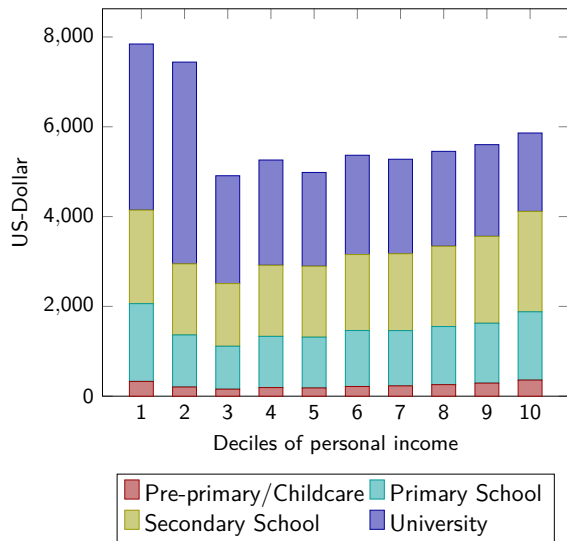


Figure 8: Education spending allocated based on actual attendance to persons, equal split among adults. Own calculation using the ACS 2017.

Cross-Section: Results Driven by Strong Age Effects

- ▶ For younger people (≤ 29) university education dominates
- ▶ When families are formed ($\approx 30-39$) childcare and primary school more important
- ▶ As children grow older they are in secondary school and, later, leave the household

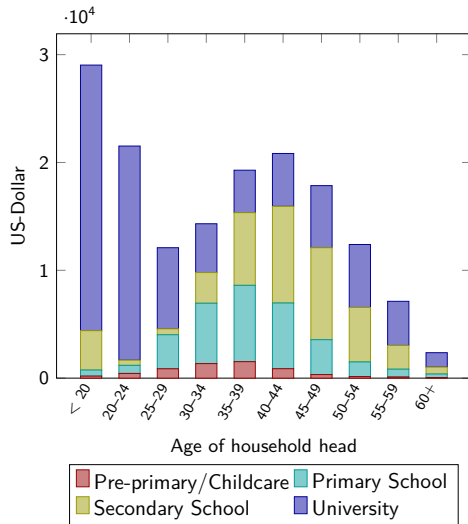


Figure 9: Education spending allocated based on actual attendance by age of household head. Own calculation using the ACS 2017.

The cross-section misses important distributional aspects:

- ▶ Income changes over the lifecycle
- ▶ Education is acquired early in life when income is low

Almost no data covers the whole lifecycle. We analyze **retrospectively** with proxies for:

1 Time spent in education

- ▶ Information on educational attainment

Assume that the highest education level implies having also attained all levels below (i.e. who has a masters degree was in high school)

- ▶ Short-cut (for now): we use *current* expenditure per student for *past* education

2 Lifetime Income

- ▶ Use **income at age 40–45**

Lifecycle-Perspective: Proxy for Lifetime Income

- ▶ Income at age 40–45 is a good proxy for lifetime income
- ▶ Germany: Bönke, Corneo, Lüthen (2015, JoLE)
- ▶ Rank correlation between current and lifetime highest between 40–45 (≈ 0.8)

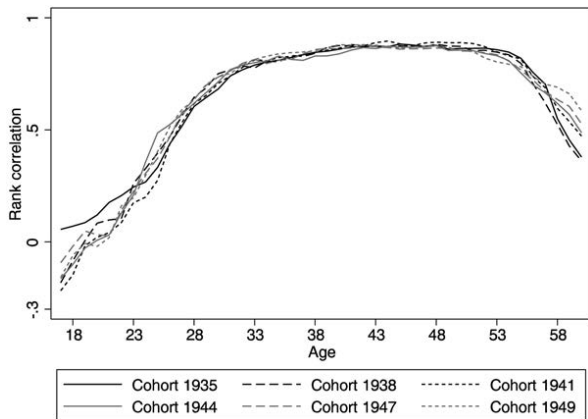


Figure 10: Rank correlation between current and lifetime income. Source: Bönke, Corneo, Lüthen (2015).

Lifecycle-Perspective: Proxy for Lifetime Income

- ▶ Income at age 40–45 is a good proxy for lifetime income
- ▶ US: Haider, Solon (2006, AER)
- ▶ Regression coefficients from

$$\ln(Y_i) = \theta \ln(Y_{it}) + \varepsilon_{it}$$

(where Y_i is lifetime and Y_{it} is annual income)

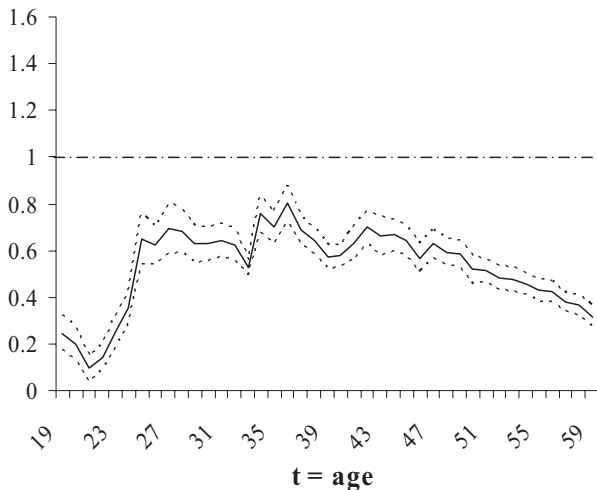


Figure 10: Regression coefficients from regressing lifetime on current income; US. Source: Haider, Solon (2006).

Lifecycle-Perspective: Proxy for Lifetime Income

- ▶ Income at age 40–45 is a good proxy for lifetime income
- ▶ Brenner (2010)
- ▶ Setup as Haider, Solon (2006) for Germany and comparison with the US and Sweden.
- ▶ Patterns similar, even in different countries.



Figure 10: Regression coefficients from regressing lifetime on current income; US, Sweden, Germany. Source: Brenner (2010).

Lifecycle-Perspective: Educational Attainment

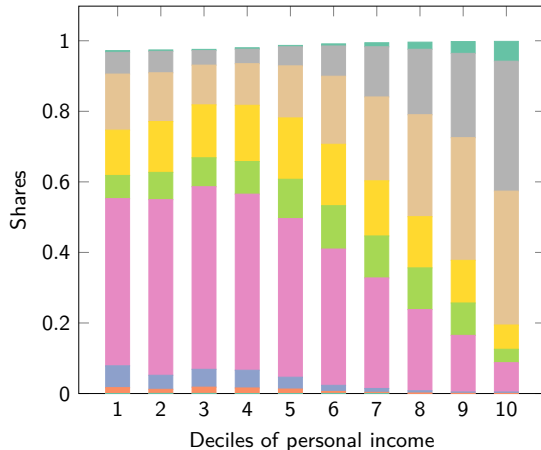


Figure 11: Educational attainment of persons aged 40–45. Own calculation using the ACS 2017.

Lifecycle-Perspective: Results

- ▶ Now, the **upper part** of the income distribution benefits more from education transfers
- ▶ Average amount for top 10% (\$ 336 K) is 1.48 times larger than for bottom 50% (\$ 227 K)
 - ▶ Corresponds to 3.5 years at university or 7.3 years at secondary school
- ▶ Assumption of a proportional allocation still rejected
 - ▶ Average share of total income in the top 10% would need to be ≈ 14 times larger than in bottom 50%

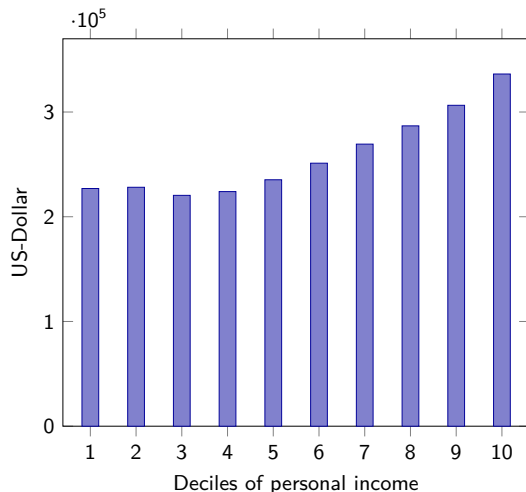


Figure 12: Education transfers for 40–45 year old persons based on their educational attainment. Own calculation using the ACS 2017.

Intergenerational Perspective

To what extent does education spending differ by parental background?

- ▶ Employ an **intergenerational perspective**

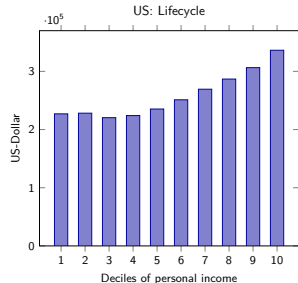
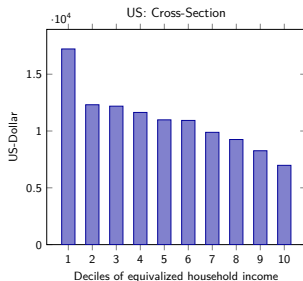
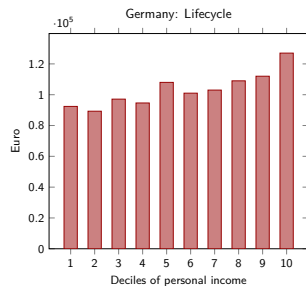
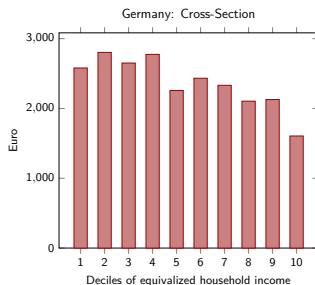
Answer not possible with ACS:

- ▶ Analysis for Germany using SOEP data
- ▶ Setup similar to lifecycle:
 - ▶ 40–45 year olds
 - ▶ Years spent in different educational institutions \times monetary value of education = lifetime transfers for education
- ▶ New: differentiate by **characteristics of the parents**

Intergenerational Perspective: Comparison Germany–US

Germany and the US not similar but comparable:

- ▶ In the cross-section education benefits the lower part of the income distribution
- ▶ People with higher lifetime income receive more education spending



Intergenerational Perspective: Parents' Educational Attainment

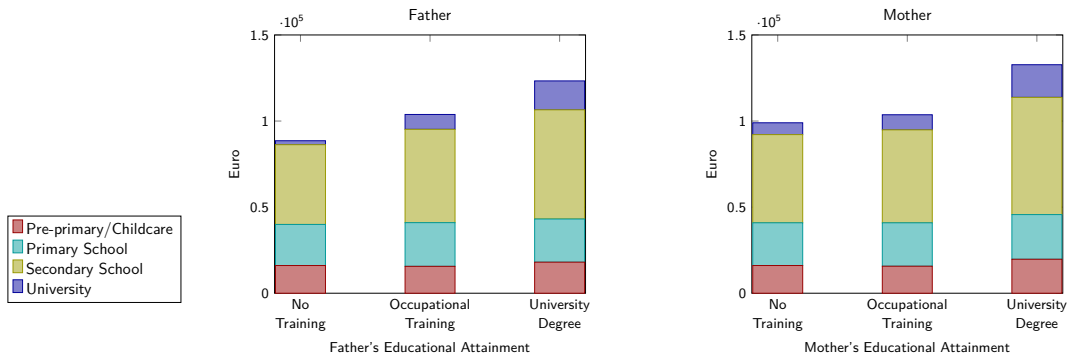


Figure 13: Education transfers for 40–45 year old persons based on their educational attainment by parents' educational attainment. Own calculation using the SOEP 2017.

- ▶ Children of better educated parents receive more education transfers during their life course
- ▶ Difference between no training and university degree: ≈ 34 K, ie. 4.8 years of university spending

Intergenerational Perspective: Parents' Occupational Prestige

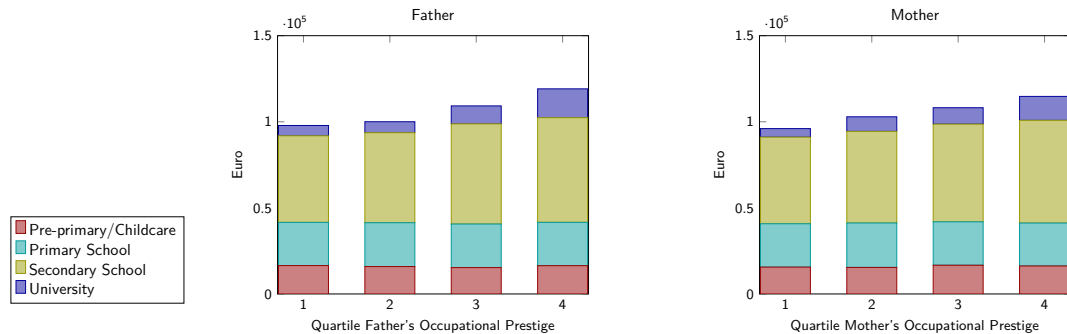


Figure 14: Education transfers for 40–45 year old persons based on their educational attainment by parents' occupational prestige. Own calculation using the SOEP 2017.

- ▶ Lifetime education transfers by quartiles of occupational prestige (SIOPS/Treiman-Index)
- ▶ Similar to education, children of parents with more prestigious occupations receive higher transfers
- ▶ Difference between 1st and 4th quartile: ≈ 20 K, ie. 2.9 years of university spending

Summary and Outlook

- ▶ Allocation of collective expenditure is sensitive to assumptions
- ▶ Instead of assumptions, we allocate education expenditure by actual use
 - ▶ In the cross-section the assumption of proportional allocation does not work well
The lower half of the distribution receives higher transfers; driven by age effects
 - ▶ The patterns found in the cross-section are reversed when employing a lifecycle view
Individuals with higher lifetime earnings receive substantially higher education transfers
 - ▶ An intergenerational perspective points towards persistence
Children of parents that are better educated/have better jobs benefits more from education spending
- ▶ Approach can be applied to a variety of settings and countries without strong data requirements
- ▶ Road ahead:
 - ▶ Include more types of expenditure, especially health (sizeable, at least in Germany strong redistributive effect)
 - ▶ In the long run: lifecycle simulation model including taxes and transfers (in-cash & in-kind)

Annual Expenditure per Student

Table 1: Annual Expenditure for Education. Per Student US-Dollar; pre-primary and primary education similar by assumption.

Educational Stage	approx. Age	ISCED-Level(s)	Expenditure (\$ per Student)
Pre-Primary	3–4	0	12,445
Primary	5–10	1	12,445
Lower Secondary	11–13	2	13,434
Higher Secondary	14–17	3	14,877
Tertiary	18+	5–8	30,810
Overall Mean			16,802

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