

Income Inequality, Consumption and Status Competition in Germany

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Abstract

We ask whether rising income inequality in Germany caused higher spending of non-rich households and a divergence of household saving rates along the income distribution. We use household data to show that the non-rich spend more relative to their income in response to higher income and consumption at the top. The effect is most pronounced in the bottom half of the income distribution. We present evidence that this result is consistent with status effects in household consumption. Non-rich households devote larger shares of their income to more visible and status relevant goods. The underlying motivation differs along the income distribution. We find that particularly households at the bottom of the distribution have a strong motive to signal wealth through conspicuous consumption.

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1 Introduction

Income inequality in Germany started to increase dramatically from the early 2000s, primarily driven by households in the lower half of the income distribution falling behind with regard to the top. Consumption inequality increased to a far less, as lower income households maintained relatively high consumption levels despite falling incomes. This resulted in a particular reduction of saving rates for lower income groups and a spread of saving rates along the distribution. We show that the rise in income inequality can explain these trends through effects on consumption and saving behaviour of non-rich households in Germany.

We employ cross-sectional household data from the German Income and Expenditure Survey (EVS) for the period from 1998 to 2018. Based on state-year variation in the incomes of the 80th and 90th percentiles of the income distribution, we find that non-rich households (the lower 80%) increase their consumption expenditures and save less when incomes at the top increase, holding own disposable incomes and other sociodemographic household characteristics constant. According to our estimates, a 10% increase in 80th percentile income is associated with non-rich households spending an additional percent of their disposable income.

We conduct a series of empirical tests aimed at uncovering the mechanism underlying to this correlation. Our results do not yield any support for explanations based on the permanent income hypothesis and a life-cycle theory of consumption, a local price channel or wealth effects based on home equity.

Rather, we find evidence status competition and trickle-down consumption (Bertrand and Morse, 2016) as the causal mechanism underlying to the positive association between incomes or consumption at the top and non-rich spending. Bertrand and Morse (2016) propose a successor to the expenditure cascades model by Frank et al. (2014) in which upwards directed social status comparisons (Duesenberry, 1949; Veblen, 2009) allow for a direct link between rising incomes or consumption at the top and spending of the non-rich. According to these relative income models individual consumption increases, and savings decline as the own relative position with respect to a reference group of typically higher income households worsens. Any given household will respond to rising consumption of higher income households by spending more and saving less to maintain its status.

Our results are similar to those by Bertrand and Morse (2016) for the U.S. After disaggregating total household expenditures into 17 consumption categories plus saving, we show that non-rich households systematically allocate a larger share of their resources to more visible consumption goods when exposed to higher incomes or consumption at the top.

We conduct our own representative survey for Germany, building on the survey design by Hefetz (2011) and extending it to a complementary measure of status relevance. While the visibility measure is strongly linked to a signalling-by-consuming motive (Charles et al., 2009) our second measure additionally identifies consumption categories that are perceived as status relevant without necessarily serving as a signal of wealth, i.e., they do not have to be recognisable by others. Therefore, it also captures competitive or positional advantages (Frank, 2008) of an improved relative consumption position.

Our initial findings with regard to consumption visibility by extends on the status relevance of consumption goods. Non-rich households' income shares allocated to more status relevant consumption categories increase with incomes or consumption at the top.

We go beyond the analysis of pure consumption categories and include saving as an additional use of disposable income into our analysis. Being most inconspicuous yet ranking at the upper end of the status relevance scale, saving poses an important decision to households striving for higher status. They can either forego saving for the sake of higher visible expenditures and thus sending more immediate signals of wealth and status. Or restrain from lavish spending at the benefit of higher (future) status enhancing savings.

Negative saving responses suggest that non-rich households are willing to forego non-visible saving for the sake of higher conspicuous consumption expenditures, despite believing it to be highly relevant to their social status. We interpret this as suggestive evidence that a signalling-by-consuming motive dominates potentially more sustained status investments.

The large sample sizes of our own survey and the EVS allows for the analysis of more narrowly defined income groups within our sample of non-rich households. Specifically, we ask whether the substantial downward mobility in the (lower) middle class (Grabka et al., 2016) led to a distinct form of status-seeking. Thus, we test for heterogeneity of trickle-down consumption response along different parts of the income distribution. We find that the overall effect is primarily driven by households in the bottom 60%.

There are pronounced differences in category-specific income share responses to top incomes or consumption along the income distribution. Lower ranking households more strongly increase their expenditures on visible categories such as Vehicles, Holidays and Alcohol and Tobacco, offset by stronger saving rate reductions. We find large income share reductions at the bottom of the distribution on the less visible, yet more status relevant human capital investments Health and Education. These effects, as well as the saving rate reduction, become less pronounced at higher income ranks. Hence, the extent to which non-rich households' income share

responses to incomes or consumption at the top are related to the visibility and status relevance measures varies based on a households' position along the income distribution.

The initially high importance of visibility for non-rich households' consumption responses declines with income rank. We interpret this as a diminishing signalling motive, as the need for differentiation from other (poor) households lessens with an improved relative income position. Declining pressures to signal status through visible spending allows for more status enhancing expenditures, irrespective of visibility, among higher ranking households.

2 Income Inequality, Consumption and Saving in Germany

Personal income inequality in Germany rose dramatically during the 2000s. The period between 1999/2000 and 2005 featured increases in income inequality that were unparalleled among other OECD countries (OECD, 2008). This rise in income inequality was not so much driven by an explosion of top income shares, as was the case for the U.S. (van Treeck and Sturn, 2012). Instead, stagnating or falling incomes in the bottom 60% of the distribution led to lower income groups falling behind substantially with regard to income developments of the top 40% (Figure 1(a)). Widening income differentials implied strongly declining relative incomes for those at the lower end of the distribution.

Developments in household consumption did not parallel the income trends. Lower income groups mostly maintained or even increased consumption expenditures despite falling disposable incomes (Figure 1(b)). This implied a substantial reduction of saving rates at the bottom of the income distribution (Figure 1(c)), which largely coincided with the extent of relative income losses with regard to the top.

A common explanation of these trends refers to the permanent income hypothesis (Friedman, 1957) and the life-cycle theory of consumption (Modigliani and Brumberg, 1954). Accordingly, increasing income inequality did not translate into more unequal consumption, as it was primarily driven by transitory income shocks, which households could offset by dissaving to smooth their consumption (Bartels and Schröder, 2020).

However, this interpretation lies at odds with results in the literature, that at least partly ascribe the more recent increases in income inequality to a substantial increase in the dispersion of the permanent component of incomes (Bartels and Bönke, 2010; Fuchs-Schündeln et al., 2010).

An intuitively appealing explanation builds on the relative income hypothesis (Duesenberry, 1949) and subsequent theories of expenditure cascades or trickle-down consumption (Frank et al., 2014; Bertrand and Morse, 2016). These argue that individual consumption increases, and savings decline as the own relative position with respect to a reference group of typically higher

income households worsens. As income inequality increases, higher income households can expand their consumption to a larger extent than those falling behind, thereby shifting the frame of reference for lower income groups. The latter reduce their savings to maintain their relative consumption position and keep up with changing consumption norms.

These theories were primarily proposed to explain the fall in the aggregate saving rate in the U.S., yet there is no comparable decline of aggregate savings in Germany. However, status consumption was predominantly driven by upper middle-income households against the backdrop of rising top income shares in the U.S. (Bertrand and Morse, 2016; Frank et al., 2014). Falling (upper) middle class saving contributed to lower national saving and the current account deficit (Behringer and van Treeck, 2018).

The rise in overall income inequality in Germany was not so much due to an explosion of top income shares, but rather concerned the bottom 60% of the distribution. The ensuing divergence of household saving rates is less relevant to broad macroeconomic trends. Nevertheless, it likely contributed to increased wealth inequality in the longer term.

3 Data

Our main data source is the German Income and Expenditure Survey (Einkommens- und Verbrauchsstichprobe, EVS), which is carried out quinquennially by the Federal Statistical Office of Germany¹. The EVS consists of repeated cross-sections, with about 40.000 to 50.000 households participating in each wave. Our analysis employs the waves of 1998, 2003, 2008, 2013 and 2018. Besides the large sample size, the main advantage of this dataset is the highly detailed account of household expenditures. This allows us to divide total household expenditures into 18 distinct categories for some of our analyses.

Drawing on a representative survey of the German population we assign measures of visibility and status relevance to each of our consumption categories. The measure of visibility is based on a question that asks respondents how quickly they would notice above average expenditures in each of our categories upon meeting someone from another household similar to theirs. We code answers ranging from “Never” to “Immediately” so that they translate into a measure ranging from 0 to 1. The visibility question is based on the survey design of Heffetz (2011) and intends to capture the noticeability of higher expenditures. The idea goes back to Veblen’s (2009) concept of conspicuous consumption, which describes the process of signaling own income or wealth through lavish spending. It assumes that the relevance of status comparisons

¹ A detailed documentation of the EVS waves is available at the Federal Statistical Office of Germany (2008a; 2008b; 2012; 2016; 2021).

varies across consumption goods, depending on how observable they are in social interactions (Charles et al., 2009).

Our status relevance measure comes from a question that asks respondents whether they perceive above average expenditures of households similar to theirs in any of our categories as a symbol for higher status. We translate answers ranging from “Absolutely not” to “Absolutely” into a measure of status relevance that lies between 0 and 1. The question is conditional on noticing higher expenditures by others and thus captures the status relevance of a given category irrespective of its function as a signal. It goes beyond the visibility measure in so far as it also captures the importance of competitive or positional advantages (Frank, 2008) resulting from an improved relative consumption position.

A detailed overview of all categories, a short description of their separate components, as well as the respective measures of visibility and status relevance, are provided in table A1 of the Appendix.

We impose several sample restrictions to ensure the validity of observations and that our results are not driven by some outliers. We exclude households that report savings in excess of their disposable income and those who report to dissave more than three times their disposable income. We additionally omit households that spend more than double of their disposable income on any single category and those with zero food consumption.

Following Bertrand and Morse (2016), we drop households with a total income above the 80th percentile in their federal state of residence from our core sample, as our analysis is aimed at uncovering influences from the top of the distribution on the consumption behaviour of non-rich households. We refer to households as “non-rich” if their annual disposable income lies below the 80th percentile of their state and to those above the 80th or 90th income percentile as “rich” or “very rich”.

Our disposable income variable is calculated as the sum of wage income, capital income, public and private transfers, income from subletting, and from the sale of goods, net of taxes and social security contributions. Our measure of savings is the sum of all expenditures on asset accumulation and the repayment of debt, less income from the release of tangible and financial assets and borrowing.

Total household consumption is measured as the sum of all private consumption expenditures. House purchases are excluded from total expenditures. Instead, we define housing consumption of owner-occupiers as expenditures on maintenance and repairs, operating costs, and mortgage

interest payments for the own home². For renters, housing consumption is measured as rent paid. Housing benefits enter our measure of income and housing consumption.

Parts of our analyses require a panel structure. Since the EVS consists of repeated cross sections, we additionally utilise the Socio-Economic Panel (SOEP), a yearly, longitudinal panel dataset, representative of the German population.

4 Regional inequality and Non-Rich Consumption

In this section, we ask whether rising income inequality can explain declining saving rates of lower income households via higher spending. We analyse the relationship between changes in the income distribution and consumption expenditures of non-rich households by assessing the association between the consumption expenditures of a given household below the 80th percentile in the state-year income distribution and average income or consumption of the households ranking above this threshold. Therefore, we estimate the regional income distribution for each state³ and year in our sample.

Building on Bertrand and Morse (2016), we first regress household consumption on income or consumption at the top and a set of standard sociodemographic characteristics:

$$\omega_{ist} = \alpha + \beta \ln(\bar{y}_{st,p=0,80}) + \gamma X_{ist} + \delta I_{ist} + \theta state_s + \mu year_t + \varepsilon_{ist}$$

The dependent variable ω_{ist} is total private consumption expenditure as a share of disposable household income of a given non-rich household i in state s and year t . The explanatory variable of interest is the natural logarithm of the average household income at the 80th (or 90th) percentile of the state-year income distribution. We interchangeably use consumption of (very) rich households as our explanatory variable, which is defined as the average consumption expenditures of all households above the 80th (or 90th) percentile in a given state and year.

X_{ist} is a set of standard sociodemographic characteristics. In particular, we control for the gender and age of the household head, as well as a squared term of the age, marital status and professional education of the household head, the number of children and adults living in the household, homeowner status and a dummy that indicates whether the household head holds a German citizenship. Following Bertrand and Morse (2016), we nonparametrically control for total household income with an indicator variable for buckets of 2,000 Euros of annual

² In the 1998 and 2003 waves of the EVS mortgage interest payments for the own home are not documented separately from other mortgage interest payments. We rely on information from the remaining three waves available to us to impute the amount of interest payments for the mortgage of the own home when necessary.

³ Due to relatively small sample sizes, we group the three city-states Hamburg, Berlin, and Bremen, as well as the Saarland with adjacent states.

disposable household income. All estimations include state and year fixed effects. We cluster heteroskedasticity robust standard errors at the regional level and apply cross-sectional weights. Table 1 presents the results from different econometric specifications of our model. Our estimates suggest a positive and statistically significant association between incomes at the top of the regional income distribution and consumption of the non-rich across all model specifications. According to column 1, consumption of non-rich households as a share of disposable income increases on average by 0.1 percentage points for each 1% increase in incomes at the 80th percentile of the regional income distribution. We obtain a similar result when we employ the logarithm of the average household income at the 90th percentile as our explanatory variable of interest in column 2. The estimated coefficient is robust to the inclusion of state-specific time trends (column 3) and the state unemployment rate (column 4).

In columns 5 to 8, we document a comparable relationship when our explanatory variable of interest is the consumption of the (very) rich, defined as the natural logarithm of the average total consumption of all households with an annual income above the 80th (or 90th) percentile threshold in their state-year distribution. The specifications are analogous to those in columns 1 to 4. According to column 5 non-rich households spend on average an additional 0.16 percent of their disposable income for each 1% rise in consumption expenditures of the rich.

In parts of our ensuing analyses, we rely on the SOEP for its panel component. Thus, we replicate this baseline result with our SOEP data in tables A2 and A3 of the appendix. Table A2 presents results from SOEP household data from the. The estimated coefficients for $\text{Log}(80\text{thPercentileIncome})$ and $\text{Log}(90\text{thPercentileIncome})$ point towards the same direction, yet they are somewhat smaller in magnitude and less robust. This is likely attributable to the unsatisfactory measurement of consumption in the SOEP.⁴

In table A3 we show that our results based on the EVS hold when we combine it with the state-year income distribution and average incomes at the 80th and 90th percentile calculated from the SOEP.

5 Possible explanations

Results in table 1 establish a positive relationship between rising incomes and consumption at the top of the regional income distribution and consumption of the non-rich. We conduct a

⁴ In the SOEP consumption is constructed as the difference between disposable household income and active saving. However, the savings measure has a cut-off value of zero. Particularly, in lower income groups, which are more likely to dissave, this measure understates total household consumption.

series of empirical tests of potential theoretical explanations, proposed by Bertrand and Morse (2016), to identify the mechanism underlying to this finding.

A. Permanent income

Non-rich households might correctly anticipate higher future incomes based on growing incomes of the rich around them. They could then immediately spend more to smooth their consumption intertemporally. Thus, in table 2 we assess whether higher incomes at the 80th or 90th percentile of the regional income distribution predict higher future incomes of the non-rich. Since the EVS is a repeated cross-section and only conducted every five years, we resort to the SOEP, to investigate whether incomes at the top affect on non-rich households' future incomes. We estimate the relationship between future household income of a given household below the 80th percentile of the state-year income distribution and our previously employed explanatory variables $\text{Log}(80\text{thPercentileIncome})$ or $\text{Log}(90\text{thPercentileIncome})$. We look at non-rich households' income in one, two or four years (columns 1 to 6) or averaged over the coming two and four years (columns 7 to 10) as our dependent variable. We control for current incomes, state and year fixed effects and include the same set of sociodemographic household characteristics as previously. We cluster standard errors at the state level.

We do not find a positive effect of incomes at the rich (panel A) or very rich (panel B) on future incomes of non-rich households in any of our specifications. Instead, some of our point estimates even imply a negative relationship.

In table 3 we provide additional evidence on this channel, by testing whether incomes of the rich are positively related to non-rich households' sentiment with regard to their own financial situation or overall economic development. We employ survey responses from the SOEP, that ask respondents about their concerns in these two areas. Neither $\text{Log}(80\text{thPercentileIncome})$, nor $\text{Log}(90\text{thPercentileIncome})$ are significantly related to non-rich households' expectations towards their own financial situation (columns 1 to 4) or the overall economy (columns 5 to 8). This finding is consistent with the results in table 2. Both oppose the notion of a positive relationship between income developments at the top and future household income (expectations) of the non-rich.

B. Precautionary savings

We investigate whether our initial finding could be explained by a precautionary savings motive, by asking if rising incomes at the top are related to higher stability of non-rich households' future incomes. Reduced future income uncertainty could attenuate the need for precautionary

savings and induce consumption (Carroll, 1994). In columns 13 and 14 of table 2 we do not find a negative relationship between $\text{Log}(80\text{thPercentileIncome})$ or $\text{Log}(90\text{thPercentileIncome})$ and future income uncertainty of the non-rich, measured as the standard deviation of the logarithm of non-rich households' income between $t+1$ and $t+4$.

C. Wealth effects

Rising top income levels in a given state might be positively correlated with house prices (Goda et al., 2019; Matlack and Vigdor, 2008). Such a relationship could explain our baseline result if non-rich households increase their expenditures in response to housing wealth gains and higher home equity (Mian et al., 2013; Mian and Sufi, 2011).

In columns 1 to 4 of table 4 we replicate the analysis from the first four columns of table 1 and additionally allow for heterogeneous effects of $\text{Log}(80\text{thPercentileIncome})$ and $\text{Log}(90\text{thPercentileIncome})$, dependent on whether the household owns any real estate. We do not find any differences in the association between incomes at the top and non-rich consumption conditional on real estate asset ownership status.

We additionally take advantage of the information on real estate wealth available in the EVS and directly control for it in a replication of the estimations from columns 1 to 4 of table 1. The respective results are reported in columns 5 to 8 of table 4. As theoretically predicted, the coefficient on $\text{Log}(\text{RealEstateWealth})$ enters positively and is statistically significant. Nevertheless, the estimated coefficients on $\text{Log}(80\text{thPercentileIncome})$ and $\text{Log}(90\text{thPercentileIncome})$ are virtually unchanged in each of the specifications.

We repeat both of these tests with $\text{Log}(\text{ConsumptionRich})$ and $\text{Log}(\text{ConsumptionVeryRich})$ as explanatory variables instead of incomes of the rich. The results are analogous to those reported in table 4 and provided in table A4 of the appendix.

D. Local prices

Growing incomes at the top of the distribution might be positively correlated with local prices. Higher local prices in federal states with growing incomes and consumption of the rich could cause non-rich households to spend more without any actual behavioural changes, if they are slow to adjust their consumption to price changes, due to habit formation (Alessie and Lusardi, 1997), consumption commitments (Chetty and Szeidl, 2016) or inattention (Reis, 2006). Estimation results reported in table 7 and 8 address this mechanism.

In table 5 we introduce state-level CPIs as an additional control in our baseline model. Our point estimates are unaffected, suggesting that the positive relationship between incomes or consumption at the top and non-rich consumption expenditures does not hinge on local prices. In table A5 of the appendix, we provide an additional piece of evidence. We use state-level CPIs and estimate their correlation with $\text{Log}(80\text{thPercentileIncome})$ and $\text{Log}(90\text{thPercentileIncome})$ in a state-year panel. In columns 1 to 4 we draw on our measure of income of the rich as calculated in the SOEP, which allows for a much larger number of observations. We do not find a statistically significant relationship between $\text{Log}(80\text{thPercentileIncome})$ or $\text{Log}(90\text{thPercentileIncome})$ and the state-level CPI in any of our specifications. Columns 5 to 8 replicate this analysis based on distributional income measures as calculated in the EVS. We do not find that rising incomes at the top are correlated with local prices.

6 Positional concerns, visibility, and status

In this section we turn towards the earlier proposed expenditure cascades or trickle-down consumption mechanism, as potential explanations of a positive relationship between incomes or consumption of rich households and non-rich consumption.

Our analysis follows the strategy proposed by Bertrand and Morse (2016) and Charles et al. (2009), that draws on visibility and status measures to identify consumption expenditures induced by considerations about relative standing. Following the notions of conspicuous consumption (Veblen, 2009) and positional externalities (Frank, 2008), concerns about relative standing should matter more for some goods than for others, based on differences in their visibility and positionality.

We expect households to allocate larger shares of their resources to goods that ranker higher on the visibility or status scale, if consumption increases of non-rich households are motivated by concerns about their relative standing. Accordingly, the extent to which household spending on different items responds to relatively declining incomes should be systematically related to the visibility or status relevance of the respective goods.

We divide household expenditures into 18 categories and assign a visibility and a status value to each of them. We then estimate consumption responses of non-rich households to rising incomes or consumption of the rich individually for each of the 18 categories, based on the following model:

$$\omega_{ist}^k = \beta \ln(\bar{y}_{st,p=0,80}) + \gamma X_{ist} + \delta I_{ist} + \ln\left(\frac{p_{st}}{P_t}\right) + \theta \text{state}_s + \mu \text{year}_t + \tau \text{statetrend} + \varepsilon_{ist}$$

where ω_{ist}^k is the income share allocated to a given category k by non-rich household i in state s and year t , calculated as expenditures on a given category over disposable household income. p_{st} is the state-specific CPI and P_t is the overall CPI. The remainder of the model is analogous to the baseline model.⁵

In addition to the income share of a given category, we estimate specifications in which the dependent variable is defined as the budget share of category consumption in overall consumption expenditures. We run regressions with our previously employed explanatory variables of interest, $\text{Log}(80\text{thPercentileIncome})$ and $\text{Log}(\text{ConsumptionRich})$, for both of our dependent variable definitions.⁶ Thus, we estimate 4 variations of this model for each of our 17 (+1) consumption categories. Results are reported in table 6. Each of the reported coefficients stems from an individual regression.

Overall, the categories Clothing and Jewellery, Housing, Holidays and Vehicles stand out for the most pronounced positive consumption responses to rising incomes or consumption of the rich by non-rich households. Hence, the non-rich react to rising incomes or consumption at the top by increasing their expenditures on these categories in absolute terms and thus allocating larger income shares. Other categories with relatively large yet not statistically significant positive consumption responses include Personal care, and Furnishings.

We find that non-rich households' expenditures on health and education decline with rising consumption or incomes at the top. In line with the overall positive consumption effect in our baseline model, we estimate a large and significant reduction of non-rich households' saving rates in column 18. When exposed to higher consumption or incomes at the top of their regional income distribution, non-rich households save substantially less.

Figure 2 plots the estimated consumption responses from demand system 1 for each of our categories against their respective visibility and status values. We include fitted regression lines. The continuous line includes the category Saving, while the dashed line focuses on consumption categories only, by omitting Saving from the linear fit.

Within the sample of the 17 consumption categories the estimated income share responses are systematically related to both our measures of visibility and status relevance. Non-rich households exposed to higher consumption or incomes at the top disproportionately increase their expenditures and income shares allocated to categories that are more visible and status relevant.

⁵ We also estimate a variant of our model where we additionally control for the category-specific CPI of each category. Our results are largely unchanged. However, we lose a lot of observations for several of our category-estimations due to coverage issues for some CPI components.

⁶ We also replicate this analysis with our explanatory variables $\text{Log}(90\text{thPercentileIncome})$ and $\text{Log}(\text{ConsumptionVeryRich})$. We obtain comparable results. We do not report these results due to space reasons.

Overall, we interpret this result as evidence of status consumption, as the causal mechanism underlying to our baseline finding of a positive association between non-rich households' consumption expenditures and rising incomes or consumption at the top.

The previous result holds for our measure of visibility when the category Saving is included, as it lines up near perfectly with the linear fit of the estimated coefficients and the visibility values. A slightly different pattern emerges when we include the estimated coefficient for the saving rate response into our plot against the status relevance. The fitted line with the status relevance of our categories becomes nearly horizontal. Hence, when we include the entirety of income usages, we find a stronger correlation with the measure of visibility than for status relevance. This result is primarily driven by the strongly negative saving response of non-rich households to higher consumption by the rich.

It seems that the non-rich are willing to forego non-visible saving for the sake of higher conspicuous consumption expenditures, despite believing it to be highly relevant to their social status. They prioritise visible expenditures, as an immediate signal of financial status, over potentially non-visible expenditures or saving, which they perceive as status enhancing in a more sustained manner. This is also consistent with the negative point estimates for our private human capital categories Health and Education, which are the only two categories besides Saving, that score slightly higher on the status scale than on the visibility scale (table A1).

We interpret this as suggestive evidence that a signalling by consuming motive dominates potentially more long-term status investments for the overall sample of non-rich households, when responding to rising incomes or consumption at the top.

7 Status competition by income groups

In section 2 we show that the rise in overall income inequality in Germany was mostly driven by lower and (lower-)middle income households falling behind. Substantial increases in income inequality in the lower part of the income distribution involved a growing low-pay sector and a rising labour market dualism (Corneo, 2015). In particular, the shrinking middle class, subject to substantial downward mobility (Grabka et al., 2016; Goebel et al., 2010) and a (perceived) lack of upward mobility, experienced a disproportionate increase in fear of social decline (Lengfeld and Hirschle, 2009). We suspect that rising inequality triggered stronger status consumption responses among households with lower and lower-middle incomes due to more pronounced status anxiety and widespread fear of status loss.

We investigate this possibility by further disentangling the effect of rising incomes or consumption of the rich on non-rich consumption along the income distribution. We replicate the

baseline estimations in columns 1, 3 and 4 of table 1, yet allow for heterogeneous effects along the four quintiles of the income distribution that are included in our sample of non-rich households, by interacting our explanatory variable of interest with an indicator of quintile affiliation. We also allow for different intercepts by quintile. Results are reported in table 7. In table A6 we report analogous estimates for our explanatory variable $\text{Log}(\text{ConsumptionRich})$.

The effect for the fourth quintile right below the top is significantly lower when compared to Quintiles 1 to 3 and in fact tends towards zero. This is consistent with our descriptive findings in section 2, where we documented that relative income losses primarily accrued in the bottom three quintiles. The positive and significant effect of rich income or consumption on non-rich spending in table 1 is driven by higher expenditures of the lower three quintiles in our sample of non-rich households.

Whereas income developments in the (lower) middle class were insufficient to maintain the relative standard of living that these households aspire, this was not the case for the upper middle. Widespread fears about status loss are likely confined to the more anxious lower- and middle-income households, leading to more pronounced consumption responses to rising incomes or consumption of the rich.

This finding additionally highlights an important distinction vis-à-vis the U.S., where an explosion of top income shares (Alvaredo et al., 2013) triggered status consumption responses cascading down the entire income distribution (Bertrand and Morse, 2016). This includes marked effects on the upper middle class, which is highly relevant to broad macroeconomic trends. Thus, unlike in the U.S., status competition has not led to a declining aggregate saving rate in Germany, as the upper middle remained largely unaffected.

Beyond differences in the magnitude of the overall effect, the motives associated with status consumption might vary based on a non-rich households' position along the income distribution, potentially provoking distinct resource reallocations in response to rising inequality. We ask whether category-specific trickle-down consumption effects systematically vary within our sample of non-rich households based on quintile affiliation. If so, can this be explained by different status-seeking approaches, which we identify based on our measures of visibility and status relevance?

Therefore, we additionally investigate heterogeneity of non-rich consumption responses by expenditure category. We replicate our demand system estimates by category, yet allow for quintile-heterogeneity analogously to the estimates in table 7, by introducing an interaction effect of $\text{Log}(80\text{thPercentileIncome})$ or $\text{Log}(\text{ConsumptionRich})$ with our indicator of quintile affiliation. We do not report individual regression estimates due to space reasons.

We proceed as in the previous analysis of category-specific consumption responses for the overall sample of non-rich households, by plotting the estimated income share responses for quintiles 1 and 4 against the assessments of visibility and status relevance of the consumption categories by the respective quintiles (figure 3).

Most noticeably, the correlation of non-rich households' consumption responses to higher consumption at the top with the measure of visibility falls with higher quintile affiliation. In turn, estimated coefficients by quintile correlate more strongly with the status relevance for higher ranking quintiles.

From quintile 1 to 4 the linear fit when plotting the coefficients against the status relevance for all 18 categories turns from slightly negative to slightly positive. When excluding Saving, the estimated consumption responses for the remaining 17 consumption categories more strongly relate to status relevance in quintile 4 than in quintile 1.

Quintiles two and three range in between, as responses to rising incomes or consumption are more strongly focused on visible consumption than in the fourth quintile. Yet, the status relevance of consumed goods appears more relevant than at the bottom.

These different patterns primarily result from the much smaller saving rate reduction of the fourth quintile but are also partly explained by different spending responses on categories such as Health, Education, Vehicles and Alcohol and Tobacco.

Households at the bottom most strongly increase visible expenditures like Vehicles and Alcohol and Tobacco and consumption responses diminish with rising quintile affiliation. Expenditures on the slightly more status relevant than visible categories Health and Education decline substantially in the bottom quintile, yet we find significantly smaller negative effects for higher ranking quintiles.

We interpret this finding as a diminishing signalling motive, as households increase their position on the income distribution. Demonstrative or conspicuous consumption is used as a tool for differentiation from other low-income households, to prevent disutility from being perceived as poor by others. Thus, households at the bottom of the income distribution, who are most likely to be perceived as poor, have the strongest motive to signal a higher (socio-)economic standing by means of consuming visibly.

A similar argument has been made by Charles et al. (2009), who highlight conspicuous consumption as a means of differentiation from others of the same socioeconomic group. This cannot be accomplished by spending more on status relevant yet inconspicuous goods or even saving. With a rising relative income position, this motive becomes less pronounced, and households are not required to engage in signalling activities.

Accordingly, the status relevance of income allocations appears less important to those at the bottom yet becomes more relevant for those ranking higher in the income distribution. Households can progressively respond to rising incomes or consumption at the top with higher status enhancing expenditures, irrespective of their visibility, as the signalling motive lessens with an increasing relative income position. Consumption responses become more status-oriented, ensuring positional advantages through status-enhancing expenditures (Frank, 2008).

The prioritisation of the signalling motive among the poorer members of society has further negative implications for resource allocations beyond the adverse impact on saving rates. Low and (lower-)middle income households sacrifice expenditures on status relevant categories such as, saving, education and health, to expand their visible consumption on categories, such as, Holidays, Vehicles, or Alcohol and Tobacco. This might allow them to avoid disutility from sending short-term negative signals about their economic status. Yet, it comes at the cost of lower saving and reduced human capital investments, with negative implications for future wealth inequality and inequality of labour incomes.

8 Conclusion

We initially asked whether rising income inequality in Germany could explain the diversion of household saving rates along the income distribution in recent decades. Based off state-year variation, we document a positive association between consumption expenditures of households at the top of the distribution and spending of the non-rich. Non-rich households that face higher expenditures of top income households in their federal state of residence spend more and larger shares of their income and save less.

We continued by testing a series of potential causal mechanisms underlying to this finding. Our results suggest a direct behavioural influence of rising inequality on households' consumption-saving decisions. Non-rich households spend larger shares of their incomes and devote larger shares of their budget to more visible and status relevant goods, when falling behind relative to households at the top of the distribution. A finding that is highly consistent with inequality-fuelled status consumption effects.

Particularly, a signalling-by-consuming motive appears to give rise to lower savings and reduced human capital investments. Allowing for heterogeneous consumption responses reveals that this effect is most pronounced at the lower end of the income distribution. Whereas higher ranking non-rich households respond in a somewhat more sustained status-enhancing manner to rising incomes or consumption at the top.

Evidently income developments in the (lower) middle class have not been sufficient to maintain the aspired (relative) standard of living. Status seeking under rising income inequality substantially contributed to falling saving rates among non-rich households, with the most detrimental effects for lower and lower middle-income households. The subsequent divergence of saving rates fuels wealth inequality. Resource reallocations due to status seeking have the most adverse effects on human capital investments of households at the bottom of the income distribution. We deem these developments unsustainable, as they will likely contribute to rising future income polarisation and inequality.

References

- Alessie, R., & Lusardi, A. (1997). Consumption, saving and habit formation. *Economics Letters*, 55(1), 103–108.
- Alvaredo, F., Atkinson, A. B., Piketty, T., & Saez, E. (2013). The top 1 percent in international and historical perspective. *Journal of Economic Perspectives*, 27(3), 3–20.
- Bartels, C., & Bönke, T. (2010). *German male income volatility 1984 to 2008: trends in permanent and transitory income components and the role of the welfare state* (No. 325) SOEPpaper.
- Bartels, C., & Schröder, C. (2020). *Income, Consumption And Wealth Inequality In Germany: Three Concepts, Three Stories?* (No. 2). Forum New Economy.
- Behringer, J., & Van Treeck, T. (2018). Income distribution and the current account. *Journal of International Economics*, 114, 238–254.
- Bertrand, M., & Morse, A. (2016). Trickle-Down Consumption. *Review of Economics and Statistics*, 98(5), 863–879.
- Carroll, C. D. (1994). How does Future Income Affect Current Consumption? *Quarterly Journal of Economics*, 109(1), 111–147.
- Charles, K. K., Hurst, E., & Roussanov, N. (2009). Conspicuous Consumption and Race. *Quarterly Journal of Economics*, 124(2), 425–467.
- Chetty, R., & Szeidl, A. (2016). Consumption Commitments and Habit Formation. *Econometrica*, 84(2), 855–890.
- Corneo, G. (2015). Earnings inequality in Germany and its implications. *Economic and Political Studies*, 3(2), 60–84.
- Duesenberry, J. (1949). *Income, Saving, and the Theory of Consumer Behavior*. Harvard University Press.
- Federal Statistical Office of Germany. (2008a). *Qualitätsbericht Einkommens- und Verbrauchsstichprobe 1998*.
- Federal Statistical Office of Germany. (2008b). *Qualitätsbericht Einkommens- und Verbrauchsstichprobe 2003*.
- Federal Statistical Office of Germany. (2012). *Qualitätsbericht Einkommens- und Verbrauchsstichprobe 2008*.
- Federal Statistical Office of Germany. (2016). *Qualitätsbericht Einkommens- und Verbrauchsstichprobe 2013*.
- Federal Statistical Office of Germany. (2021). *Qualitätsbericht Einkommens- und Verbrauchsstichprobe 2018*.
- Frank, R. H., Levine, A., & Dijk, O. (2014). Expenditure Cascades. *Review of Behavioral Economics*, 1(1–2), 55–73.
- Frank, R. H. (2008). Should public policy respond to positional externalities?. *Journal of Public Economics*, 92(8–9), 1777–1786.
- Friedman, M. (1957). *A Theory of the Consumption Function*. Princeton University Press.
- Fuchs-Schündeln, N., Krueger, D., & Sommer, M. (2010). Inequality trends for Germany in the last two decades: A tale of two countries. *Review of Economic Dynamics*, 13(1), 103–132.
- Goda, T., Stewart, C., & Torres García, A. (2019). Absolute income inequality and rising house prices. *Socio-Economic Review*, 40, Article mwz028, 371.

- Goebel, J., Gornig, M., & Häußermann, H. (2010). Polarisierung der Einkommen: die Mittelschicht verliert. *DIW Wochenbericht*, 77(24), 2-8.
- Grabka, M. M., Goebel, J., Schröder, C., & Schupp, J. (2016). Schrumpfender Anteil an Beziehenden mittlerer Einkommen in den USA und Deutschland. *DIW Wochenbericht*, 83(18), 391-402.
- Heffetz, O. (2011). A Test of Conspicuous Consumption: Visibility and Income Elasticities. *Review of Economics and Statistics*, 93(4), 1101–1117.
- Lengfeld, H., & Hirschle, J. (2009). Die Angst der Mittelschicht vor dem sozialen Abstieg. Eine Längsschnittanalyse 1984–2007. *Zeitschrift für Soziologie*, 38(5), 379-398.
- Matlack, J. L., & Vigdor, J. L. (2008). Do rising tides lift all prices? Income inequality and housing affordability. *Journal of Housing Economics*, 17(3), 212–224.
- Mian, A., Rao, K., & Sufi, A. (2013). Household Balance Sheets, Consumption, and the Economic Slump. *Quarterly Journal of Economics*, 128(4), 1687–1726.
- Mian, A., & Sufi, A. (2011). House Prices, Home Equity–Based Borrowing, and the US Household Leverage Crisis. *American Economic Review*, 101(5), 2132–2156.
- Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. Kurihara, K.K., Eds., *Post-Keynesian Economics*, Rutgers University Press.
- OECD (2008). Growing Unequal?: Income Distribution and Poverty in OECD Countries, Country note: Germany. <http://www.oecd.org/dataoecd/45/25/41525346.pdf>
- Reis, R. (2006). Inattentive consumers. *Journal of Monetary Economics*, 53(8), 1761–1800.
- van Treeck, T., & Sturn, S. (2012). *Income inequality as a cause of the Great Recession? A survey of current debates* (Conditions of work and employment series 39). International Labour Organization.
- Veblen, T. (2009). *The theory of the leisure class* (Reissued.). *Oxford world's classics*. Oxford University Press.

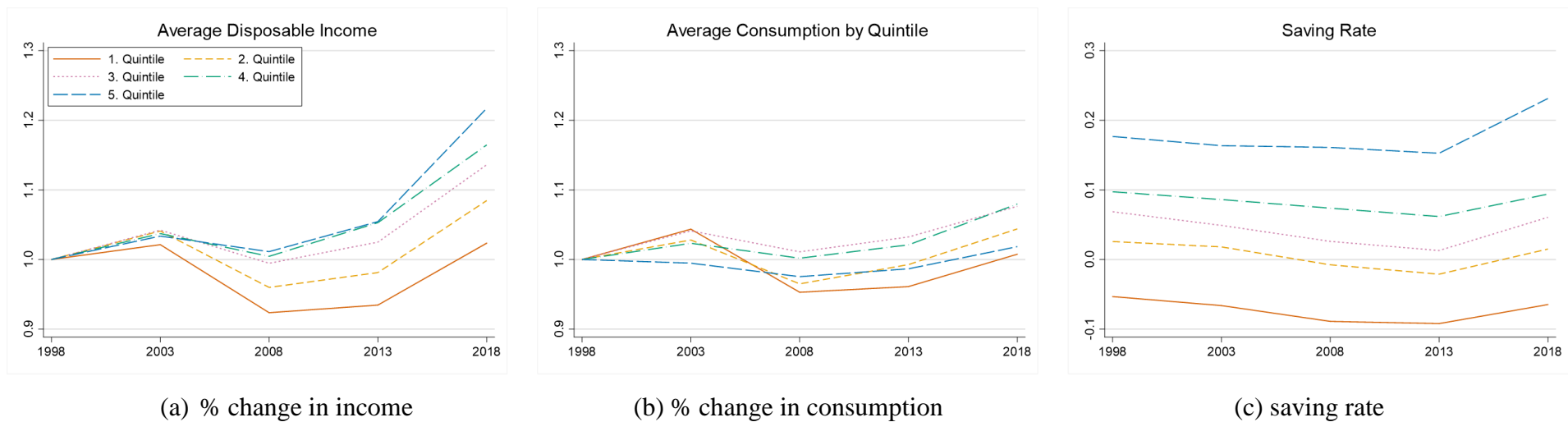


Figure 1 - Disposable income, consumption and saving rates by quintile

Notes: Data source: EVS, 1998 to 2018, author calculations. Disposable income and consumption are equivalised using the modified OECD equivalence scale.

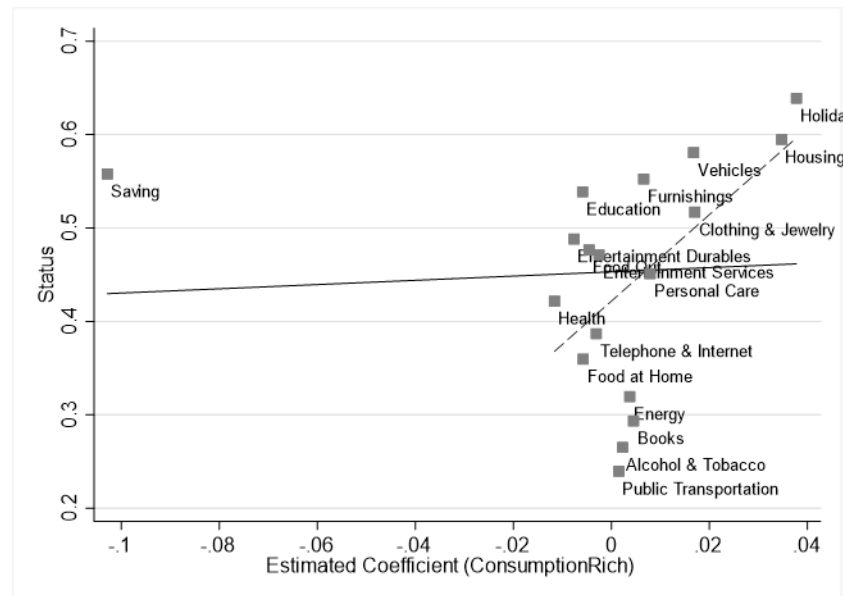
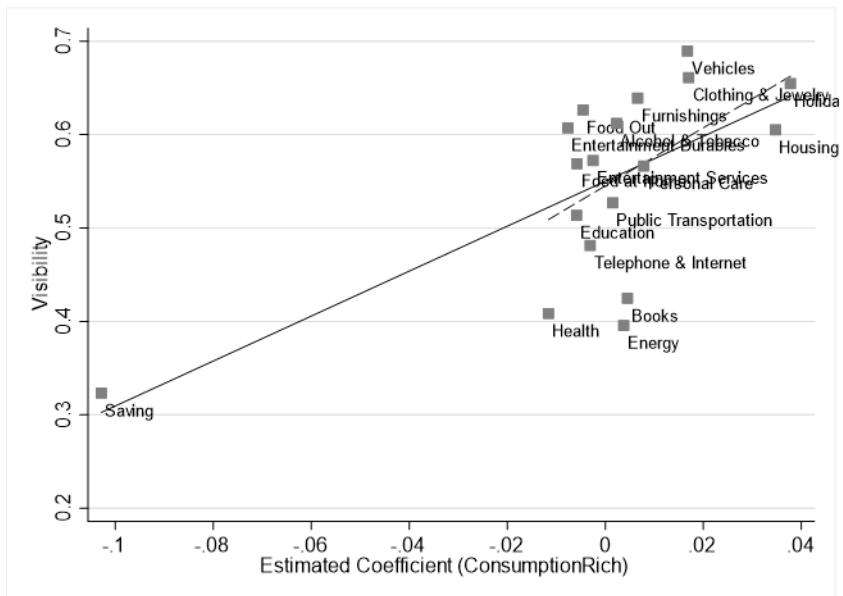


Figure 2 - Visibility or status relevance plotted against trickle estimate by category

Notes: On the y-axis are our survey measures of visibility and status relevance. The x-axis plots the coefficients on $\text{Log}(\text{ConsumptionRich})$ from demand system 1 in Table 6.

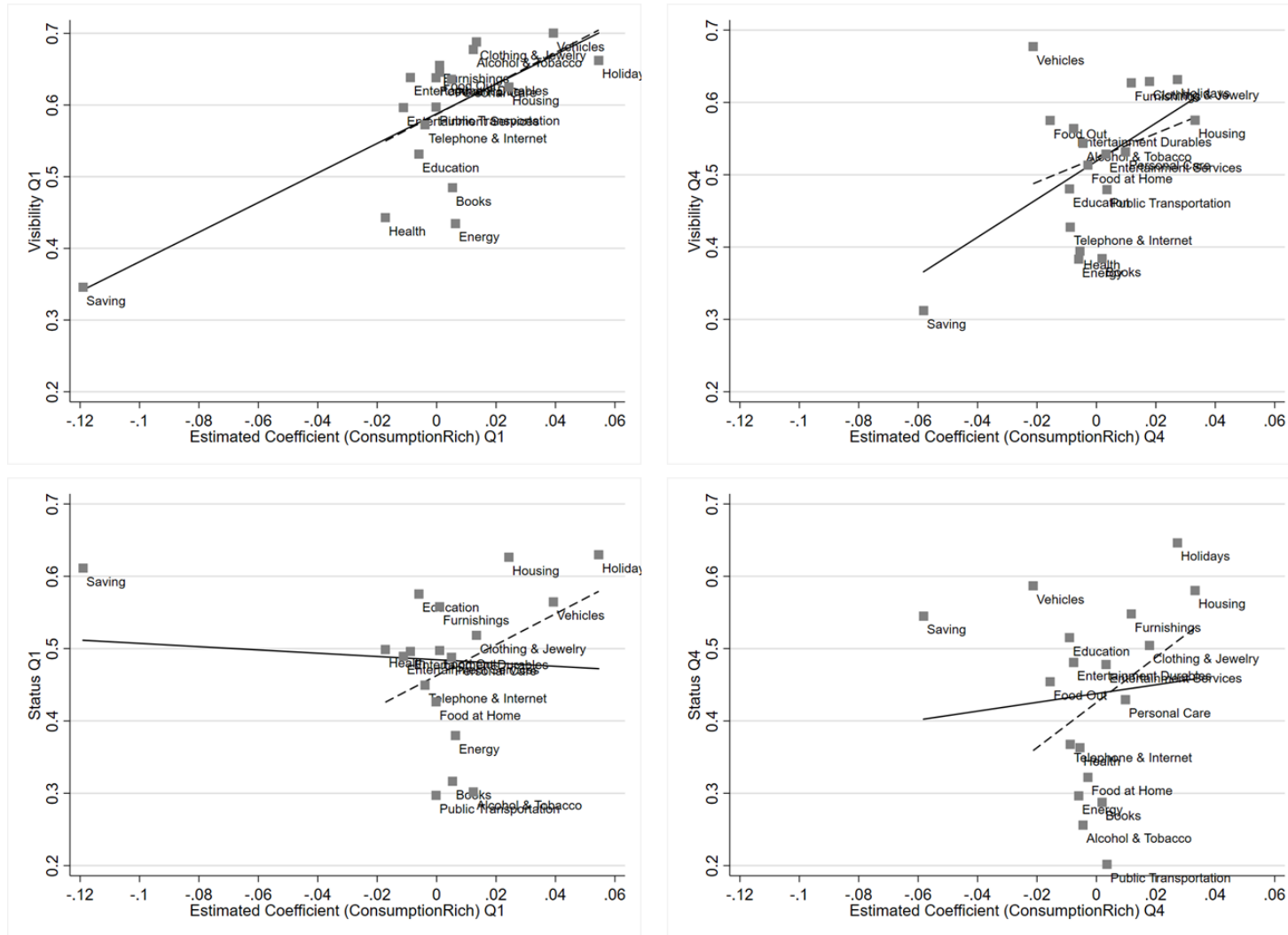


Figure 3 - Visibility or status relevance plotted against trickle estimate by category, by quintile

Table 1 - Top income levels or consumption and non-rich consumption

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Consumption/Income							
Sample:	x<80th							
Log(80thPercentileIncome)	0.102** [0.034]		0.059* [0.029]	0.067** [0.024]				
Log(90thPercentileIncome)		0.120*** [0.036]						
Log(ConsumptionRich)					0.161*** [0.037]		0.121*** [0.035]	0.125*** [0.035]
Log(ConsumptionVery-Rich)						0.086** [0.034]		
Unemployment Rate				-0.204 [0.201]				-0.167 [0.184]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	154,373	154,373	154,373	154,373	154,373	154,373	154,373	154,373
R ²	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. Log(80th/90thPercentileIncome) is the logarithm of the average income at the 80th/90th percentile of the state-year income distribution. Log(ConsumptionRich/VeryRich) is the logarithm of the average consumption of all households above the 80th/90th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year.

Table 2 - Top income levels and future income (stability) for the non-rich

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Dependent Variable</i>	Log(HH income) in t+1	Log(HH income) in t+2	Log(HH income) in t+2	Log(HH income) in t+4	Log(HH income) in t+4	Log(HH income) in t+4	Log(Avg. HH in- come) between t+1 and t+2	Log(Avg. HH in- come) between t+1 and t+4	Log(Avg. HH in- come) between t+1 and t+4	Log(Avg. HH in- come) between t+1 and t+4	S.D. of Log(HH in- come) between t+1 and t+4	S.D. of Log(HH in- come) between t+1 and t+4
Panel A												
Log(HH income)	0.720** *	0.719** *	0.658** *	0.657***	0.599***	0.598***	0.672***	0.672***	0.631***	0.631***	-0.077***	-0.076***
	[0.005]	[0.005]	[0.007]	[0.007]	[0.010]	[0.009]	[0.006]	[0.006]	[0.007]	[0.007]	[0.006]	[0.006]
Log(80thPercentileIn- come)	0.008	-0.052	-0.005	-0.095*	0.045	-0.082	0.009	-0.070*	0.010	-0.092**	0.025	0.042
	[0.039]	[0.044]	[0.052]	[0.045]	[0.095]	[0.077]	[0.046]	[0.038]	[0.063]	[0.039]	[0.026]	[0.030]
State-specific time trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	142,619	142,619	121,345	121,345	91,207	91,207	121,345	121,345	88,976	88,976	88,976	88,976
R-squared	0.649	0.649	0.582	0.582	0.512	0.513	0.690	0.691	0.684	0.685	0.067	0.068
Panel B												
Log(HH income)	0.720** *	0.720** *	0.658** *	0.657***	0.599***	0.598***	0.672***	0.671***	0.631***	0.631***	-0.077***	-0.076***
	[0.005]	[0.005]	[0.007]	[0.007]	[0.010]	[0.009]	[0.006]	[0.006]	[0.007]	[0.007]	[0.006]	[0.006]
Log(90thPercentileIn- come)	0.003	0.003	-0.023	-0.112**	0.094	-0.002	-0.017	-0.092**	0.013	-0.063	0.015	0.037
	[0.029]	[0.029]	[0.046]	[0.043]	[0.079]	[0.084]	[0.037]	[0.031]	[0.049]	[0.044]	[0.021]	[0.025]
State-specific time trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	142,619	142,619	121,345	121,345	91,207	91,207	121,345	121,345	88,976	88,976	88,976	88,976
R-squared	0.649	0.649	0.582	0.583	0.512	0.513	0.690	0.691	0.684	0.685	0.067	0.068

Data source: SOEPv36, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. In columns 1 to 8 the dependent variable is defined as the logarithm of the future income of a given household at different points in time noted above. Dependent variables in columns 9 to 12 are the logarithms of average future household income over different time horizons. Dependent variables in columns 13 and 14 are the standard deviation of log household income from (t+1) to (t+4). We control for household characteristics, state and year fixed effects in all regressions. Log(80th/90thPercentileIncome) is the logarithm of the average income at the 80th/90th percentile of the state-year income distribution.

Table 3 - Top income levels and sentiments of the non-rich

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Worried about household finances				Worried about economic development			
Log(80thPercentileIncome)	0.037 [0.138]	-0.039 [0.128]			-0.124 [0.174]	-0.155 [0.103]		
Log(90thPercentileIncome)			0.088 [0.108]	0.086 [0.071]			-0.051 [0.125]	-0.022 [0.098]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	No	Yes	No	Yes	No	Yes	No	Yes
Household income FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	168,087	168,087	168,087	168,087	163,816	163,816	163,816	163,816
R ²	0.187	0.188	0.187	0.188	0.133	0.135	0.133	0.135

Data source: SOEPv36, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. In columns 1 to 4 the dependent variable is the responses to a survey question about concerns about the own economic situation and in columns 5 to 8 it is the response to the same question about the economy in general. Log(80th/90thPercentileIncome) is the logarithm of the average income at the 80th/90th percentile of the state-year income distribution.

Table 4 - Home equity channel

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Consumption/Income							
Sample:	x<80th							
Log(80thPercentileIncome)	0.104** [0.034]		0.063* [0.029]	0.071** [0.025]	0.103** [0.035]		0.060* [0.030]	0.068** [0.025]
Log(80thPercentileIncome)*Homeowner	-0.008 [0.021]		-0.011 [0.021]	-0.011 [0.021]				
Log(90thPercentileIncome)		0.120*** [0.037]				0.121*** [0.036]		
Log(90thPercentileIncome)*Homeowner		0.002 [0.020]						
Unemployment Rate				-0.209 [0.203]				-0.222 [0.201]
Log(RealEstateWealth)					0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	154,070	154,070	154,070	154,070	154,373	154,373	154,373	154,373
R ²	0.146	0.146	0.147	0.147	0.146	0.146	0.146	0.146

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. Log(80th/90thPercentileIncome) is the logarithm of the average income at the 80th/90th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year. Homeowner is a dummy indicating whether the household owns any real estate and Log(RealEstateWealth) is the logarithm of total real estate wealth of a given household.

Table 5 - Local price channel

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(Consumption)							
Sample:	x<80th							
Log(80thPercentileIncome)	0.098*** [0.030]		0.066*** [0.021]	0.067*** [0.020]				
Log(90thPercentileIncome)		0.108*** [0.027]						
Log(ConsumptionRich)					0.157*** [0.036]		0.113*** [0.033]	0.113*** [0.032]
Log(ConsumptionVery-Rich)						0.086** [0.031]		
Unemployment Rate				-0.029 [0.154]				0.015 [0.160]
Log(LocalCPI)	0.174 [0.396]	0.224 [0.398]	0.598 [0.421]	0.563 [0.392]	0.286 [0.450]	0.297 [0.510]	0.553 [0.394]	0.571 [0.411]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	146,085	146,085	146,085	146,085	146,085	146,085	146,085	146,085
R ²	0.143	0.143	0.144	0.144	0.143	0.143	0.144	0.144

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. Log(80th/90thPercentileIncome) is the logarithm of the average income at the 80th/90th percentile of the state-year income distribution. Log(ConsumptionRich/VeryRich) is the logarithm of the average consumption of all households above the 80th/90th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year. Log(LocalCPI) is the logarithm of the state-year CPI. All CPI measures are from the national statistical authority with 2015 as the base year.

Table 6 - Non-rich consumption responses to top incomes and consumption, by expenditure category

Demand system estimations		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Clothing & Jewelry	Housing	Food at Home	Food Out	Alcohol & Tobacco	Personal Care	Telephone & Internet	Books	Entmt Services
		<u>Dependent Variable: Household Category Consumption/Disposable Income</u>								
System 1	Log(ConsumptionRich)	0.017*** [0.004]	0.035*** [0.009]	-0.006 [0.009]	-0.005 [0.004]	0.002 [0.004]	0.008 [0.007]	-0.003 [0.003]	0.005* [0.002]	-0.003 [0.005]
		<u>Dependent Variable: Household Category Consumption/Total Consumption</u>								
System 2	Log(ConsumptionRich)	0.012** [0.005]	0.019** [0.007]	-0.020** [0.008]	-0.010** [0.004]	0.000 [0.005]	0.004 [0.007]	-0.008** [0.003]	0.002 [0.002]	-0.003 [0.005]
		<u>Dependent Variable: Household Category Consumption/Disposable Income</u>								
System 3	Log(80thPercentileIncome)	0.006 [0.006]	0.024*** [0.007]	-0.007 [0.004]	-0.002 [0.003]	-0.003 [0.002]	0.006 [0.004]	-0.006** [0.002]	0.002 [0.002]	-0.001 [0.004]
		<u>Dependent Variable: Household Category Consumption/Total Consumption</u>								
System 4	Log(80thPercentileIncome)	0.002 [0.007]	0.023*** [0.007]	-0.012** [0.005]	-0.005 [0.003]	-0.003 [0.002]	0.004 [0.004]	-0.009*** [0.002]	0.001 [0.001]	-0.002 [0.005]
		(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
		Energy	Holidays	Public Transport	Education	Health	Furnishings	Entmt Durables	Vehicles	Saving
		<u>Dependent Variable: Household Category Consumption/Disposable Income</u>								
System 1	Log(ConsumptionRich)	0.004 [0.015]	0.038*** [0.012]	0.002 [0.002]	-0.006 [0.005]	-0.012** [0.005]	0.007 [0.012]	-0.008 [0.005]	0.017 [0.017]	-0.103* [0.053]
		<u>Dependent Variable: Household Category Consumption/Total Consumption</u>								
System 2	Log(ConsumptionRich)	-0.014 [0.014]	0.030*** [0.009]	0.003 [0.002]	-0.007 [0.005]	-0.026*** [0.006]	0.001 [0.012]	-0.010 [0.007]	0.018* [0.009]	
		<u>Dependent Variable: Household Category Consumption/Disposable Income</u>								
System 3	Log(80thPercentileIncome)	0.006 [0.014]	0.024*** [0.007]	-0.001 [0.001]	0.000 [0.003]	-0.018*** [0.004]	0.015* [0.008]	-0.010** [0.003]	0.016 [0.011]	-0.080** [0.028]
		<u>Dependent Variable: Household Category Consumption/Total Consumption</u>								
System 4	Log(80thPercentileIncome)	-0.005 [0.014]	0.019** [0.006]	0.001 [0.002]	-0.001 [0.003]	-0.027*** [0.004]	0.007 [0.007]	-0.011*** [0.003]	0.012 [0.007]	

Notes for Table 6:

Data source: EVS, 1998 to 2018. Each cell contains the result from a separate regression for each of our four demand systems. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is either defined as category-specific consumption over income or total consumption for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects, state-specific time trends and prices in all regressions. $\text{Log}(80\text{thPercentileIncome})$ is the logarithm of the average income at the 80th percentile of the state-year income distribution. $\text{Log}(\text{ConsumptionRich})$ is the logarithm of the average consumption of all households above the 80th percentile of the state-year income distribution.

Table 7 - Top income levels and non-rich consumption

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
	Log(Consumption)			
Sample:	x<80th			
$\text{Log}(80\text{thPercentileIncome})$	0.095** [0.035]	0.119*** [0.038]	0.077** [0.033]	0.084** [0.029]
$\text{Log}(80\text{thPercentileIncome}) * \text{Q2}$		-0.006 [0.018]	-0.006 [0.017]	-0.005 [0.017]
$\text{Log}(80\text{thPercentileIncome}) * \text{Q3}$		-0.021 [0.022]	-0.022 [0.022]	-0.022 [0.022]
$\text{Log}(80\text{thPercentileIncome}) * \text{Q4}$		-0.088*** [0.027]	-0.086** [0.028]	-0.086** [0.028]
Unemployment Rate				-0.203 [0.205]
State and year FEs	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Quintile FE	Yes	Yes	Yes	Yes
Observations	154,373	154,373	154,373	154,373
R ²	0.146	0.146	0.146	0.146

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. $\text{Log}(80\text{thPercentileIncome})$ is the logarithm of the average income at the 80th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year. Dummy variables Q2, Q3, and Q4 indicate whether a household ranks in the second, third or fourth quintile of the state-year income distribution.

Appendix

Table A1 - Consumption categories

(1) Cate- gory	(2) Category Name	(3) Visibi- lity	(4) Sta- tus	(5) Category Description
1	Clothing & Jewelry	0.66	0.52	clothing, shoes, jewelry and watches
2	Housing	0.61	0.59	rent, maintenance & home repairs, operating costs and mortgage interest payments
3	Food at Home	0.57	0.36	food and non-alcoholic beverages
4	Food Out	0.63	0.48	food and drinks at restaurants, cafés, canteens, etc.
5	Alcohol & Tobacco	0.61	0.27	alcoholic beverages and tobacco products
6	Personal Care	0.57	0.45	hairdressers and other personal care services; appliances and consumables for personal care
7	Telephone & Internet	0.48	0.39	phone & internet services; phone purchases
8	Books	0.42	0.29	books & brochures, newspapers, magazines and stationary supplies
9	Entertainment Services	0.57	0.47	entry fees for sports and recreational events, cultural events and institutions, etc; broadcasting services and PayTV; pets and veterinarians
10	Energy	0.40	0.32	home utilities such as electricity, gas, distance heating, warm water, etc.
11	Holidays	0.65	0.64	airline fares and lodging away from home
12	Public Transportation	0.53	0.24	public transportation like busses and trains
13	Education	0.51	0.54	education, from nursery to college, like tuition and other school expenses.
14	Health	0.41	0.42	medical care, medical appliances, drugs, dentists, doctors, hospitals, attendance of people in need of care, etc.
15	Furnishings	0.64	0.55	home furnishings and household items, like furniture, appliances, tools, linen; home services
16	Entertainment Durables	0.61	0.49	electric devices such as computers and TVs, bikes, musical and sports equipment, etc.
17	Vehicles	0.69	0.58	the purchase of new and used motor vehicles such as cars and motorbikes
18	Saving	0.32	0.56	

Table A2 - Top income levels and non-rich consumption

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
	Log(Consumption)			
Sample:	x<80th			
Log(80thPercentileIncome)	0.044*		0.044	0.045
	[0.024]		[0.029]	[0.031]
Log(90thPercentileIncome)		0.029		
		[0.027]		
Unemployment Rate				0.107
				[0.155]
State and year FEs	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Observations	156,495	156,495	156,495	156,495
R ²	0.637	0.637	0.638	0.638

Robust standard errors in brackets; Data source: SOEPv36

Table A3 - Top income levels and non-rich consumption

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
	Log(Consumption)			
Sample:	x<80th			
Log(80thPercentileIncome)	0.096*		0.072	0.075
	[0.049]		[0.055]	[0.053]
Log(90thPercentileIncome)		0.074		
		[0.046]		
Unemployment Rate				-0.161
				[0.210]
State and year FEs	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Observations	138,495	138,495	138,495	138,495
R ²	0.141	0.141	0.142	0.142

Robust standard errors in brackets; Data source: EVS, distribution based on SOEPv36

Table A4 - Home Equity Channel

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(Consumption)							
Sample:	x<80th							
Log(ConsumptionRich)	0.177***		0.137***	0.141***	0.163***		0.123***	0.127***
	[0.044]		[0.041]	[0.040]	[0.037]		[0.035]	[0.034]
Log(ConsumptionRich) *Homeowner	-0.040		-0.039	-0.038				
	[0.033]		[0.032]	[0.032]				
Log(ConsumptionVeryRich)		0.101**				0.087**		
		[0.041]				[0.033]		
Log(ConsumptionVeryRich) *Homeowner		-0.038						
		[0.032]						
Unemployment Rate				-0.172				-0.185
				[0.185]				[0.183]
Log(RealEstateWealth)					0.002***	0.002***	0.002***	0.002***
					[0.000]	[0.000]	[0.000]	[0.000]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	154,070	154,070	154,070	154,070	154,373	154,373	154,373	154,373
R ²	0.146	0.146	0.147	0.147	0.146	0.146	0.146	0.146

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. Log(ConsumptionRich/VeryRich) is the logarithm of the average consumption of all households above the 80th/90th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year. Homeowner is a dummy indicating whether the household owns any real estate and Log(RealEstateWealth) is the logarithm of total real estate wealth of a given household.

Table A5 - Do higher top income levels correlate with higher local prices?

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log(Local CPI)							
Sample:	State-Year Panel SOEP				State-Year Panel EVS			
Log(80thPercentileIncome)	-0.005	-0.011			-0.008	0.008		
	[0.008]	[0.007]			[0.017]	[0.015]		
Log(90thPercentileIncome)			-0.007	-0.010*			-0.001	0.009
			[0.006]	[0.006]			[0.018]	[0.016]
Unemployment Rate		-0.275***		-0.275***		-0.301***		-0.298***
		[0.032]		[0.032]		[0.077]		[0.075]
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific time trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	293	293	293	293	70	70	70	70
R ²	0.998	0.999	0.998	0.999	0.999	0.999	0.999	0.999

Data source: SOEPv36 and EVS, 1998 to 2018. The sample consists of a state-year panel. All CPI measures are from the national statistical authority with 2015 as the base year. Log(80th/90thPercentileIncome) are taken from SOEP data in columns 1 to 4 and from the EVS in columns 5 to 8. Log(LocalCPI) is the logarithm of the state-year CPI.

Table A6 - Consumption rich and non-rich consumption

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
	Log(Consumption)			
Sample:	x<80th			
Log(ConsumptionRich)	0.156*** [0.038]	0.180*** [0.048]	0.137** [0.046]	0.141** [0.046]
Log(ConsumptionRich)*Q2		-0.012 [0.028]	-0.010 [0.027]	-0.010 [0.027]
Log(ConsumptionRich)*Q3		-0.016 [0.033]	-0.014 [0.033]	-0.015 [0.034]
Log(ConsumptionRich)*Q4		-0.082* [0.045]	-0.077 [0.045]	-0.077 [0.045]
Unemployment Rate				-0.171 [0.191]
State and year FEs	Yes	Yes	Yes	Yes
State-specific time trends	No	No	Yes	Yes
Household income FEs	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Quintile FE	Yes	Yes	Yes	Yes
Observations	154,373	154,373	154,373	154,373
R ²	0.146	0.146	0.146	0.146

Data source: EVS, 1998 to 2018. The sample consists of household-year observations below the 80th percentile in the state-year income distribution. The dependent variable is defined as total household consumption over income for a given EVS household in a given state and year. We control for household characteristics, state and year fixed effects in all regressions. Log(ConsumptionRich) is the logarithm of the average consumption of all households above the 80th percentile of the state-year income distribution. Unemployment rate is the state unemployment rate in the respective year. Dummy variables Q2, Q3, and Q4 indicate whether a household ranks in the second, third or fourth quintile of the state-year income distribution.