# A Temporary VAT Cut as Unconventional Fiscal Policy[*]

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## Abstract

We exploit the temporary VAT cut by three percentage points in Germany in the second half of 2020 as a natural experiment to study the spending response to unconventional fiscal policy. We use survey and scanner data on households' consumption expenditures and their perceived pass-through of the tax change into prices to quantify the effects of this VAT policy. The temporary VAT cut led to a relative increase in durable spending of 37 percent for individuals with high perceived pass-through. Semi-durable spending also increased. According to a back-of-the-envelope calculation, the VAT policy increased aggregate consumption spending by 26 billion Euros, or 1.6 percent.

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*Changes in the VAT and sales taxes are salient. The causal chain is comprehensible to the average consumer. The news is actionable.* Valerie Ramey, 2021

# 1 Introduction

Monetary policy is often considered the preferred tool to stabilize business cycles because it can be implemented swiftly and because it does not rely on large fiscal multipliers to stimulate aggregate demand. When the effective lower bound (ELB) on nominal interest rates limits the effectiveness of conventional monetary policy, alternative policy measures are needed. Unconventional fiscal policy uses changes in consumption taxes to engineer an increasing path of prices of consumption goods, either through pre-announced increases or immediate, temporary cuts. With nominal interest rates fixed at the ELB, unconventional fiscal policy acts as a potential stimulus because higher expected future prices are tantamount to lower current real interest rates, which should incentivize consumption spending today.

The theoretical channel through which unconventional fiscal policy stimulates aggregate consumption expenditures is, hence, very similar to the transmission channel of conventional monetary policy and operates through the consumption Euler equation.[1] In addition to changing intertemporal trade-offs, a temporary VAT cut might, depending on the strength of Ricardian equivalence forces, also have temporary positive income effects for consumers. Differently from conventional and unconventional monetary policy, unconventional fiscal policy is salient and its causal chain comprehensible to the average consumer, who can act right away by adjusting the timing of purchases (Ramey, 2021). It can also be effective when agents do not have rational expectations (Bianchi-Vimercati, Eichenbaum, and Guerreiro, 2021), in contrast to forward guidance, whose effectiveness requires people to make very forward-looking decisions. All of the above, salience, comprehensibility, actionability, and simplicity leads us to expect that the estimated effects of unconventional fiscal policy on consumption are larger than those documented for monetary policy, which indeed we find.

We exploit as a natural experiment the unexpected announcement of the German federal government on June 3rd, 2020, about temporarily cutting the value added tax (VAT) rate, in order to study the consumption spending effects and transmission channels of unconventional fiscal policy. The announcement was passed into law on June 29th, 2020, became effective a few days later on July 1st, 2020, and lasted until December 31st, 2020. Using survey methods and scanner data, we find that Germans substantially increased their consumption expenditures, especially on durable goods, during the period of lower VAT.

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[1]See Shapiro (1991), Feldstein (2002), Hall (2011), Correia, Farhi, Nicolini, and Teles (2013), D'Acunto, Hoang, and Weber (2018, 2022), and Seidl and Seyrich (2022).

Both the intertemporal substitution and the positive income effect on consumers of a temporary VAT cut are only operative to the extent that retailers pass the lower taxes on to consumer prices. We do not investigate this first part of the transmission chain of VAT cuts, but the literature has demonstrated that such pass-through indeed occurred.[2]

The literature evaluating the consumption response to temporary VAT cuts and their stimulative and distributional consequences is relatively scant, partly because the idea of unconventional fiscal policy is relatively new and partly because the identification of its effects requires appropriate data. Investigating the effects of unconventional fiscal policy on households' consumption plans and actual expenditures poses three empirical challenges. First, in principle, changes in the VAT rate affect all consumers in an economy. Second, the econometrician needs to observe households' consumption plans and realizations in conjunction with a large set of potential determinants of households' spending such as income and expectations. Third, she needs to isolate a shock resembling a measure of unconventional fiscal policy. Generic VAT or sales tax changes do not qualify. The shock needs to be an unexpected announcement of a temporary immediate cut in consumption taxes, which disqualifies the majority of sales tax changes studied in the literature. Moreover, the announcement should not trigger a countervailing change in nominal central bank interest rates, so that the temporary VAT cut and the resulting increasing price path lead to lower *real* interest rates, which reduce households' saving motives and increase their consumption via intertemporal substitution. Therefore, studying the effects of a temporary VAT cut during the ELB period is particularly promising.

The specific time period during which our natural experiment took place poses additional identification challenges. During the second half of 2020, Germany was in the midst of the Covid-19 pandemic and an accompanying recession. The stated purpose of the temporary VAT cut was, therefore, to stimulate the German economy. It was part of a larger stimulus package, which also included, for instance, a direct transfer payment for families with children and tax relief measures for firms. Finally, the second half of any year exhibits particular seasonal spending patterns (e.g., summer vacations and Christmas).

We propose surveys as a means to overcome these multiple challenges. We elicit both (quantitative) spending data and information on the households' subjective perception of the temporary VAT cut. Surveys also provide us with substantial socio-demographic informa-

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[2]Fuest, Neumeier, and Stöhlker (2020) show this pass-through for retail prices, and Deutsche Bundesbank (2020) and Egner (2021) for aggregate consumer price inflation. Moreover, consistent with theory, pass-through was stronger in more competitive industries, as Montag, Sagimuldina, and Schnitzer (2021) show for gasoline prices. Blundell (2009) discusses the evidence for other countries, finds generally similarly high pass-through, and provides a general discussion of the theoretical effects of unconventional fiscal policy. See also Benzarti, Carloni, Harju, and Kosonen (2020) for a study of the potential asymmetries in (permanent) VAT change pass-through for a number of European Union countries.

tion and allow us to elicit psychological household characteristics, which serves two functions. First, we show that households' subjective perceptions of the temporary VAT cut, which are central for our first identification strategy, are largely independent of household characteristics. Second, socio-demographic information and psychological household characteristics help us understand the mechanism through which unconventional fiscal policy works.

Specifically, our analysis proceeds in two steps. First, from an ex-ante perspective, we elicited in July of 2020 qualitative spending plans for durables for the second half of 2020 and the level of informedness about the change in VAT. Most consumers knew about the cut in VAT but only a subset of them knew about the return to normal rates in January 2021. We split survey participants into those that were informed about the complete VAT path and others. We argue that only the former group has an intertemporal substitution motive, whereas the latter group has only an income effect from the perceived permanent VAT cut, if any. To be precise, those that knew that the VAT rate would increase again after six months also had a temporary perceived income effect, which should have been, however, (weakly) smaller than the perceived income effect of those who only knew about the VAT cut. Comparing the spending plans of the two groups, the ex-ante analysis, therefore, allows us to identify, along the extensive margin, a lower bound for the intertemporal substitution effect of the VAT policy on planned durable spending.

We establish with the ex-ante approach the existence of statistically and economically significant VAT-induced intertemporal substitution in durable consumption expenditures. Specifically, the change in VAT policy made households about 10 percentage points more likely to increase durable purchases relative to the second half of a normal year.

Second, from an ex-post perspective, we asked in January of 2021 survey participants about their realized quantitative durable consumption spending during the second half of 2020. We supplement the survey data for durables with scanner data covering spending on semi-durables and non-durables. We achieve identification by separating survey respondents according to their retrospectively perceived pass-through of the VAT cut to consumer prices. Consumers who do not believe that after-tax prices changed have again no motive to engage in intertemporal substitution in consumption. They do not perceive an income effect, either. Therefore, by comparing the spending behavior of consumer groups with different degrees of perceived VAT pass-through, we can identify the causal effect of the VAT policy on consumption spending.

We find that the temporary VAT cut led to a substantial relative increase in durable spending. Households with a high perceived pass-through spent about 37% more than those with low or no perceived pass-through based on our preferred estimate. Similarly, we find semi-durable spending was 10% higher for households that perceived a high pass-through

relative to other households. Non-durable consumption spending did not react. That is, the VAT policy effect is increasing in the durability of the consumption good, consistent with the consumption Euler equation in models with both durables and non-durables. We also find that the VAT policy effect, in particular for more durable goods, increases over time and is maximal right before the reversal of the VAT rate (see McKay and Wieland, 2021b, for similar effects from monetary policy). Finally, for durable consumption expenditures, we also find direct evidence on intertemporal substitution in that consumers who perceived a high VAT pass-through report in January 2021 that they plan to spend less on durables in the upcoming compared to the preceding half year.

In a back-of-the-envelope calculation, these micro estimates translate into an aggregate effect of 22 billion Euros of additional durable spending (10.8 percent of actual durable spending in 2020) and of 26 billion Euros of additional overall consumption spending (or 1.6 percent of actual aggregate consumption spending) due to the temporary VAT cut. The combined effect of increased consumption spending and the lower effective VAT tax rate resulted in a revenue short-fall for the fiscal authorities in the range of 12 to 15 billion Euros. The total consumption multiplier of 1.4 implied by these back-of-the-envelope calculations is roughly in line with the GDP multiplier of 1.6 that Clemens and Röger (2022) estimate in a standard New Keynesian DSGE model augmented by a durable goods channel.[3]

In the cross-section, two not necessarily overlapping groups of consumers drive the durable spending response: first, bargain hunters, i.e., households that self-report to shop around, or households that, in a survey experiment, turn out to be particularly price sensitive; second, younger households in a relatively weak financial situation. We also find no evidence that perceived credit constraints of households matter, nor their exposure to Covid-19. Finally, the stabilization success of the temporary VAT cut is related to its simplicity (Andre, Pizzinelli, Roth, and Wohlfart, 2021; D'Acunto, Hoang, Paloviita, and Weber, 2021). Its effect is not concentrated in households that are particularly financially literate or have long planning horizons for saving and consumption decisions. Hence, in contrast to unconventional monetary policy which often relies on consumer sophistication (see, e.g., Farhi and Werning, 2019; Woodford, 2019; Gabaix, 2020, for the case of forward guidance), unconventional fiscal policy is successful in stimulating aggregate consumption spending across a diverse spectrum of households. These results provide empirical support for the argument that salience, comprehensibility, actionability, and simplicity are important features of successful stabilization policies. Taken together, these findings suggest that the temporary VAT cut not only had a positive stabilization effect but also positive distributional implications.

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[3]The size of the multiplier might also be due to the amount of slack in the economy at the time of the implementation (Chodorow-Reich, 2019).

We add to the literature in that we study the quantitative and qualitative, aggregate and distributional consumption responses to temporary, unexpected VAT tax cuts both with an ex-ante but also an ex-post approach, using both survey and scanner data and using different sources of cross-sectional variation. Importantly, this identification working through different groups of households within a country avoids using other countries as the control group. The latter approach in the literature is sometimes combined with a staggered event study design which has recently been criticized by Orchard, Ramey, and Wieland (2022). Using surveys allows us to leverage expectation data and thus makes possible the ex-ante approach as a complement to the usual ex-post evaluations.

By contrast, D'Acunto, Hoang, and Weber (2022) exploit a pre-announced, permanent increase in the German VAT to study the qualitative consumption response of consumers. Similarly, Cashin and Unayama (2021) study a pre-announced increase in the Japanese VAT, using quantitative consumption data. Identification is achieved through a structural model rather than a quasi-experimental setup. Crossley, Low, and Sleeman (2014) study the 2008 surprise temporary VAT cut in the UK using other European countries as a control group but without identification from different groups of households which works even when the VAT cut itself was not exogenous to macroeconomic conditions.

Similarly to the three papers discussed so far, Büttner and Madzharova (2021) study VAT changes at the national level but with a focus on unit sales of a small subset of durables: household appliances. Unit sales, however, cannot reveal actual consumption changes, e.g., when consumers change the load size of the washing machines they purchase. For identification, Büttner and Madzharova (2021) use households in countries not facing tax changes as a control group but are potentially subject to the aforementioned critique on staggered difference-in-differences settings. By contrast, Baker, Kueng, McGranahan, and Melzer (2019) and Baker, Johnson, and Kueng (2021) study permanent sales tax changes at the sub-national level, the former focusing on car sales, the latter on non-durable consumer spending. Identification is achieved by comparing households in localities with and without the sales tax change. Compared to this approach, our across-household identification is less affected by local general equilibrium relative price movements, cross-border shopping, and possible intra-temporal substitution. Finally, Agarwal, Marwell, and McGranahan (2017) focus on temporary (with a typical duration of three to seven days) and pre-announced sales tax holidays at the sub-national level for a specific subset of goods and Agarwal, Ghosh, and Zhang (2022) study the consumption response around a national VAT reform in India using scanner data. For the German context, Bachmann, Bayer, and Kornejew (2021), Behringer et al. (2021), and Fuest, Neumeier, and Peichl (2021) provide descriptive evidence, broadly in line with ours, regarding the extensive margin effect of the 2020 VAT cut.

Figure 1: Google searches for "Mehrwertsteuer" (i.e., VAT)

## 2 Background and data

After the surge in Covid-19 cases in the winter and spring of 2020, the German government imposed substantial restrictions to daily life and business activities, resulting in a sharp economic contraction. To alleviate the economic costs on households and firms, the government announced in June of 2020 a second large-scale economic rescue package ("*Zweites Corona-Steuerhilfegesetz*"), which, unlike the first rescue package in March 2020, also included measures directed at households. A central part of the package was a temporary cut in general VAT. The regular VAT rate was cut by 3 percentage points from 19% to 16%. Germany also has a reduced VAT rate, which was cut by 2 percentage points from 7% to 5%. The reduced VAT rate is applied to products such as books, take-away food, and others. The standard VAT rate, in expenditure terms, applies to roughly half of the German consumption basket, the reduced rate to just under 20%. The rest, mostly rent payments, is not subject to VAT (see Egner, 2021). In Germany, the VAT is a federal tax.

The announcement of the temporary cut in VAT was largely unexpected. Figure 1 provides evidence that the VAT was not on top of Germans' minds before the announcement of the temporary decrease. If German households had expected the temporary decrease, they might have postponed purchases to the lower VAT period. This concern is less relevant in our setting because in both of our identification strategies the treatment and the control group would have had a similar incentive to postpone spending to the lower VAT period, allowing

us to identify the causal effect of unconventional fiscal policy.

To implement our first, i.e., the ex-ante approach, we added supplementary questions to the July 2020 wave of the Bundesbank Online Household Panel (BOP-HH), which is a representative online panel of the German population with well over 2,000 survey participants. The survey has been running monthly since April 2020 and focuses on eliciting subjective expectations.[4]

To implement our second, i.e., the ex-post approach, we make use of two separate surveys. First, we added supplementary questions to the January 2021 wave of the BOP-HH, which went into the field after the VAT rates had been raised back to their original levels. Second, we commissioned, also in January 2021, a survey with about 10,000 respondents through the Gesellschaft für Konsumforschung (GfK), a German survey firm specializing in consumer-oriented research. We combine the information from this commissioned survey with the scanner data on semi-durable and non-durable expenditures that the GfK collects regularly.[5] Except for standard socio-demographic background questions, we document all survey questions we use in this paper in Appendix B, both in the German original and English translation.

All three surveys elicit information about monthly net household income in the form of income brackets, of which we take the mid-point as the household's net income level. In addition, each survey asks for information about monthly non-durable consumption, either retrospectively or prospectively in the form of spending plans. We impose the following sample restrictions using these data. First, we limit the sample to households with a ratio of monthly non-durable consumption expenditures to monthly income below 1.5. Second, we eliminate monthly non-durable consumption expenditures below 100 and above 10,000 Euros.[6] Altogether, we eliminate 12%, 2%, and 5% of the observations, respectively, for the BOP-HH July 2020, BOP-HH January 2021, and GfK January 2021 surveys.[7]

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[4]The design follows the New York Fed Survey of Consumer Expectations (Crump, Eusepi, Tambalotti, and Topa, 2021), and the survey was thoroughly tested with three pilot waves in 2019.

[5]The GfK provides the German input to the EU-harmonized consumer sentiment survey. Its scanner data are comparable to Nielsen scanner data in the US, see, e.g., Coibion et al. (2022).

[6]Given the different foci of the three surveys, we implement "monthly non-durable consumption expenditures" slightly differently across surveys: for the BOP-HH July 2020 survey, we use the expected monthly non-durable consumption expenditures for the second half of 2020 (Q11 in Appendix B); for the BOP-HH January 2021, the actual non-durable consumption expenditures from the previous month (Q17); and for the GfK survey, we use realized average monthly non-durable consumption expenditures for the second half of 2020 (Q26).

[7]Given the focus on expectations in the BOP-HH July 2020 survey, we implement a third sample restriction: expected non-durable consumption expenditures for the second half of 2020 is less than twice the typical non-durable consumption expenditures for a second half of a year.

# 3   Results

We first discuss the results from our ex-ante approach, which establishes the *existence* of statistically and economically significant intertemporal substitution of durable consumption expenditures during the second half of 2020 due to the VAT policy. Afterwards, with our ex-post approach, we *quantify* the VAT policy's effect on durable consumption expenditures in the same time period. In both approaches, we study which households predominantly change their durable consumption expenditures. Then we provide quantitative evidence for intertemporal substitution by showing that households, who perceived a high pass-through of the VAT cut, planned to reduce their durable consumption spending in the first half of 2021. We close this section with evidence on semi- and non-durable consumption and a back-of-the-envelope calculation of the aggregate effects of the VAT policy.

## 3.1   The ex-ante approach

For the ex-ante approach, we exploit a qualitative question asking participants in the BOP-HH July 2020 wave whether their planned durable consumption spending in the second half of 2020 is more, the same, or less than in a normal, i.e., pre-pandemic, second half of a year.

In addition, we asked those households that were planning to spend more on durables for their reasons of doing so. Panel A of Figure 2 shows the most important reasons are of an idiosyncratic nature, e.g., long-standing spending plans. Increases in asset values and income play a relatively minor role. Importantly, the VAT policy directly, but also indirectly through expected lower prices in the second half of 2020 and expected higher prices in 2021, constitutes the second most important group of reasons for households to increase their planned durable spending. Finally, Figure 2, Panel A, also shows that the children bonus ("Kinderbonus"), a direct transfer payment of 300 Euros per child for families with children, which was also part of the German stimulus package announced in June 2020, played only a minor role. The right-hand side of Panel A shows that, even focusing on families with children, the VAT policy dominates the children bonus as a reason for increasing durable spending plans.

To isolate the effect of the VAT policy on consumption spending from other channels, we elicited survey participants' level of informedness about the VAT policy. While almost all consumers knew in July 2020 that the VAT was cut, consistent with heightened public interest about the VAT as shown in Google-search volumes ()Figure 1), only about 60 percent knew about the full path; that is, they also knew about the planned (and indeed later executed) return to the old value in January 2021 (see the left-hand side of Panel B in Figure 2).[8]

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[8]The question that elicits the degree of the participants' informedness was asked after the consumption questions without the possibility to go back in the questionnaire.

Figure 2: The ex-ante approach

A) Reasons for increased durable spending plans

B) Identification: informedness
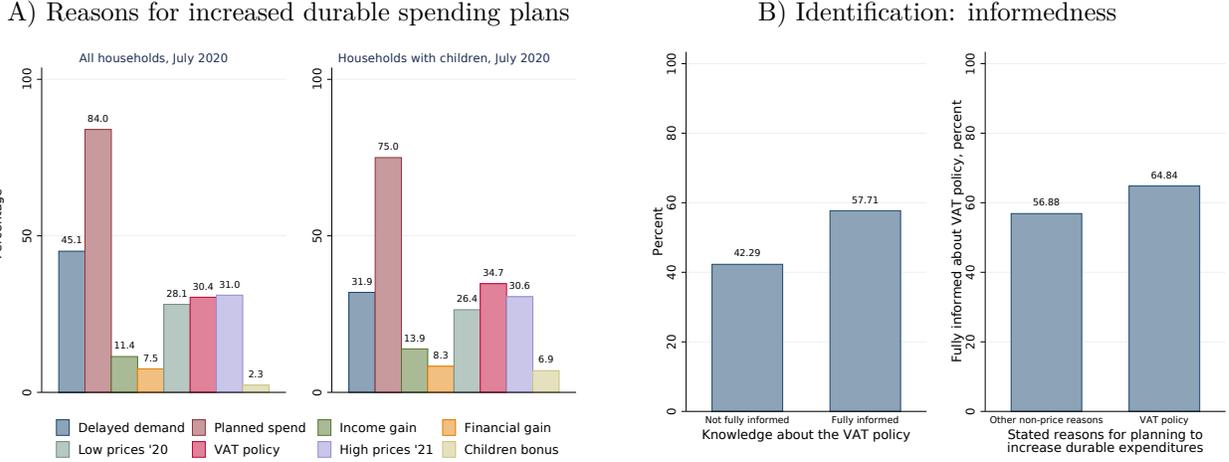


*Notes:* Panel A: After the respondents answered the question about their durable spending plans (Q2 in Appendix B), those that answered they would increase were asked about their reasons for planning to do so (Q3). They were given eight reasons which they could evaluate on a four-point intensity scale. Panel shows the fractions of respondents that chose the highest two answers on this intensity scale. Panel B, left-hand side: shows fraction of respondents that were informed about the full VAT path (Q1). Panel B, right-hand side: shows share of fully informed for those survey respondents that plan to increase their durable consumption spending in the second half of 2020, split into those that self-report the VAT policy and those that give other non-price reasons.

We then estimate a regression in which the qualitative durable consumption spending plans are regressed on a dummy variable which takes a value of zero when survey respondents state that they only know about the decline in the VAT but not about the return to normal rates in January 2021; and which takes a value of one when survey respondents are informed about the complete VAT path. We argue the coefficient on this dummy variable captures a lower bound for the causal intertemporal substitution effect of the temporary VAT cut, through durable consumption spending. Any perceived income effect, if it exists,[9] should be (weakly) larger for the not fully informed.

Identification of this effect of the temporary VAT cut requires, at the minimum, that the level of informedness about the full path of the VAT is uncorrelated with observable characteristics of the respondents that also determine their spending decisions. Figure 3 provides direct evidence that the level of informedness does not vary by gender, age, education, employment status, children, income, and net wealth. Figure A.1 in the Online Appendix, in addition, shows that the level of informedness is also uncorrelated with both the past local Covid-19 exposure of the household and its expected duration of Covid-19 restrictions.

One might also be worried about reverse causality in our ex-ante approach. Consumers who plan to buy durables in general might have a higher probability of being informed about

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[9]Income effects are the smaller, the more Ricardian households perceive the VAT policy to be.

Figure 3: The ex-ante approach. Balancedness according to respondent characteristics
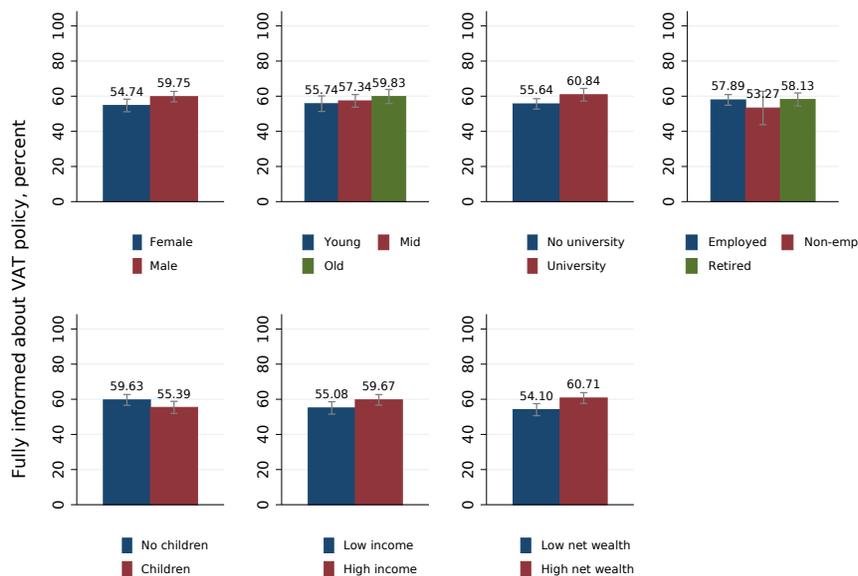


*Notes:* Panels show fraction of respondents that were informed about the full VAT path (Q1) according to the following respondent characteristics: gender, age, education, employment status, children, income, net wealth. Low/high cut uses the median as threshold. "Young" denotes below age 45, "Mid" between 45 and 60, and "Old" above 60. Whiskers represent 95 percent confidence intervals.

the full future VAT path. This argument should, however, be independent of the reasons for buying these durables: simply visiting the Amazon website, for example, makes it more likely, in this alternative narrative, to become informed about the full future VAT path. The right-hand side of Panel B in Figure 2 shows that this concern is not warranted. The graph presents the share of fully informed households, split into those that self-report the VAT policy as a reason for their planned durable consumption spending increase in the second half of 2020, and those that give reasons unrelated to prices. The former are substantially more informed about the full VAT path than the latter, making it unlikely that consumers are merely informed because they are planning to purchase a durable anyway.

Columns (1) and (2) of Table 1 present our baseline results from the ex-ante approach: Informed households are about 10 percentage points more likely to increase durable purchases compared to uninformed consumers and relative to the second half of a normal year. To put this number into perspective, we gather from the BOP-HH January 2021 wave that, in the second half of 2020, 29% of respondents did not buy any durables at all. A 10 percentage point change in the extensive margin of durable consumption spending is, therefore, economically significant. In addition, these ex-ante results alleviate concerns that consumers in our ex-post analysis might aim to justify their shopping behavior in the second half of 2020 through simply claiming that they perceived low prices.

Table 1: Durable spending plans and knowledge about the VAT path, July 2020 survey

| Plans to buy durables | Full Sample | | Net Wealth | | Expected Income Change | | Age | | | Expected Inflation | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | w/o controls | controls | Low | High | Low | High | Young | Mid | Old | Low | High |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| **2020HY2 vs. typical second half-year** | | | | | | | | | | | |
| Fully informed | 0.098*** | 0.086*** | 0.163*** | 0.026 | 0.182*** | 0.024 | 0.153** | 0.097* | 0.078 | 0.039 | 0.109*** |
| | (0.033) | (0.032) | (0.048) | (0.044) | (0.049) | (0.044) | (0.066) | (0.056) | (0.049) | (0.059) | (0.042) |
| Constant | -0.241*** | -1.074*** | -0.378*** | -0.112*** | -0.364*** | -0.134*** | -0.146*** | -0.246*** | -0.304*** | -0.159*** | -0.256*** |
| | (0.025) | (0.150) | (0.034) | (0.035) | (0.035) | (0.034) | (0.048) | (0.044) | (0.038) | (0.047) | (0.031) |
| Observations | 1,794 | 1,781 | 806 | 978 | 770 | 988 | 462 | 601 | 731 | 559 | 1,100 |

*Notes*: Results based on OLS regressions using data from the July 2020 wave of BOP-HH. We code the answer to Q2 in Appendix B "more durable consumption spending than in a normal year" as +1, "same" as 0, and "less" as -1. Column (2) includes additional controls for gender, age, education, employment status, having children, the households' income and net wealth, as well as controls for the federal state and the municipality size the household lives in. Table A.1 in Appendix A reports the coefficients on the controls and also presents results for a regression in which, in addition to the household-specific socio-economic controls, we add a battery of the households' expectations about relevant idiosyncratic and aggregate economic variables. For the low/high cuts, we always use the median of the corresponding variable as threshold. "Young" denotes below age 45, "Mid" between 45 and 60, and "Old" above 60. The splits for "Net Wealth", "Expected Income Change", and "Expected Inflation" are based, respectively, on Q4–Q6. Robust standard errors (in parentheses). Significance levels, $* p < 0.1$, $** p < 0.05$, $*** p < 0.01$.

### 3.1.1 Heterogeneity

Next, we estimate a number of regressions with sample splits to tease out potential hetero-geneities in the reaction of planned durable consumption spending to the VAT policy and to analyze its possible transmission channels. We report the results in columns (3)–(11) of Table 1. The effect is stronger for households with low own income change expectations over the next twelve months. It is also stronger for households with low net wealth. In that sense, the temporary VAT cut has a progressive effect. Finally, the positive effects of the VAT policy are also stronger for younger households.

These results raise the question whether household age and net wealth/expected income change merely proxy for each other in these split-sample regressions. Table A.2 in Appendix A shows that this is indeed the case: it is young and middle-aged households in a less favorable financial situation, i.e., low net wealth and low expected incomes, that drive the aggregate intertemporal substitution effect. By contrast, young and middle-aged households, which find themselves in a financially favorable situation, and old households, regardless of their financial situation, do not plan to spend more on durables. That older households do not appear to react with increased durable consumption spending to the temporary VAT cut is consistent with the notion that their shorter planning horizon compared to young and middle-aged households makes them, on average, mere net users of their existing durable capital stock that is less likely to require adjustment.

Finally, the last two columns of Table 1 show that an intertemporal substitution channel likely explains our results: The positive effect of the temporary VAT cut on durable spending is concentrated in households that expect high future inflation (a question that is asked in the standard part of the BOP-HH), that is, for consumers with a stronger intertemporal substitution motive.

### 3.1.2 Robustness

One advantage of using expectational survey data is the availability of a battery of household expectations about idiosyncratic and aggregate economic variables that are relevant for con-sumption decisions. Column (3) of Table A.1 in Appendix A shows that our result is robust to controlling for these expectations.

We also find that the estimated effects are similar when we split the sample into households with high/low previous local Covid-19 exposures or long/short expected duration of Covid-19 restrictions in Table 2. The first result means that potential differences in forced savings due to prior differential Covid-19 exposure at the beginning of the pandemic with its severe restrictions on public life are not driving our results. The second result implies that potential

Table 2: Durable spending plans and knowledge about VAT path—Covid-19, July 2020

| Plans to buy durables | All | Covid-19 cases | | Exp. pandemic duration | |
| | | Low | High | Low | High |
| **2020HY2 vs. typ. sec. half-year** | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Fully informed | 0.098*** | 0.096** | 0.099** | 0.099** | 0.094** |
| | (0.033) | (0.046) | (0.046) | (0.047) | (0.046) |
| Constant | -0.241*** | -0.233*** | -0.249*** | -0.215*** | -0.257*** |
| | (0.025) | (0.035) | (0.035) | (0.035) | (0.036) |
| Observations | 1,794 | 902 | 892 | 845 | 931 |

*Notes:* Results based on OLS regressions using data from the July 2020 wave of BOP-HH (no additional controls). We code the answer "more durable consumption spending than in a normal year" as +1, "same" as 0, and "less" as -1. Low/high cut uses the median as threshold. "Covid-19 cases" are the cumulated cases from the beginning of the pandemic until July 12, 2020, at the county (Kreis) level per 100K population. The data is merged to the BOP data through a county identifier (Kreiskennziffer). "Exp. pandemic duration" is based on Q10, which asks about the expected duration of Covid-19 restrictions. Robust standard errors (in parentheses). Significance levels, $* \ p < 0.1$, $** \ p < 0.05$, $*** \ p < 0.01$.

differences in the incentives to pull forward durable consumption expenditures are unlikely to be drivers of our results, either.

The recent HANK literature discusses financial constraints as a potential limit to intertemporal substitution. In Germany, it turns out that households do not self-report to be constrained. For example, only three percent in the July 2020 wave of BOP-HH report that they could not borrow to cover their expenditures next month. The vast majority—more than 80 percent—is confident that they can cover their expenditures out of their flow incomes. An additional eleven percent might have to tap into their savings and five percent report to be able to borrow with difficulties in order to cover their expenditures. The numbers are nearly identical for expenditures over the next six months. Finally, the July 2020 wave of BOP-HH is not special in this regard. We see similar numbers in the April and May waves of the BOP-HH and in the most recent wave of the German Panel on Household Finances (PHF) in 2017, also administered by the Bundesbank.

## 3.2 The ex-post approach

We now turn to study the actual consumption response in the second half of 2020, i.e., the period during which the VAT was temporarily lower. To do so, we use two different surveys and scanner data on household spending.

Figure 4: The ex-post approach. Identification: perceived pass-through
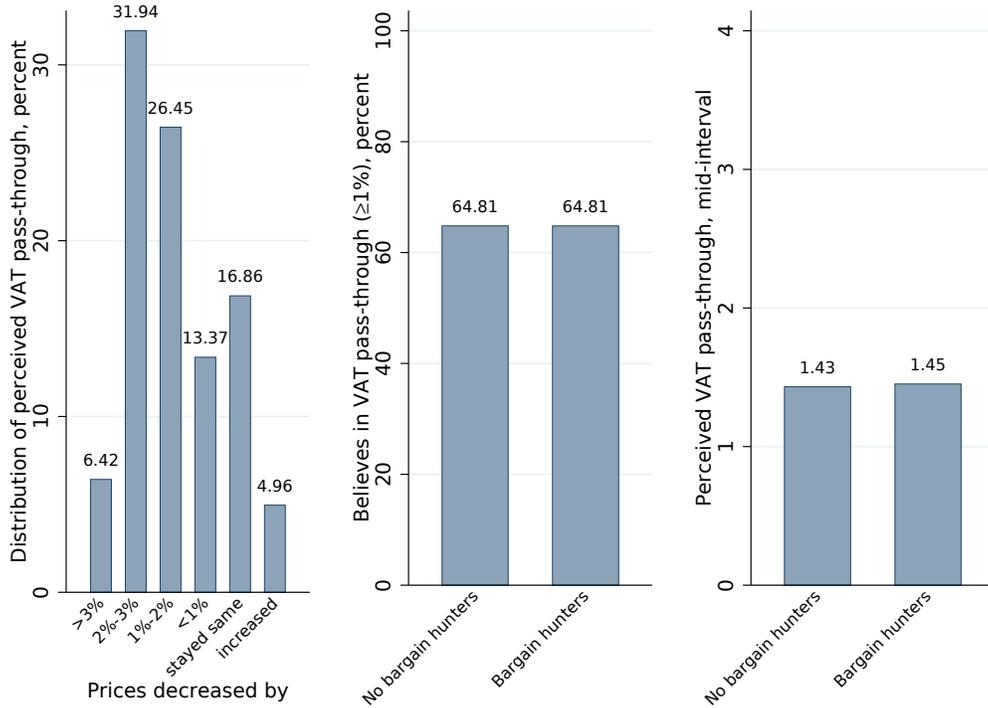


*Notes:* Graphs show the distribution of perceived VAT pass-through (left panel), the fraction of respondents which perceive a pass-through of equal to or larger than 1 percent (middle panel) and their average perceived pass-through (right panel) by being a bargain hunter or not from the January 2021 BOP-HH survey (Q12 in Appendix B). We classify respondents as bargain hunters if they answer with the highest category on the intensity scale of Q14.

### 3.2.1 Durables in 2020

For the ex-post approach, we asked participants in two separate surveys retrospectively about their realized durable consumption spending in Euro during the second half of 2020: BOP-HH January 2021 and GfK January 2021. In addition, we elicited the survey participants' perceived pass-through of the VAT cut to consumer prices in both surveys. Approximately two thirds of households perceived a pass-through to consumer prices of equal to or more than 1% in the BOP-HH January 2021 (see Figure 4, left panel; Figure A.2 in the appendix shows this perceived pass-through distribution for the GfK survey). This identification approach avoids the need to ask survey respondents to form their own counterfactuals about their spending reaction to the VAT policy as in "How did you change your spending behavior due to the VAT policy?"

In addition, employing two surveys has the following advantages: First, it allows us to corroborate our main aggregate result that the temporary VAT cut stimulated durable

consumption from two independent sources. At the same time, being able to ask different questions across surveys enables us to investigate a broader set of respondent heterogeneities and thus potential transmission channels.[10] Second, with the GfK survey data, we gain access to the GfK scanner data on non-durable and semi-durable spending for the surveyed households.

We begin by estimating a regression with realized durable spending during the second half of 2020 (or rather its inverse hyperbolic sine transformation to account for zero or near-zero durable spending) as the dependent variable.[11] The main regressor is a dummy variable which takes a value of zero when survey respondents state that they perceived a low degree of pass-through and which takes a value of one when survey respondents perceived the pass-through to be high (see notes to Table 3 for details). Our argument is that consumers who do not believe that after-tax prices decreased as a result of the VAT cut have no motive to increase (durable) spending.

As in the ex-ante approach, we verify in Figures A.3 (for BOP-HH January 2021) and A.4 (for GfK January 2021) in Appendix A that perceived pass-through is uncorrelated with the following observable characteristics of the respondents: gender, age, education, employment status, children, income, and net wealth. This result is true when we measure perceived pass-through through the fraction of respondents on either side of a pass-through threshold (upper panels) and when we measure it as the average perceived pass-through (lower panels).

Revisiting the question of reverse causality, one might be worried that frequent and more price-sensitive shoppers are more likely to observe the actual pass-through—recall that the literature has documented substantial pass-through—and are therefore more likely to report a high perceived pass-through. We, therefore, include an additional question in the January 2021 BOP-HH that asks households whether they would consider themselves "bargain hunters", that is, we asked them whether they usually are very attentive to prices and search for good deals. If the reason for the perceived pass-through of the VAT cut was merely heightened shopping activity, our identification would not be valid. However, the middle and right panels of Figure 4 show that bargain hunters and non-bargain hunters have roughly the same level of perceived pass-through.

Columns (1) and (2) of Table 3 present our estimates based on the BOP-HH (Panel A) and the GfK survey data (Panel B), both for regressions with just the dummy variable defined above plus a constant, and for regressions with household-specific controls (see table notes). According to our preferred estimate, with controls and based on the GfK survey with

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[10]Researchers are limited in the number of questions they can add to the BOP-HH.

[11]The inverse hyperbolic sine transformation of a variable $x$ is defined as $\log(x+\sqrt{x^2+1})$. In particular, the inverse hyperbolic sine transformation of zero is zero. We also note that, away from zero, this transformation is close to the natural logarithm, which means that our estimates can be interpreted in percentage terms.

Table 3: Durable spending and beliefs about VAT pass-through, January 2021 surveys

**A) BOP-HH, January 2021**

| Euro spending on durables in 2020HY2 | Full Sample | | Bargain Hunter | | Net Wealth | | Age | | |
|---|---|---|---|---|---|---|---|---|---|
| | w/o controls (1) | controls (2) | Yes (3) | No (4) | Low (5) | High (6) | Young (7) | Mid (8) | Old (9) |
| High perceived pass-through | 0.418** (0.167) | 0.558*** (0.210) | 0.875*** (0.321) | 0.238 (0.195) | 0.710*** (0.245) | 0.128 (0.265) | 0.656** (0.322) | 0.745** (0.306) | 0.072 (0.254) |
| Constant | 5.125*** (0.136) | -2.513 (2.055) | 4.709*** (0.264) | 5.288*** (0.157) | 4.943*** (0.197) | 5.489*** (0.222) | 5.448*** (0.268) | 5.258*** (0.249) | 4.828*** (0.206) |
| Observations | 2,242 | 1,401 | 637 | 1,605 | 911 | 981 | 550 | 668 | 982 |

**B) GfK, January 2021**

| Euro spending on durables in 2020HY2 | Full Sample | | Price Sensitive | | Public Servant | | Financial Literacy | | | Planning in Advance | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | w/o controls (1) | controls (2) | Yes (3) | No (4) | Yes (5) | No (6) | Yes (7) | Somewhat (8) | No (9) | Yes (10) | No (11) |
| High perceived pass-through | 0.496*** (0.074) | 0.321*** (0.082) | 0.517*** (0.091) | 0.277** (0.131) | 0.589*** (0.167) | 0.447*** (0.082) | 0.278** (0.138) | 0.554*** (0.116) | 0.563*** (0.131) | 0.452*** (0.101) | 0.441*** (0.105) |
| Constant | 4.835*** (0.060) | -2.659*** (0.651) | 4.691*** (0.073) | 5.558*** (0.109) | 5.183*** (0.140) | 4.778*** (0.066) | 5.160*** (0.114) | 4.733*** (0.094) | 4.731*** (0.104) | 5.356*** (0.084) | 4.385*** (0.083) |
| Observations | 10,243 | 7,916 | 6,619 | 3,058 | 2,045 | 8,169 | 3,067 | 4,049 | 3,097 | 5,126 | 5,104 |

*Notes*: Results based on OLS regressions using data from the January 2021 waves of BOP-HH (Panel A) and GfK (Panel B). The left-hand-side spending data on durables have been transformed with the inverse hyperbolic sine transformation (Q13 in Appendix B for the BOP-HH January 2021 and Q19 for the GfK). We code any answer with "perceived pass-through of $< 1\%$" as 0, and $\geq 1\%$ as 1 for BOP-HH January 2021; for GfK (Q12), we code any answer with "perceived pass-through of $\leq 0\%$" as 0, and $> 0\%$ as 1. Column (2) includes additional controls for gender, age, education, employment status, having children, the households' income and net wealth, as well as controls for the federal state and the municipality size the household lives in. We classify respondents as bargain hunters if they answer with the highest category on the intensity scale of Q14. Low/high cuts for "Net Wealth" (Q15) use the median as threshold. "Young" denotes below age 45, "Mid" between 45 and 60, and "Old" above 60. To gauge price sensitivity, we expose consumers to hypothetical price-change scenarios and then ask them about their overall consumption spending response (Q20). We then estimate for every consumer a substitution elasticity. We split the consumers according to the median substitution elasticity. "Public servant" is the result of a simple "yes or no" question (Q21). "Financial literacy" is self-reported on a scale between 0 (very financially literate) and 10 (no financial literacy) (Q22). "Yes" if score $\geq 3$ and $<6$, "Somewhat" if score$<3$, "No" if score $\geq 6$. "Planning in Advance" is 0 if respondents state that they always decide "in the moment" (Q23). Robust standard errors (in parentheses). Significance levels, $* p < 0.1$, $** p < 0.05$, $*** p < 0.01$.

smaller estimation uncertainty due to a larger sample size, households that perceived the VAT pass-through to be high report about 37 percent higher durable spending in the second half of 2020.[12,13]

### 3.2.2 Heterogeneity

As for heterogeneity, we find three results with the BOP-HH January 2021 survey, documented in Table 3, columns (3) to (9) of Panel A. First, we confirm the result from the ex-ante approach that it is, in particular, young and middle-aged households with low net wealth that increase their durable spending in reaction to the temporary VAT cut (see also Table A.5 in Appendix A for details). Second, focusing on a different dimension of heterogeneity, we show that the aggregate result is mainly driven by bargain hunters, i.e., households that self-report as being very attentive to prices and searching for good deals. Third, as Table A.5 shows, having low net wealth contributes to the aggregate positive effect on durable spending independently of whether the household is also a bargain hunter.

Investigating heterogeneity in the GfK January 2021 survey, we find the following three results (see Table 3, columns (3) to (11) of Panel B). First, just as with the bargain hunters in the BOP-HH, more price-sensitive consumers show a stronger tendency to increase their durable spending in the second half of 2020.[14] Second, the reaction barely depends on whether a household member is employed as a public servant, which is a sign that pandemic-related income shocks—which should not affect public servants—are not especially relevant for our analysis. This finding is broadly consistent with the finding from the ex-ante analysis that the Covid-19 pandemic did not seem to interfere strongly with the effects of the VAT policy. Third, the table also shows the stabilization success of the temporary VAT cut is not concentrated in households that are particularly financially literate or self-report a long planning horizon in decision making. These findings are consistent with the results in Bianchi-Vimercati, Eichenbaum, and Guerreiro (2021) and the postulate in Ramey (2021) that successful stabilization policy should be salient, comprehensible, actionable, and simple.

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[12]Since we use an inverse hyperbolic sine transformation on the left-hand side of our regressions, the estimated coefficients do not exactly represent elasticities. We use the correction formula (12) in Bellemare and Wichman (2019) to compute elasticities: $\exp(\hat{\beta} - 0.5 var(\hat{\beta})) - 1$, where $\hat{\beta}$ is the estimated coefficient.

[13]Unobservables are unlikely to drive out the effect we estimate for the perceived path-through coefficient. For all path-through regressions, following Oster (2019), we compare the point estimates in a model without any controls and with the full set of controls while taking $R^2$ movement into account, and find that selection on unobservables would have to be more than twice as important as selection on observables.

[14]Whereas in the BOP-HH January 2021 wave we asked survey participants to self-identify whether they are price sensitive, that is, bargain hunters, in the GfK January 2021 survey, we used a different but complementary strategy to measure their price sensitivity. We exposed survey participants to hypothetical price-change scenarios and then asked them about their consumption spending response. We then estimate for every respondent a substitution elasticity. The regression in Table 3, Panel B, then splits the respondents according to the median substitution elasticity.

### 3.2.3 Robustness

Tables A.3 and A.4 in Appendix A provide a number of econometric robustness specifications: First, as an alternative to OLS, we also estimate Tobit regressions. Second, we measure pass-through as the average perceived pass-through instead of as the fraction of respondents on either side of a threshold. Third, we re-estimate the specifications without controls on the same sample as those specifications with controls. Across all specifications, we find evidence of a substantial, positive durable consumption effect due to the VAT policy.

### 3.2.4 What about durables in 2021?

Table 4: Expected durable spending growth between 2021HY1 and 2020HY2, GfK survey

| Difference in Euro spending 2021HY1 - 2020HY2 | No controls (1) | Socio-economic controls (2) | Socio-economic and exp. controls (3) | No controls on sample (3) (4) | Socio-economic controls on sample (3) (5) |
|---|---|---|---|---|---|
| High perceived pass-through | -267.789** (105.226) | -212.541* (120.289) | -255.020* (130.809) | -261.300** (128.205) | -254.874* (130.385) |
| Constant | -284.268*** (81.143) | 3,024.824*** (972.539) | 2,907.950*** (1,057.773) | -346.142*** (96.848) | 2,904.462*** (1,067.879) |
| Observations | 10,243 | 7,916 | 7,175 | 7,175 | 7,175 |

*Notes:* Results based on OLS regressions using data from the January 2021 wave of GfK. The left-hand-side is the difference in durable spending (in Euro) in the first half of 2021 (Q25 in Appendix B) and the second half of 2020 (Q19). We code any answer with "perceived pass-through of $\leq 0\%$" as 0, and $> 0\%$ as 1 (Q18). Socio-economic controls include income, net wealth, age, gender, education, employment status, children. Expectations controls include inflation expectations. Robust standard errors (in parentheses). Significance levels, $* \, p < 0.1$, $** \, p < 0.05$, $*** \, p < 0.01$.

A natural question in the context of intertemporal substitution is whether those households that perceived the high pass-through in the second half of 2020 and thus, according to the results from the previous subsection, spent more on durables in the second half of 2020, then plan to reduce their durable consumption spending in 2021. Using the large-sample GfK survey from January 2021 and a question therein, which asks about planned durable consumption expenditures for the first half of 2021, we can regress the within-household planned consumption change between the first half of 2021 (with restored VAT rates) and the second half of 2020 (with lowered VAT rates) on our perceived VAT pass-through dummy variable. Table 4 shows that indeed those households that perceived a high pass-through in the second half of 2020 plan to spend between 200 and 300 Euros less on durable consumption goods in the first half of 2021.[15] To put this number into perspective, we note that the average durable consumption expenditures in the second half of 2020 were about 1,642 Euros in

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[15]We also find a similar magnitude for the point estimate in the BOP-HH January 2021. However, due to the much smaller sample size, these estimates are noisier and not statistically significant.

the GfK survey. Hence, Table 4 provides direct, within-household evidence of intertemporal substitution.

### 3.2.5 Semi- and non-durables in 2020

Using the same identification strategy as with durable spending, we exploit the scanner data of the GfK and re-estimate our baseline regression on semi-durable and non-durable spending. Examples for semi-durables in the GfK scanner data are books, cutlery, and car accessories; non-durables are essentially food items.

According to theory, we would expect the extent of intertemporal substitution to increase in the durability of the consumption good.[16] To see this point, suppose that a household receives flow utility from non-durable consumption, $C_t$, and a stock of durable goods, $D_t$: $U(C_t, D_t)$. The flow utility function has standard properties, and the future is discounted by the factor $0 < \beta < 1$. The household receives a flow of real income each period, $Y_t$, and enters the period with a stock of nominal financial assets, $A_t$, which offer a nominal gross return $R_t$. Let $P_t$ denote the price of goods. The stock of durables depreciates at rate $0 < \delta < 1$. A potentially time-varying consumption tax $\tau_t$ also exists. The flow budget constraint is then given by: $A_{t+1} + (1 + \tau_t) * (P_t C_t + P_t (D_t - D_{t-1}) + \delta P_t D_{t-1}) \leq P_t Y_t + R_t A_t$. Abstracting from uncertainty and denoting the gross inflation rate as $\Pi_t \equiv P_t / P_{t-1}$, the first-order conditions can be combined to yield:

$$\frac{U_D(C_t, D_t)}{U_C(C_t, D_t)} = \left( 1 - (1 - \delta) \frac{1 + \tau_{t+1}}{1 + \tau_t} \frac{\Pi_{t+1}}{R_{t+1}} \right) \ .$$

Under certain assumptions on preferences (for example, a log-log-specification), we have that an increase in the consumption tax must raise $D_t/C_t$ (just as a decrease in the real interest rate). The effect of the VAT policy on $D_t/C_t$ is the stronger, the lower is $\delta$, that is, the more durable is $D$. Put differently, durable consumption expenditures should be more consumption-tax sensitive than non-durables. Again, this relation is formally equivalent to the sensitivity to real interest rates; for structural VAR evidence see Erceg and Levin (2006) and Monacelli (2009), and McKay and Wieland (2021a) for a model making a related point.

We show in Table 5, columns (1) and (3), that the stimulative effect of the temporary VAT cut increases in the durability and thus the intertemporal substitutability of the underlying consumption good. To be precise, semi-durables spending is elevated for the high perceived pass-through households relative to their counterparts by 10%, while non-durables spending

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[16] A similar argument holds for long-lived investment capital goods, as House and Shapiro (2008) argue both theoretically as well as empirically using bonus depreciations in the United States.

Table 5: Semi-durable and non-durable spending and beliefs about VAT cut pass-through, GfK scanner data

| Euro spending in HY2 of | Semi-durables | | Non-durables | |
|---|---|---|---|---|
| | 2020 | 2019 | 2020 | 2019 |
| High perceived pass-through | 0.093** | 0.052 | 0.016 | 0.016 |
| | (0.039) | (0.040) | (0.010) | (0.011) |
| Constant | 2.212*** | 2.861*** | 5.392*** | 5.641*** |
| | (0.335) | (0.330) | (0.086) | (0.090) |
| Controls | Yes | Yes | Yes | Yes |
| Observations | 6,477 | 5,820 | 7,517 | 6,620 |

*Notes:* Results based on OLS regressions using GfK scanner data from the second half-year of 2020 and 2019, respectively. The left-hand-side spending data on, respectively, semi-durables (columns 1-2) and non-durables (columns 3-4) have been transformed with the inverse hyperbolic sine transformation. We code any answer with perceived pass-through of $\leq 0\%$ as 0, and $> 0\%$ as 1 for GfK (Q18 in Appendix B). Note that perceived pass-through is always measured in the 2021 GfK survey and referring to 2020HY2. Controls include gender, age, education, employment status, having children, the households' income and net wealth, as well as controls for the federal state and the municipality size the household lives in. Robust standard errors (in parentheses). Significance levels, $* \ p < 0.1$, $** \ p < 0.05$, $*** \ p < 0.01$.

exhibits no statistically significant difference between the two household groups.[17]

The scanner data of the GfK have the additional advantage that they cover pre-pandemic times, in particular the second half of 2019. These data allow us to estimate a placebo regression for semi- and non-durable consumption spending in columns (2) and (4) of Table 5: Reassuringly, those households which perceived a high pass-through of the temporary VAT cut in the second half of 2020 did not have statistically significantly different spending on semi-durables and non-durables in the second half of 2019. The increasing effect in durability also alleviates concerns that unobserved household heterogeneity drives our results because otherwise we should also see similar point estimates for non-durables as we see for durables and semi-durables.

Figure 5 provides additional evidence consistent with an intertemporal substitution mechanism. This figure shows the spending coefficients for respondents with a high perceived pass-through based on two-months rolling window regressions, both for semi-durables and non-durables in the GfK scanner data. The VAT policy effect is stronger for semi-durables

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[17]To be clear: We do not mean to say that standard consumption-Euler-equation reasoning predicts a close-to-zero effect for non-durable consumption spending. That is an empirical result in our context. Theory does predict the relative sizes of the effects across the durability of the consumption goods, which we confirm in our findings.

Figure 5: Time path of spending response
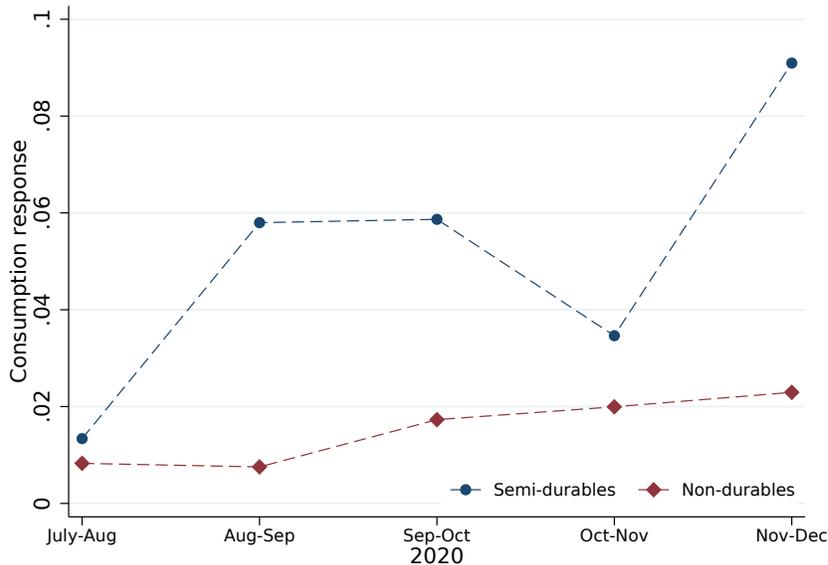


*Notes:* Coefficients based on OLS regressions using GfK scanner data. The OLS regressions have been pooled over two-month windows. The left-hand-side spending data on, respectively, semi-durables and non-durables have been transformed with the inverse hyperbolic sine transformation. We code any answer with perceived pass-through of $\leq 0\%$ as 0, and $> 0\%$ as 1 in the GfK data. Controls include gender, age, education, employment status, having children, the households' income and net wealth, as well as controls for the federal state and the municipality size the household lives in.

than for non-durables for every point in time and it increases, in particular for semi-durables, towards the expiration date of the VAT cut, i.e., to the point right before the intertemporal price change (see McKay and Wieland, 2021b, who provide a model rationalizing this effect).

This finding can be corroborated in yet another survey: The German Federal Statistical Agency asked households for five out of the six months for which the temporary VAT cut lasted whether they would prepone or spend overall more on durable goods as a result of the temporary VAT cut. Bachmann, Bayer, and Kornejew (2021, Figure 19) shows that the fraction of households that answer affirmatively to the preponing question—which captures intertemporal substitution—rises steadily from under 15 percent in August 2020 to almost 20 percent in December 2020.

### 3.2.6 Back-of-the-envelop calculation

We can, finally, use our preferred estimate of 37 percent for a back-of-envelope calculation of the aggregate effects of the VAT policy on durable spending. Roughly two-thirds of Germans had a high perceived pass-through (Figure A.2) and hence, in 2020, durable spending was 22 billion Euros or 10.8 percent of actual durable consumption higher than it would have been

without the VAT policy, that is, it would have been 177 billion Euros instead of the actual 199 billion Euros of durable spending in 2020.[18] To arrive at this number, we first calculate a no-VAT-policy-counterfactual semi-annual durable spending number for 2020 according to the following formula: $D_{20H2}^{cf} = \frac{Actual\ durable\ spending\ in\ 2020}{(1-0.65)*2+0.65*(2+effect)}$, where 0.65 is the fraction of households that perceived a high pass-through and *effect* is our preferred micro estimate from Table 3, Panel B, column (2). This calculation assumes that households that did not perceive a high pass-through split their spending equally between the two half-years. Two times $D_{20H2}^{cf}$ is our 177 billion Euros counterfactual estimate of durable spending in 2020.

Just as with durable spending, we can use our micro estimates for a back-of-the-envelope calculation of the aggregate effects of the VAT policy on semi-durable and non-durable spending. Using, respectively, the 10 percent and 0 percent effects (see columns (2) and (4) of Table 5), we calculate that in 2020 semi-durable spending was 4 billion Euros higher than it would have been without the VAT policy.[19] If we further assume that spending on services was similarly not affected by the VAT policy as spending on non-durables, its total effect amounts to 26 billion Euros (recall that the effect on durable spending was 22 billion Euros) or 1.6 percent of actual total consumption in 2020. Finally, comparing actual VAT revenues for the fiscal authorities in 2020 (see Table 3.4.3.16 of the *Volkswirtschaftliche Gesamtrechnungen, Fachserie 18, Reihe 1.4*) with counterfactual VAT revenues based on the effective VAT rate in 2019 and the counterfactual no-VAT-policy total consumption spending from 2020, we calculate a fiscal revenue short-fall in the range of 12 to 15 billion Euros, depending on how residential investment and government intermediate goods purchases, which, in Germany, are both subject to the VAT, adjust to the temporary VAT cut.[20]

We note that without accounting for behavioral consumption changes, that is, simply applying the reduced VAT rates, one would calculate a total fiscal revenue shortfall of 18 billion Euros. These numbers imply a total consumption multiplier of 1.4, which is roughly in line with the GDP multiplier of 1.6 that Clemens and Röger (2022) estimate in a standard New Keynesian DSGE model augmented by a durable goods channel.

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[18]See Table 3.3.3, "langlebige Konsumgüter", in *Volkswirtschaftliche Gesamtrechnungen, Fachserie 18, Reihe 1.4*, from the German Federal Statistical Agency.

[19]See Table 3.3.3 in *Volkswirtschaftliche Gesamtrechnungen, Fachserie 18, Reihe 1.4*, from the German Federal Statistical Agency. We map "kurzlebige Konsumgüter" to semi-durables and "Verbrauchsgüter" to non-durables.

[20]Since we do not have estimates on the effects of the temporary VAT cut on these demand aggregates, we make different assumptions on how they react using our estimates for the reaction of durable and total consumption spending.

# 4 Conclusion

The unexpected, temporary VAT cut in Germany in the second half of 2020 worked as a measure of unconventional fiscal policy. We show that the policy stimulated spending on durable and, to a lesser extent, on semi-durable consumption goods. We also find direct and indirect evidence for intertemporal substitution. From a distributional perspective, the temporary VAT cut worked in a progressive way. Young, low net wealth households reacted the most. This reaction did not depend on measures of financial literacy and saving discipline.

Furthermore, with such a VAT policy, stabilization is targeted at a very broad-based macroeconomic aggregate, namely, aggregate consumption, and does not require political micromanagement. It is also a very direct measure in that households have to buy something in order to fully benefit from the policy, in contrast to transfers which can be saved. Lastly, we point out that the efficacy of the VAT policy did not appear to be affected by the underlying Covid-19 crisis.

Nevertheless, we do not take a stance on the optimality or even the appropriateness of the temporary VAT cut in Germany in the second half of 2020. We do show, however, that, as suggested by Shapiro (1991), Feldstein (2002), Hall (2011), and Correia, Farhi, Nicolini, and Teles (2013), an unexpected temporary VAT cut can be an effective stabilization tool when the ELB binds and unconventional monetary policy like forward guidance might be less effective than predicted by standard models.

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# A    Appendix: Additional tables and figures

Figure A.1: The ex-ante approach. Balancedness according to Covid-19 exposure
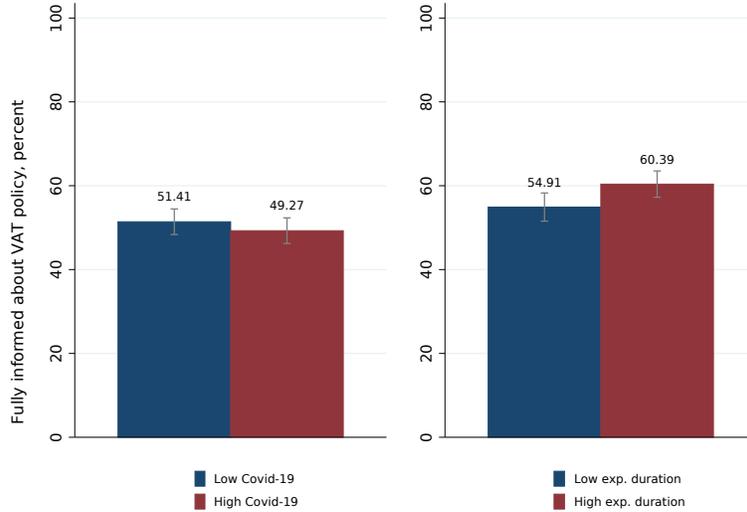


*Notes:* Left panel: fraction of respondents that were informed about the full VAT path (Q1) according to retrospective Covid-19 exposure based on the cumulated cases from the beginning of the pandemic until July 12, 2020, at the county (Kreis) level per 100K population. The data is merged to the BOP data through a county identifier (Kreiskennziffer). Right panel: fraction of respondents that were informed about the full VAT path (Q1) according to expected duration of Covid-19 restrictions based on Q10. Both panels: Low/high cut uses the median as threshold. Whiskers represent 95 percent confidence intervals.

Table A.1: Durable spending plans and knowledge about the VAT path—details, July 2020

| Plans to buy durables 2020HY2 vs. typical second half-year | No controls (1) | Socio-economic controls (2) | Socio-economic and expectation controls (3) |
|---|---|---|---|
| Fully informed | 0.098*** | 0.086*** | 0.086** |
| | (0.033) | (0.032) | (0.034) |
| Female | | -0.009 | 0.022 |
| | | (0.035) | (0.037) |
| Age: below 45 | | 0.226*** | 0.190*** |
| | | (0.063) | (0.066) |
| Age: 45-60 | | 0.102* | 0.112* |
| | | (0.056) | (0.060) |
| Education: Bachelor or above | | 0.082** | 0.080** |
| | | (0.038) | (0.039) |
| Employed full time | | 0.083* | 0.114** |
| | | (0.048) | (0.051) |
| Retired | | 0.110* | 0.094 |
| | | (0.062) | (0.066) |
| Has children | | -0.006 | -0.036 |
| | | (0.036) | (0.038) |
| Income | | 0.191*** | 0.181*** |
| | | (0.048) | (0.052) |
| Net wealth | | 0.015** | 0.013* |
| | | (0.007) | (0.007) |
| Expected inflation, percent | | | 0.008 |
| | | | (0.006) |
| Expected house price change, percent | | | -0.007** |
| | | | (0.003) |
| Expected income change, euro | | | 0.000*** |
| | | | (0.000) |
| Low expected unemployment | | | 0.103** |
| | | | (0.051) |
| Low expected economic growth | | | -0.058 |
| | | | (0.038) |
| Low expected interest rate (saving) | | | -0.118 |
| | | | (0.079) |
| Covid-19 restrictions will last, days | | | -0.000 |
| | | | (0.000) |
| Constant | -0.241*** | -1.074*** | -0.976*** |
| | (0.025) | (0.150) | (0.170) |
| Observations | 1,794 | 1,781 | 1,575 |

*Notes:* Results based on OLS regressions using data from the July 2020 wave of BOP-HH. We code the answer "more durable consumption spending than in a normal year" as +1, "same" as 0, and "less" as -1. Socio-economic controls also always include the federal state and municipality the household lives in (coefficients not shown for brevity reasons). The "income" and "net wealth" questions can be found as Q7 and Q4, respectively, in Appendix B. "Expected income change" is based on a quantitative BOP-HH question (Q5); "Expected inflation" (Q6) and "expected house price change" (Q9) are based on quantitative core BOP-HH questions; the remaining expectation controls are based on core BOP-HH questions (Q8 and Q10 in Appendix B). Robust standard errors (in parentheses). Significance levels, $* \ p < 0.1$, $** \ p < 0.05$, $*** \ p < 0.01$.

Table A.2: Durable spending plans and knowledge about the VAT path—two-dimensional splits, July 2020

**Plans to buy durables 2020HY2 vs. typical second half-year**

| | | Young | | Mid | | Old | |
| | | | | Net Wealth | | | |
| | All | Low (1) | High (2) | Low (3) | High (4) | Low (5) | High (6) |
|---|---|---|---|---|---|---|---|
| Fully informed | 0.098*** | 0.269*** | -0.014 | 0.139* | 0.042 | 0.057 | 0.054 |
| | (0.033) | (0.085) | (0.103) | (0.083) | (0.074) | (0.076) | (0.064) |
| Constant | -0.241*** | -0.262*** | 0.024 | -0.417*** | -0.094 | -0.453*** | -0.196*** |
| | (0.025) | (0.061) | (0.073) | (0.061) | (0.059) | (0.055) | (0.051) |
| Observations | 1,794 | 275 | 186 | 264 | 334 | 267 | 458 |

**Plans to buy durables 2020HY2 vs. typical second half-year**

| | | Young | | Mid | | Old | |
| | | | | Expected Income Change | | | |
| | All | Low (1) | High (2) | Low (3) | High (4) | Low (5) | High (6) |
|---|---|---|---|---|---|---|---|
| Fully informed | 0.098*** | 0.159 | 0.095 | 0.293*** | -0.121 | 0.085 | 0.081 |
| | (0.033) | (0.099) | (0.089) | (0.074) | (0.083) | (0.086) | (0.062) |
| Constant | -0.241*** | -0.269*** | -0.010 | -0.453*** | -0.008 | -0.343*** | -0.287*** |
| | (0.025) | (0.066) | (0.067) | (0.054) | (0.065) | (0.066) | (0.048) |
| Observations | 1,794 | 204 | 253 | 313 | 280 | 253 | 455 |

*Notes:* Results based on OLS regressions using data from the July 2020 wave of BOP-HH (no additional controls). We code the answer "more durable consumption spending than in a normal year" as $+1$, "same" as 0, and "less" as $-1$. "Net Wealth" based on Q4 in Appendix B. "Expected Income Change" is twelve-months ahead (Q5). Low/high cuts always use the median of the corresponding variable as threshold. Thresholds for the splits are based on the one dimensional marginal distributions. Robust standard errors (in parentheses). Significance levels, $* \; p < 0.1$, $** \; p < 0.05$, $*** \; p < 0.01$.

Figure A.2: The ex-post approach. Distribution of perceived pass-through in GfK survey
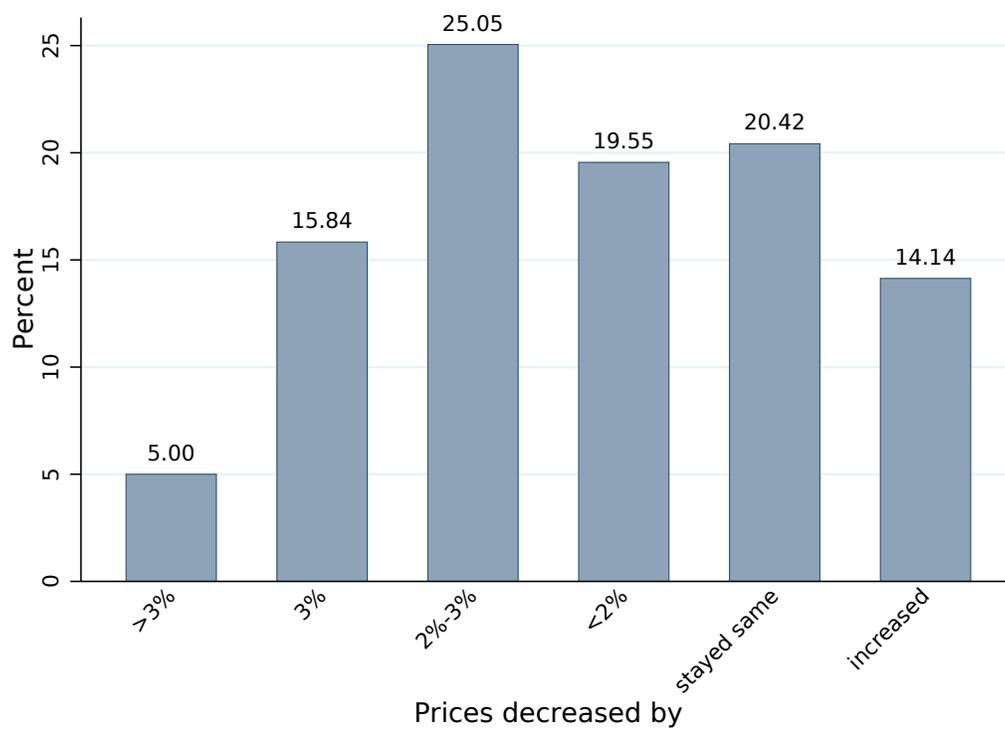


*Notes:* Graph shows the distribution of perceived VAT pass-through in the GfK survey from January 2021.

Figure A.3: The ex-post approach. Balancedness according to respondent characteristics, BOP-HH

(a) BOP-HH, January 2021, percent
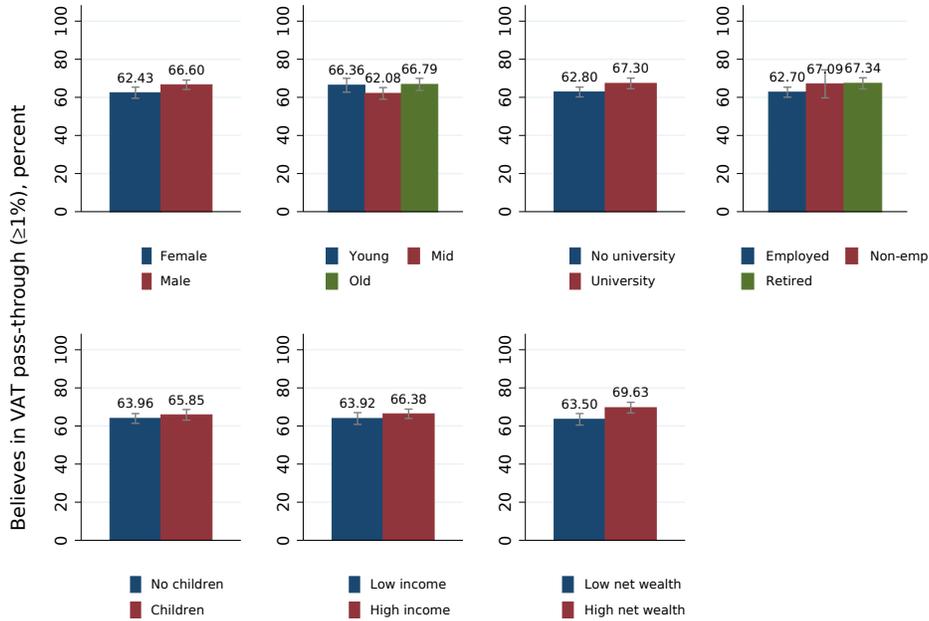


(b) BOP-HH, January 2021, mid-interval
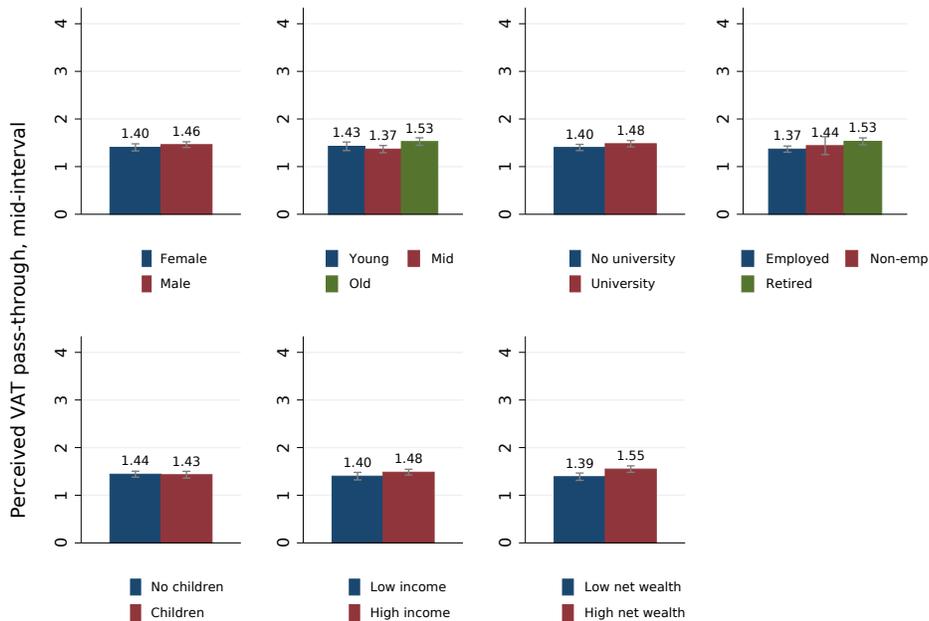


*Notes:* Panels show fraction of respondents that perceived a high VAT pass-through / average VAT pass-through (Q12) according to the following respondent characteristics: gender, age, education, employment status, children, income, and net wealth. Based on January 2021 BOP-HH. Whiskers represent 95 percent confidence intervals.

Figure A.4: The ex-post approach. Balancedness according to respondent characteristics, GfK

(a) GfK, January 2021, percent
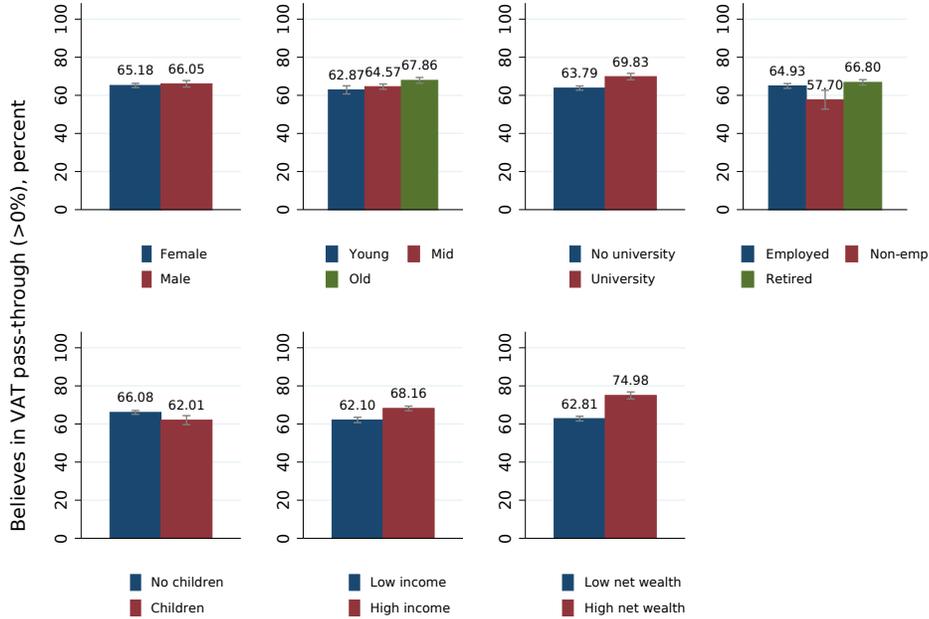


(b) GfK, January 2021, mid-interval
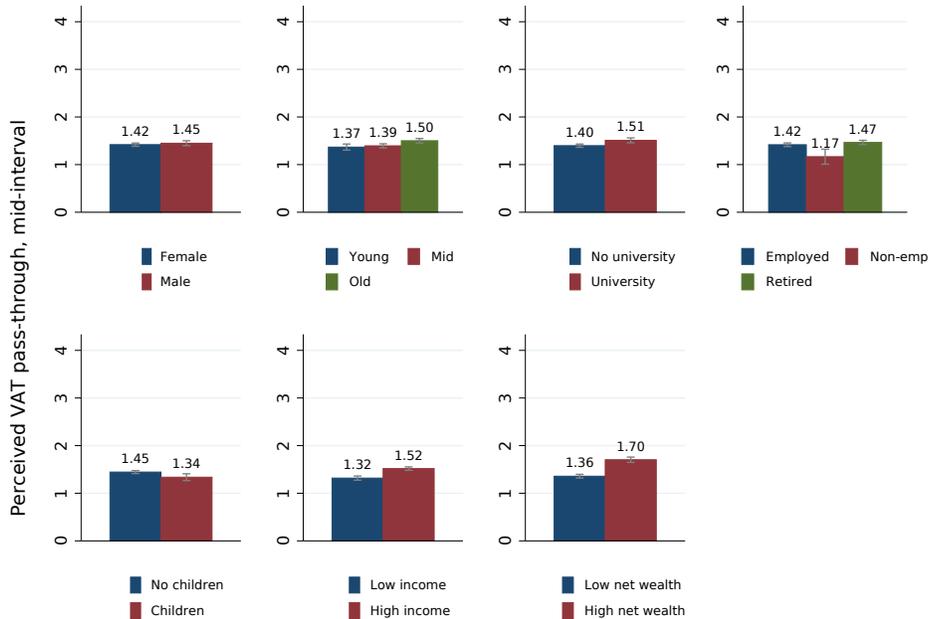


*Notes:* Panels show fraction of respondents that perceived a high VAT pass-through / average VAT pass-through (Q18) according to the following respondent characteristics: gender, age, education, employment status, children, income, and net wealth. Based on January 2021 GfK. Whiskers represent 95 percent confidence intervals.

Table A.3: Durable spending and beliefs about VAT pass-through—additional results, January 2021

| Euro spending on durables in 2020HY2 | BOP-HH | | | | | | GfK survey | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS (1) | OLS (2) | OLS (3) | OLS (4) | Tobit (5) | Tobit (6) | OLS (7) | OLS (8) | OLS (9) | OLS (10) | Tobit (11) | Tobit (12) |
| High perceived pass-through | 0.418** (0.167) | 0.558*** (0.210) | | | 0.555** (0.233) | 0.677** (0.273) | 0.496*** (0.074) | 0.321*** (0.082) | | | 0.662*** (0.105) | 0.422*** (0.113) |
| Pass-through percent | | | 0.159** (0.069) | 0.202** (0.087) | | | | | 0.138*** (0.024) | 0.075*** (0.027) | | |
| Female | | -0.661*** (0.227) | | -0.671*** (0.227) | | -0.897*** (0.293) | | -0.181** (0.084) | | -0.181** (0.084) | | -0.254** (0.116) |
| Age: below 45 | | -0.018 (0.396) | | -0.004 (0.397) | | -0.004 (0.509) | | -0.014 (0.137) | | -0.019 (0.137) | | 0.053 (0.188) |
| Age: 45-60 | | 0.038 (0.359) | | 0.047 (0.360) | | 0.041 (0.459) | | -0.129 (0.113) | | -0.132 (0.113) | | -0.151 (0.156) |
| Education: Bachelor or above | | -0.193 (0.222) | | -0.180 (0.221) | | -0.250 (0.286) | | -0.063 (0.091) | | -0.054 (0.091) | | -0.087 (0.123) |
| Employed full time | | 0.269 (0.297) | | 0.254 (0.298) | | 0.315 (0.387) | | 0.103 (0.201) | | 0.101 (0.201) | | 0.242 (0.295) |
| Retired | | -0.310 (0.383) | | -0.316 (0.385) | | -0.419 (0.494) | | 0.093 (0.210) | | 0.090 (0.210) | | 0.205 (0.308) |
| Has children | | 0.465* (0.259) | | 0.471* (0.260) | | 0.594* (0.346) | | 0.439*** (0.120) | | 0.435*** (0.120) | | 0.583*** (0.160) |
| Income | | 0.955*** (0.225) | | 0.957*** (0.225) | | 1.170*** (0.293) | | 0.820*** (0.084) | | 0.821*** (0.084) | | 1.016*** (0.118) |
| Net wealth | | -0.007 (0.011) | | -0.007 (0.011) | | -0.008 (0.015) | | 0.082*** (0.015) | | 0.084*** (0.015) | | 0.107*** (0.022) |
| Constant | 5.125*** (0.136) | -2.513 (2.055) | 5.167*** (0.127) | -2.485 (2.059) | 4.237*** (0.191) | -4.859* (2.702) | 4.835*** (0.060) | -2.659*** (0.651) | 4.962*** (0.049) | -2.584*** (0.652) | 3.952*** (0.093) | -5.448*** (0.924) |
| Observations | 2,242 | 1,401 | 2,242 | 1,401 | 2,242 | 1,401 | 10,243 | 7,916 | 10,243 | 7,916 | 10,243 | 7,916 |

*Notes*: Results based on OLS or Tobit regressions using data from the January 2021 waves of BOP-HH and GfK survey. The left-hand-side spending data on durables have been transformed with the inverse hyperbolic sine transformation. In columns (1), (2), (5), and (6), we code any answer with "perceived pass-through of < 1%" as 0, and ≥ 1% as 1; in columns (7), (8), (11), and (12), we code any answer with perceived pass-through of ≤ 0% as 0, and > 0% as 1; in columns (3), (4), (9), and (10), we use the perceived pass-through as a continuous variable. Socio-economic controls also always include the federal state and municipality the household lives in (not shown for brevity reasons). Robust standard errors (in parentheses). Significance levels, $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$.

Table A.4: Durable spending and beliefs about VAT pass-through—additional results, constant sample, January 2021

| Euro spending on durables in 2020HY2 | BOP-HH | | | | | | GfK survey | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS (1) | OLS (2) | OLS (3) | OLS (4) | Tobit (5) | Tobit (6) | OLS (7) | OLS (8) | OLS (9) | OLS (10) | Tobit (11) | Tobit (12) |
| High perceived pass-through | 0.582*** | 0.558*** | | | 0.719*** | 0.677** | 0.465*** | 0.321*** | | | 0.599*** | 0.422*** |
| | (0.208) | (0.210) | | | (0.276) | (0.273) | (0.083) | (0.082) | | | (0.114) | (0.113) |
| Pass-through percent | | | 0.198** | 0.202** | | | | | 0.122*** | 0.075*** | | |
| | | | (0.088) | (0.087) | | | | | (0.027) | (0.027) | | |
| Female | | -0.661*** | | -0.671*** | | -0.897*** | | -0.181** | | -0.181** | | -0.254** |
| | | (0.227) | | (0.227) | | (0.293) | | (0.084) | | (0.084) | | (0.116) |
| Age: below 45 | | -0.018 | | -0.004 | | -0.004 | | -0.014 | | -0.019 | | 0.053 |
| | | (0.396) | | (0.397) | | (0.509) | | (0.137) | | (0.137) | | (0.188) |
| Age: 45-60 | | 0.038 | | 0.047 | | 0.041 | | -0.129 | | -0.132 | | -0.151 |
| | | (0.359) | | (0.360) | | (0.459) | | (0.113) | | (0.113) | | (0.156) |
| Education: Bachelor or above | | -0.193 | | -0.180 | | -0.250 | | -0.063 | | -0.054 | | -0.087 |
| | | (0.222) | | (0.221) | | (0.286) | | (0.091) | | (0.091) | | (0.123) |
| Employed full time | | 0.269 | | 0.254 | | 0.315 | | 0.103 | | 0.101 | | 0.242 |
| | | (0.297) | | (0.298) | | (0.387) | | (0.201) | | (0.201) | | (0.295) |
| Retired | | -0.310 | | -0.316 | | -0.419 | | 0.093 | | 0.090 | | 0.205 |
| | | (0.383) | | (0.385) | | (0.494) | | (0.210) | | (0.210) | | (0.308) |
| Has children | | 0.465* | | 0.471* | | 0.594* | | 0.439*** | | 0.435*** | | 0.583*** |
| | | (0.259) | | (0.260) | | (0.346) | | (0.120) | | (0.120) | | (0.160) |
| Income | | 0.955*** | | 0.957*** | | 1.170*** | | 0.820*** | | 0.821*** | | 1.016*** |
| | | (0.225) | | (0.225) | | (0.293) | | (0.084) | | (0.084) | | (0.118) |
| Net wealth | | -0.007 | | -0.007 | | -0.008 | | 0.082*** | | 0.084*** | | 0.107*** |
| | | (0.011) | | (0.011) | | (0.015) | | (0.015) | | (0.015) | | (0.022) |
| Constant | 5.428*** | -2.513 | 5.520*** | -2.485 | 4.737*** | -4.859* | 5.017*** | -2.659*** | 5.147*** | -2.584*** | 4.270*** | -5.448*** |
| | (0.171) | (2.055) | (0.164) | (2.059) | (0.227) | (2.702) | (0.067) | (0.651) | (0.055) | (0.652) | (0.100) | (0.924) |
| Observations | 1,401 | 1,401 | 1,401 | 1,401 | 1,401 | 1,401 | 7,916 | 7,916 | 7,916 | 7,916 | 7,916 | 7,916 |

*Notes*: Results based on OLS or Tobit regressions using data from the January 2021 waves of BOP-HH and GfK survey. The left-hand-side spending data on durables have been transformed with the inverse hyperbolic sine transformation. In columns (1), (2), (5), and (6), we code any answer with "perceived pass-through of $< 1\%$" as 0, and $\geq 1\%$ as 1; in columns (7), (8), (11), and (12), we code any answer with perceived pass-through of $\leq 0\%$ as 0, and $> 0\%$ as 1; in columns (3), (4), (9), and (10), we use the perceived pass-through as a continuous variable. Socio-economic controls also always include the federal state and municipality the household lives in (not shown for brevity reasons). Robust standard errors (in parentheses). Significance levels, $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$.

Table A.5: Durable spending and beliefs about VAT pass-through—two-dimensional splits, January 2021

| Euro spending on durables in 2020HY2 | All | Bargain Hunter | | | | Net Wealth | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| | | | | | | | | Age | | | |
| | | Yes | Yes | No | No | Young | Young | Mid | Mid | Old | Old |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| High perceived pass-through | 0.418** | 1.057** | 0.186 | 0.521* | 0.109 | 0.913** | 0.011 | 1.089** | 0.559 | -0.078 | 0.058 |
| | (0.167) | (0.432) | (0.577) | (0.297) | (0.300) | (0.412) | (0.600) | (0.437) | (0.510) | (0.420) | (0.369) |
| Constant | 5.125*** | 4.650*** | 5.488*** | 5.109*** | 5.489*** | 5.443*** | 5.741*** | 4.962*** | 5.782*** | 4.576*** | 5.102*** |
| | (0.136) | (0.337) | (0.498) | (0.242) | (0.248) | (0.351) | (0.483) | (0.351) | (0.436) | (0.328) | (0.311) |
| Observations | 2,242 | 297 | 236 | 614 | 745 | 302 | 174 | 285 | 270 | 309 | 522 |

*Notes:* Results based on OLS regressions using data from the January 2021 waves of BOP-HH (no additional controls). The left-hand-side spending data on durables have been transformed with the inverse hyperbolic sine transformation. We code any answer with "perceived pass-through of $< 1\%$" as 0, and $\geq 1\%$ as 1. We classify respondents as bargain hunters if they answer with the highest category on the intensity scale of Q14. Low/high cuts for "Net Wealth" (Q15) use the median as threshold. "Young" denotes below age 45, "Mid" between 45 and 60, and "Old" above 60. Thresholds for the splits are based on the one dimensional marginal distributions. Robust standard errors (in parentheses). Significance levels, $* p < 0.1$, $** p < 0.05$, $*** p < 0.01$.

# B  Appendix: Survey questions

Appendix B.1 provides the German original of the questions we use to construct the variables for our empirical analysis. We provide an English translation in Appendix B.2. The full questionnaires for the BOP-HH can be found at the website of the Deutsche Bundesbank.[21]

## B.1  German original

## Bundesbank Online Panel of Households – July 2020

The following questions are used for the ex-ante analysis. In brackets, we list the original survey numbers of the questions.

Q1 **Informed about VAT policy [Question 716]**: Hatten Sie bereits vor dieser Umfrage etwas von den Aktivitäten der Bundesregierung gehört oder gelesen? Bitte wählen Sie alle zutreffenden Antworten aus.

- Der Änderung der Mehrwertsteuer

- Der Senkung der Mehrwertsteuer zum 1. Juli 2020

- Der Erhöhung der Mehrwertsteuer zum 1. Januar 2021

- Die Übernahme der EU Ratspräsidentschaft durch Deutschland im Jahr 2020

- Keine der genannten Aktivitäten

*Only if items 2 and 3 were both selected, are the respondents considered to be fully informed.*

Q2 **Plans to buy durable goods in the second half of the year 2020, compared to a typical second half-year [Question 705]**: Sie sehen nun einige Dinge, für die man im Alltag Geld ausgeben kann oder muss. Bitte geben Sie jeweils an, ob Sie planen, von Juli bis Ende Dezember 2020 für die folgenden Dinge voraussichtlich mehr oder weniger auszugeben als üblicherweise in der zweiten Jahreshälfte, etwa von Juli bis Dezember 2019? Wie ist es mit größeren Anschaffungen (z.B. Auto, Möbel, elektrische Geräte usw.)?

---

*The answer possibilities were given as follows:*

1. Plane mehr auszugeben
2. Plane in etwa gleich viel auszugeben
3. Plane weniger auszugeben

Q3 **Reasons for increased spending plans [Question 718A]**: Sie haben angegeben, dass Sie planen von Juli bis Ende Dezember 2020 voraussichtlich für gewisse Dinge mehr auszugeben als üblicherweise im zweiten Halbjahr, wie etwa in der zweiten Jahreshälfte 2019. Könnten Sie uns bitte mitteilen, wie sehr die folgenden Gründe für Ihre geplanten Mehrausgaben zutreffen bzw. nicht zutreffen? Wie ist es mit ...

- Nachholbedarf
- Wegen bereits eingetretener oder erwarteter Einkommenserhöhungen
- Das war sowieso geplant
- Wegen bereits eingetretener oder erwarteter Werterhöung meiner Finanzanlagen
- Ich erwarte Preissenkungen in diesem Zeitraum
- Wegen der Mehrwertsteueränderung
- Wegen des Kinderbonuses
- Weil ich erwarte, dass die Preise ab Januar 2021 steigen werden

*The following answer possibilities were given:*

1. trifft voll und ganz zu
2. trifft eher zu
3. trifft eher nicht zu
4. trifft ganz und gar nicht zu

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q4 **Net wealth [Question 712]**: Wie hoch schätzen Sie das gesamte Vermögen (netto) Ihres Haushalts ein? Das Gesamtvermögen (netto) ist der Wert all dessen, was den Haushaltsmitgliedern gehört abzüglich aller Schulden und Verbindlichkeiten.

- Unter 0 €

- 0 bis unter 2.500 €

- 2.500 bis unter 5.000 €

- 5.000 bis unter 10.000 €

- 10.000 bis unter 25.000 €

- 25.000 bis unter 50.000 €

- 50.000 bis unter 75.000 €

- 75.000 bis unter 100.000 €

- 100.000 bis unter 250.000 €

- 250.000 bis unter 500.000 €

- mehr als 500.000 €

Q5 **Expected income change [Question 709]**: Für wie wahrscheinlich halten Sie es, dass sich das durchschnittliche monatliche Nettoeinkommen Ihres Haushaltes in den kommenden 12 Monaten wie folgt entwickelt?

Hinweis: Bei dieser Frage geht es darum, wie Sie die Wahrscheinlichkeit einschätzen, dass ein bestimmter Sachverhalt in der Zukunft eintritt. Ihre Antworten können in einer Spanne zwischen 0 und 100 liegen, wobei 0 absolut unwahrscheinlich bedeutet und 100 absolut sicher. Mit Werten dazwischen können Sie Ihre Einschätzung abstufen. Bitte beachten Sie, dass sich die Angaben über alle Kategorien auf 100 summieren müssen.

- um 2000 Euro oder mehr sinkt

- um 1500 Euro bis unter 2000 Euro sinkt

- um 1000 Euro bis unter 1500 Euro sinkt

- um 500 Euro bis unter 1000 Euro sinkt

- um 250 Euro bis unter 500 Euro sinkt

- um 0 Euro bis unter 250 Euro sinkt

- um 0 Euro bis unter 250 Euro steigt

- um 250 Euro bis unter 500 Euro steigt

- um 500 Euro bis unter 1000 Euro steigt

- um 1000 Euro bis unter 1500 Euro steigt

- um 1500 Euro bis unter 2000 Euro steigt

- um 2000 Euro oder mehr steigt

Q6 **Expected inflation [Question 005B]**: Was denken Sie, wie hoch wird die Inflationsrate / Deflationsrate in den kommenden zwölf Monaten in etwa sein?

Hinweis: Inflation ist der prozentuale Anstieg des allgemeinen Preisniveaus. Sie wird meist über den Verbraucherpreisindex gemessen. Ein Rückgang des Preisniveaus wird gemeinhin als „Deflation" bezeichnet. Bitte tippen Sie einen Wert in das Zahlenfeld ein (eine Nachkommastelle möglich).

_____ Prozent

Additionally, as controls in our regression analysis, we include variables based on the following questions.

Q7 **Monthly household net income [Question hhinc]**: Wie hoch ist das monatliche Nettoeinkommen Ihres Haushaltes insgesamt?

*Hinweis*: Damit ist die Summe gemeint, die sich ergibt aus Lohn, Gehalt, Einkommen aus selbständiger Tätigkeit, Rente oder Pension, jeweils nach Abzug der Steuern und Sozialversicherungsbeiträge. Rechnen Sie bitte auch die Einkünfte aus öffentlichen Beihilfen, Einkommen aus Vermietung, Verpachtung, Wohngeld, Kindergeld und sonstige Einkünfte hinzu.

- unter 500 EUR
- 500 bis 999 EUR
- 1.000 bis 1.499 EUR
- 1.500 bis 1.999 EUR
- 2.000 bis 2.499 EUR
- 2.500 bis 2.999 EUR
- 3.000 bis 3.499 EUR
- 3.500 bis 3.999 EUR
- 4.000 bis 4.999 EUR
- 5.000 bis 5.999 EUR
- 6.000 bis 7.999 EUR
- 8.000 bis 9.999 EUR
- 10.000 EUR und mehr

Q8 **Macroeconomic expectations [Question 004]**: Nun geht es um Ihre Einschätzung zur allgemeinen wirtschaftlichen Entwicklung in Deutschland in den kommenden zwölf Monaten. Was glauben Sie, wie werden sich die folgenden Größen in den kommenden zwölf Monaten entwickeln? Werden/wird. . .

- die Arbeitslosenquote in Deutschland

- die Zinsen auf Sparkonten

- das Wirtschaftswachstum in Deutschland

*With the following answer possibilities:*

1. deutlich sinken

2. geringfügig sinken

3. ungefähr gleich bleiben

4. geringfügig steigen

5. deutlich steigen

Q9 **House price expectations [Question 701]**: Was denken Sie, um wie viel Prozent werden sich die Immobilienpreise in Ihrer Umgebung in den kommenden 12 Monaten verändern?

Hinweis: Bitte tippen Sie einen Wert in das Zahlenfeld ein (eine Nachkommastelle möglich). Benutzen Sie hierfür bitte einen Punkt statt eines Kommas. Im Falle von angenommenen sinkenden Immobilienpreisen geben Sie bitte einen negativen Wert ein.

_____ Prozent

Q10 **Duration of Covid restrictions [Question 711]**: Was denken Sie, wie lange werden die Corona-Pandemie-bedingten Einschränkungen bei Veranstaltungen und Zusammenkünften dauern? Noch . . .

Hinweis: Bitte tragen Sie die Zahl ein, die Sie für am wahrscheinlichsten halten. Sie können die Angabe entweder in Tagen, Wochen oder Monaten machen. Bitte entscheiden Sie sich für eines der drei Felder.

1. Tage _____

2. Wochen _____

3. Monate _____

Finally, we use the following question for data cleaning purposes:

Q11 **Spending and spending plans non-durable [Question 704A]**: Wie viel geben Sie in etwa durchschnittlich pro Monat für Konsumgüter des täglichen Bedarfs (Lebensmittel, Bekleidung, Freizeitaktivitäten inklusive Restaurantbesuche, Benzin und ähnliches) aus bzw. planen Sie auszugeben? Hinweis: Bitte tippen Sie in jedes Feld einen Beitrag ein. Wenn Sie es nicht genau wissen, schätzen Sie bitte.

a) üblicherweise gebe ich pro Monat in der zweiten Jahreshälfte (Juli bis Ende Dezember) aus _____ Euro

b) in der zweiten Jahreshälfte 2020 (Juli bis Ende Dezember) plane ich pro Monat auszugeben _____ Euro

## Bundesbank Online Panel of Households − January 2021

The BOP-HH January 2021 wave is used in our ex-post analysis. In brackets, we list the original survey numbers of the questions.

Q12 **VAT pass-through [Question P1306]**: Was glauben Sie, wie hat die vorübergehende Mehrwertsteuersenkung die Preise zwischen dem 1. Juli 2020 und dem 31. Dezember 2020 beeinflusst?

- Die Preise sind um mehr als 3% gesunken.

- Die Preise sind zwischen 2% und 3% gesunken.

- Die Preise sind zwischen 1% und 2% gesunken.

- Die Preise sind um weniger als 1% gesunken.

- Die Preise sind gleichgeblieben.

- Die Preise sind gestiegen.

Q13 **Spending durables [Question P1304]**: Wie viel haben Sie für größere Anschaffungen (z.B. Auto, Möbel, elektrische Geräte usw.) ausgegeben?
Hinweis: Bitte tippen Sie in jedes Feld einen Beitrag ein. Wenn Sie es nicht genau wissen, schätzen Sie bitte.

- In der zweiten Jahreshälfte 2020 (Juli bis Ende Dezember 2020) habe ich tatsächlich ausgegeben: _____ Euro

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q14 **Bargain Hunting [P1305]**: Inwieweit treffen die folgenden Aussagen auf Sie zu oder nicht zu?

- Üblicherweise bin ich eine Person, die (Sonder-)Angebote sucht und auf die Preise achtet.

*The following answer possibilities were given:*

1. trifft voll und ganz zu

2. trifft eher zu

3. trifft eher nicht zu

4. trifft ganz und gar nicht zu

Q15 **Gross wealth and liabilities [Question CQ007]**: Wie hoch schätzen Sie das gesamte Vermögen und die Verbindlichkeiten Ihres Haushalts ein?

Infobox: "Zum Vermögen gehören Immobilien, Fahrzeuge, Beteiligungen an Unternehmen, Finanzanlagen sowie Guthaben bei Versicherungen. Die Verbindlichkeiten umfassen Hypothekenschulden, Konsumentenkredite, überzogene Girokonten und andere Schulden oder Verbindlichkeiten."

– Gesamtvermögen (brutto)

1. 0 bis unter 2.500 €

2. 2.500 bis unter 5.000 €

3. bis unter 25.000 €

4. 5.000 bis unter 10.000 €

5. 10.000 bis unter 25.000 €

6. 25.000 bis unter 50.000 €

7. 50.000 bis unter 75.000 €

8. 75.000 bis unter 100.000 €

9. 100.000 bis unter 250.000 €

10. 250.000 bis unter 500.000 €

11. 500.000 € und mehr

– Ausstehender Betrag besicherter Kredite (Hypothekenkredite)

1. 0 (kein Kredit)

2. Schulden in Höhe von 1 bis unter 25.000 €

3. 25.000 bis unter 50.000 €

4. 50.000 bis unter 100.000 €

5. 100.000 bis unter 150.000 €

6. 150.000 bis unter 200.000 €

7. 200.000 bis unter 300.000 €

8. 300.000 bis unter 500.000 €

9. 500.000 € und mehr

– Ausstehender Betrag unbesicherter Kredite (bspw. Dispokredite, Konsumentenkredite, Kredite zur Finanzierung eines Unternehmens, oder einer beruflichen Tätigkeit, von Fahrzeugen, Haushaltseinrichtung, Urlaub oder Bildung, Kredite von Freunden und Verwandten).

1. 0 (kein Kredit)

2. Schulden in Höhe von 1 bis unter 1.000 €

3. 1.000 bis unter 2.000 €

4. 2.000 bis unter 5.000 €

5. 5.000 bis unter 10.000 €

6. 10.000 bis unter 20.000 €

7. 20.000 bis unter 40.000 €

8. 40.000 € und mehr

Additionally, as control in our regression analysis, we include a variable based on the following question:

Q16 **Monthly household net income [Question CS008]**: Wie hoch ist das monatliche Nettoeinkommen Ihres Haushaltes insgesamt?

*Hinweis*: Damit ist die Summe gemeint, die sich ergibt aus Lohn, Gehalt, Einkommen aus selbständiger Tätigkeit, Rente oder Pension, jeweils nach Abzug der Steuern und Sozialversicherungsbeiträge. Rechnen Sie bitte auch die Einkünfte aus öffentlichen Beihilfen, Einkommen aus Vermietung, Verpachtung, Wohngeld, Kindergeld und sonstige Einkünfte hinzu.

1. unter 500 EUR

2. 500 bis 999 EUR

3. 1.000 bis 1.499 EUR

4. 1.500 bis 1.999 EUR

5. 2.000 bis 2.499 EUR

6. 2.500 bis 2.999 EUR

7. 3.000 bis 3.499 EUR

8. 3.500 bis 3.999 EUR

9. 4.000 bis 4.999 EUR

10. 5.000 bis 5.999 EUR

11. 6.000 bis 7.999 EUR

12. 8.000 bis 9.999 EUR

13. 10.000 EUR und mehr

Finally, we use the following question for data cleaning purposes:

Q17 **Past monthly expenditures [Question CQ004]**: Wenn Sie einmal an den letzten Monat denken: Wieviel Euro haben Sie im letzten Monat in etwa für die folgenden Dinge jeweils ausgegeben?

- Artikel des täglichen Bedarfs (z.B. Lebens- und Genussmittel, Non-Food-Artikel wie Reinigungsmittel o.Ä.)

- Bekleidung und Schuhe

- Freizeitaktivitäten (z.B. Restaurantbesuch, Kulturveranstaltung, Fitnessstudio)

- Mobilität (z.B. Kraftstoff, Fahrzeugkredite und laufende Kosten, Bus- und Bahn-Tickets)

## GfK Homescanner Panel Survey – January 2021

The GfK Homescanner Panel Survey survey, January 2021 wave, is used in our ex-post analysis. In brackets, we list the original survey numbers of the questions.

Q18 **VAT pass-through [Question 7]**: Was glauben Sie: Wie hat die zeitweise Mehrwertsteuersenkung im Jahr 2020 die Preisentwicklung von Waren und Dienstleistungen insgesamt ab dem 01. Juli 2020 bis 31. Dezember 2020 beeinflusst?

- Die Preise sind um mehr als 3% gesunken.

- Die Preise sind um 3% gesunken.

- Die Preise sind um 2% bis 3% gesunken.

- Die Preise sind um weniger als 2% gesunken.

- Die Preise sind gleichgeblieben.

- Die Preise sind gestiegen.

Q19 **Spending durables [Question 5c]**: Wie viel haben Sie in etwa für größere Anschaffungen (z.B. Auto, Möbel, elektrische Geräte usw.) ausgegeben?
Hinweis: Bitte tippen Sie in jedes Feld einen Beitrag ein. Wenn Sie es nicht genau wissen, schätzen Sie bitte.

– In der zweiten Jahreshälfte 2020 (Juli bis Ende Dezember 2020) habe ich tatsächlich ausgegeben: _____ Euro

Q20 **Price Sensitivity [Question 16]**: Bitte denken Sie an alle Ausgaben Ihres Haushalts. Damit gemeint sind u. a. Ausgaben für Lebensmittel, Drogerieartikel, Wohnkosten (z.B. Miete, Hypothek), Zuzahlungen für ärztliche Behandlungen / Medikamente, Mobilität, Freizeit sowie große Anschaffungen. Wir möchten nun von Ihnen wissen, ob Sie MEHR oder WENIGER ausgeben würden, wenn die Verbraucherpreise insgesamt steigen oder sinken würden.

Bitte geben Sie entweder in der Spalte „steigen um" oder in der Spalte „sinken um" an, um wie viel Prozent Ihre Haushaltsausgaben Ihrer Einschätzung nach steigen oder sinken würden oder aber kreuzen Sie in der Mitte an, wenn Sie denken, dass Ihre Ausgaben unverändert bleiben würden. Bitte machen Sie eine Angabe pro Zeile.

Meine Haushaltsausgaben würden. . .

– steigen um _____ %.

– unverändert bleiben.

– sinken um _____ %.

*Respondents were presented with the following scenarios:*

1. Die Preise steigen um 10%

2. Die Preise steigen um 3%

3. Die Preise steigen um 1%

4. Die Preise sinken um 1%

5. Die Preise sinken um 3%

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q21 **Public Servant [Question 12]**: Sind Sie, Ihr(e) Partner(in) oder ein anderes Haushaltsmitglied als Angestellte(r) oder als Beamte(r) im öffentlichen Dienst tätig?
Hinweis: Bitte alles Zutreffende angeben.

– Ja, ich bin im öffentlichen Dienst tätig

– Ja, mein(e) Partner(in) / anderes Haushaltmitglied ist im öffentlichen Dienst tätig

– Nein

Q22 **Skills [Question 10]**: Im Folgenden sehen Sie einige Aussagen als Gegensatzpaare. Bitte geben Sie pro Zeile jeweils an, ob Sie eher der linken Aussage oder eher der rechten Aussage zustimmen. Verwenden Sie dazu bitte die Zahlen von „0" bis „10": „0" bedeutet, dass Sie der linken Aussage voll und ganz zustimmen, und „10" bedeutet, dass Sie der rechten Aussage voll und ganz zustimmen.

- **Analytical:**
  Ich bin ein analytischer Mensch. 0_____ 1_____ 2_____ 3_____ 4_____ 5_____ 6_____ 7_____ 8_____ 9_____ 10_____ Ich handle eher intuitiv.

- **Financial literacy:**
  Ich kenne mich mit Finanzen / Finanzmathematik sehr gut aus. 0_____ 1_____ 2_____ 3_____ 4_____ 5_____ 6_____ 7_____ 8_____ 9_____ 10_____ Ich kenne mich mit Finanzen / Finanzmathematik überhaupt nicht aus.

Q23 **Planning in advance [Question 14]**: Wenn Sie entscheiden, wie viel Sie ausgeben bzw. sparen werden, wie weit planen Sie dann normalerweise in die Zukunft?

1. Ich plane nicht im Voraus, sondern entscheide immer für die aktuelle Situation.

2. Ich plane im Voraus.

Additionally, as control in our regression analysis, we include a variable based on the following question (we take the other socio-economic controls, including household income, from the regular GfK dataset):

Q24 **Net wealth [Question 20]**: Wie hoch schätzen Sie das gesamte Vermögen (netto) Ihres Haushalts ein? Das Gesamtvermögen (netto) ist der Wert all dessen, was den Haushaltsmitgliedern gehört abzüglich aller Schulden und Verbindlichkeiten?

- Unter 0 €
- 0 bis unter 2.500 €
- 2.500 bis unter 5.000 €
- 5.000 bis unter 10.000 €
- 10.000 bis unter 25.000 €
- 25.000 bis unter 50.000 €
- 50.000 bis unter 75.000 €
- 75.000 bis unter 100.000 €

- 100.000 bis unter 250.000 €

- 250.000 bis unter 500.000 €

- Mehr als 500.000 €

- Ich möchte diese Frage nicht beantworten

To study intertemporal substitution directly, we make use of the following question:

Q25 **Spending durables [Question 5e]**: Wie viel planen Sie in etwa für größere Anschaffungen (z.B. Auto, Möbel, elektrische Geräte usw.) auszugeben?
Hinweis: Bitte tippen Sie in jedes Feld einen Beitrag ein. Wenn Sie es nicht genau wissen, schätzen Sie bitte.

- In der ersten Jahreshälfte 2021 (Januar bis Ende Juni 2021) plane ich auszugeben:
  _____ Euro

Finally, we use the following question for data cleaning purposes:

Q26 **Past monthly expenditures [Question 4b]**: Bitte denken Sie an die monatlichen Ausgaben für Konsumgüter des täglichen Bedarfs in Ihrem Haushalt (Lebensmittel, Bekleidung, Freizeitaktivitäten inklusive Restaurantbesuche, Benzin und ähnliches) und ergänzen Sie die folgende Aussage. In der zweiten Jahreshälfte 2020 (Juli bis Ende Dezember 2020) habe ich pro Monat durchschnittlich tatsächlich ausgegeben: _____ Euro.
*Hinweis:* Bitte tragen Sie in jedes Feld einen Betrag ein und runden Sie bitte auf ganze Euro. Wenn Sie es nicht genau wissen, schätzen Sie bitte.

## B.2   English translation

## Bundesbank Online Panel of Households– July 2020

The following questions are used for the ex-ante analysis. In brackets, we list the original survey numbers of the questions.

Q1 **Informed about VAT policy [Question 716]**: Had you heard or read anything about the Federal Government's activities before this survey? Please select all answers that apply.

- The change of the VAT.

- The reduction in VAT on 1 July 2020.

- The increase in VAT on 1 January 2021.

- Germany's assumption of the EU presidency in 2020

- None of the above activities

*Only if items 2 and 3 were both selected, are the respondents considered to be fully informed.*

Q2 **Plans to buy durable goods in the second half of the year 2020, compared to a typical second half-year [Question 705]:** You will now be shown some everyday items that you can or need to buy. Please indicate in each case whether you are planning to probably spend more or less on the following items between July and the end of December 2020 than you would normally do in the second half of the year, i.e. as you did between July and December 2019?

How about larger purchases (e.g. car, furniture, electronics, etc.)?

*The answer possibilities were given as follows:*

1. I plan to spend more.
2. I plan to spend roughly the same.
3. I plan to spend less.

Q3 **Reasons for increased spending plans [Question 718A]**: You indicated that you are planning to probably spend more on certain items between July and the end of December 2020 than you would normally do in the second half of the year, such as in the second half of 2019. Could you please tell us to what extent the following reasons do or do not apply to your planned additional expenditure?

  – Need to catch up on expenditure
  – Due to actual or expected increases in income
  – It was planned anyhow
  – Due to actual or prospective increases in the value of my financial assets
  – I expect prices to decline over this period
  – Due to the change in VAT
  – Because of extra child bonus
  – Because I expect prices to rise from January 2021 onward

*The following answer possibilities were given:*

1. Applies in full
2. Applies generally
3. Does not apply generally
4. Does not apply at all

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q4 **Net wealth [Question 712]**: How high do you estimate the total (net) wealth of your household to be? Total (net) wealth is the value of everything that the household members have less all debt and liabilities.

  – Less than €0

- 0 Euro and more, but less than 2,500 Euro

- 2,500 and more, but less than 5,000 Euro

- 5,000 and more, but less than 10,000 Euro

- 10,00O and more, but less than 25,000 Euro

- 25,000 and more, but less than 50,000 Euro

- 50,000 and more, but less than 75,000 Euro

- 75,000 and more, but less than 100,000 Euro

- 100,000 and more, but less than 250,000 Euro

- 250,000 and more, but less than 500,000 Euro

- More than 500,000

Q5 **Expected income change [Question 709]**:In your opinion, how likely is it that your household's average monthly net income will change as follows in the next twelve months?

The aim of this question is to determine how likely you think it is that something specific will happen in the future. You can rate the likelihood on a scale from 0 to 100, with 0 meaning that an event is completely unlikely and 100 meaning that you are absolutely certain it will happen. Use values between the two extremes to moderate the strength of your opinion. Please note that your answers to the categories have to add up to 100.

- Fall by 2000 Euro or more

- Fall by between 1500 Euro and less than 2000 Euro

- Fall by between 1000 Euro and less than 1500 Euro

- Fall by between 500 Euro and less than 1000 Euro

- Fall by between 250 Euro and less than 500 Euro

- Fall by between 0 Euro and less than 250 Euro

- Increase by between 0 Euro and less than 250 Euro

- Increase by between 250 Euro and less than 500 Euro

- Increase by between 500 Euro and less than 1000 Euro

- Increase by between 1000 Euro and less than 1500 Euro

- Increase by between 1500 Euro and less than 2000 Euro

- Increase by between 2000 Euro or more

Q6 **Expected inflation [Question 005B]**: Roughly what do you expect the rate of inflation/deflation to be over the next twelve months?

Note: Inflation is the percentage increase of the general price level. It is mostly measured using the consumer price index. A drop in the price level is commonly described as "deflation". Please enter a value in the input field (values may have one decimal place).

_____ percent

Additionally, as controls in our regression analysis, we include variables based on the following questions.

Q7 **Monthly household net income [Question hhinc]**: How high is the total monthly net income of your household?

*Note*: This refers to the total amount, comprising wages, salaries, income from self-employment and pensions, in each case after deducting tax and social security contributions. In this amount, please include any income received through public aid, earnings from rental or leasing, housing allowance, child benefits and any other sources of income.

- Less than 500 EUR
- 500 to 999 EUR
- 1.000 to 1.499 EUR
- 1.500 to 1.999 EUR
- 2.000 to 2.499 EUR
- 2.500 to 2.999 EUR
- 3.000 to 3.499 EUR
- 3.500 to 3.999 EUR
- 4.000 to 4.999 EUR
- 5.000 to 5.999 EUR
- 6.000 to 7.999 EUR
- 8.000 to 9.999 EUR
- 10.000 EUR and more

Q8 **Macroeconomic expectations [Question 004]**: Now we would like to ask you about your assessment of general economic developments in Germany over the next twelve months. What developments do you expect in the following metrics over the next twelve months? Will...

- the unemployment rate in Germany

- the interest rate on deposits

- the rate of economic growth in Germany

*With the following answer possibilities:*

1. decrease significantly

2. decrease slightly

3. stay roughly the same

4. increase slightly

5. increase significantly

Q9 **House price expectations [Question 701]**: By what percentage do you think property prices in your area will change over the next twelve months?
Note: Please enter a value in the input field (values may have one decimal place). Please use a full stop rather than a comma as the decimal separator. If it is assumed that property prices will fall, please enter a negative value.

_____ percent

Q10 **Duration of Covid restrictions [Question 711]**: How long do you think the restrictions on events and gatherings in response to the coronavirus pandemic will last? For a further ...
Note: Please enter the number that you think is most likely. You can enter the value either in days, weeks or months. Please select one of the three fields.

1. days _____

2. weeks _____

3. months _____

Finally, we use the following question for data cleaning purposes:

Q11 **Spending and spending plans non-durable [Question 704A]**: How much roughly do you spend or are you planning to spend on average on everyday consumer goods (food, clothing, entertainment/recreation including restaurant visits, petrol and the like) per month?

Note: Please enter an amount in every field. If you do not know the exact amount, please provide an estimate.

a) In the second half of the year (July to the end of December), I normally spend _____ Euro per month. Euro

b) In the second half of 2020 (July to the end of December), I plan to spend _____ Euro per month.

## Bundesbank Online Panel of Households – January 2021

The BOP-HH January 2021 wave is used in our ex-post analysis. In brackets, we list the original survey numbers of the questions.

Q12 **VAT pass-through [Question P1306]**: In your opinion, how has the temporary reduction of the VAT affected prices between 1. July 2020 and 31. December 2020?

- Prices fell by more than 3%.

- Prices fell between 2% and 3%.

- Prices fell between 1% and 2%.

- Prices fell by less than 1%.

- Prices remained unchanged.

- Prices rose.

Q13 **Spending durables [Question P1304]**: How much have you spent on larger purchases (e.g. car, furniture, electronics, etc.)?
Note: Please enter an amount in every field. If you are not quite sure, give a rough estimate.

- In the second half of 2020 (July to the end of December), I spent: _____ Euro

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q14 **Bargain Hunting [P1305]**: To what extent do the following statements apply to you?

- I usually look for bargains and am price-conscious.

*The following answer possibilities were given:*

1. Applies in full

2. Applies generally

3. Does not apply generally

4. Does not apply at all

Q15 **Gross wealth and liabilities [Question CQ007]**:How high do you estimate the total assets and liabilities of your household to be?

Infobox: "Assets include real estate, vehicles, holdings in undertakings, financial assets and balances with insurance companies. Liabilities include mortgage debt, consumer credit, overdrawn current accounts and other debt or liabilities."

– Total assets

1. 0 to less than 2.500 €

2. 2.500 to less than 5.000 €

3. 5.000 to less than 10.000 €

4. 10.000 to less than 25.000 €

5. 25.000 to less than 50.000 €

6. 50.000 to less than 75.000 €

7. 75.000 to less than 100.000 €

8. 100.000 to less than 250.000 €

9. 250.000 to less than 500.000 €

10. 500.000 € and more

– Collateralised loans (mortgage loans)

1. 0 (no loans)

2. Debts totalling 1 to less than 25.000 €

3. 25.000 to less than 50.000 €

4. 50.000 to less than 100.000 €

5. 100.000 to less than 150.000 €

6. 150.000 to less than 200.000 €

7. 200.000 to less than 300.000 €

8. 300.000 to less than 500.000 €

9. 500.000 € and more

– Uncollateralised loans (e.g. overdraft facilities, consumer loans, loans to finance a company or a professional activity, for vehicles, house fittings, holidays or education, loans from friends and family).

1. 0 (no loans)

2. Debts totalling 1 to less than 1.000 €

3. 1.000 to less than 2.000 €

4. 2.000 to less than 5.000 €

5. 5.000 to less than 10.000 €

6. 10.000 to less than 20.000 €

7. 20.000 to less than 40.000 €

8. 40.000 € and more

Additionally, as control in our regression analysis, we include a variable based on the following question:

Q16 **Monthly household net income [Question CS008]**: What is the total monthly net income of your household?
*Note*: This refers to the total amount, comprising wages, salaries, income from self-employment and pensions, in each case after deducting tax and social security contributions. In this amount, please include any income received through public aid, earnings from rents and leases, housing allowance, child benefits and any other sources of income.

1. Less than 500 EUR

2. 500 to 999 EUR

3. 1.000 to 1.499 EUR

4. 1.500 to 1.999 EUR

5. 2.000 to 2.499 EUR

6. 2.500 to 2.999 EUR

7. 3.000 to 3.499 EUR

8. 3.500 to 3.999 EUR

9. 4.000 to 4.999 EUR

10. 5.000 to 5.999 EUR

11. 6.000 to 7.999 EUR

12. 8.000 to 9.999 EUR

13. 10.000 EUR and more

Finally, we use the following question for data cleaning purposes:

Q17 **Past monthly expenditures [Question CQ004]**: : If you think back to last month: roughly how many euro did you spend on the following items last month?

- Essential goods (e.g. food and beverages, non-food items such as cleaning products or similar)
- Clothing and footwear
- Entertainment/recreation (e.g. restaurant visits, cultural events, gym)
- Mobility (e.g. fuel, car loans and running costs, bus and train tickets)

## GfK Homescanner Panel Survey – January 2021

The GfK Homescanner Panel Survey survey, January 2021 wave, is used in our ex-post analysis. In brackets, we list the original survey numbers of the questions.

Q18 **VAT pass-through [Question 7]**: In your opinion, how has the temporary reduction of the VAT affected prices between 1. July 2020 and 31. December 2020?

- Prices fell by more than 3%.
- Prices fell between 2% and 3%.
- Prices fell between 1% and 2%.
- Prices fell by less than 1%.
- Prices remained unchanged.
- Prices rose.

Q19 **Spending durables [Question 5c]**: How much have you spent on larger purchases (e.g. car, furniture, electronics, etc.)?
Note: Please enter an amount in every field. If you are not quite sure, give a rough estimate.

- In the second half of 2020 (July to the end of December), I spent: _____ Euro

Q20 **Price Sensitivity [Question 16]**: Please consider all expenditures of your household. This includes spending on food, drugs, housing (e.g., rent or mortgage payments), medical bills, transport, leisure activities as well as larger purchases. Would you spend more or less if consumer prices rose or fell?

Please indicate in the column "increase by" or "decrease by" by how much your expenditure would change in your opinion or select the third option "remain unchanged" to indicate no change in spending. Please provide one answer for each row.

The expenditure of my household would. . .

- increase by_____ %.
- remain unchanged.
- decrease by _____ %.

*Respondents were presented with the following scenarios:*

1. Prices rise by 10%
2. Prices rise by 3%
3. Prices rise by 1%
4. Prices fall by 1%
5. Prices fall by 3%

To study potential heterogeneity patterns in the ex-ante analysis, we use the responses to the following survey questions:

Q21 **Public Servant [Question 12]**: Do you or your partner or someone else in your household work in the civil service?
Note: Please select all applicable answers.

- Yes, I work in the civil service.
- Yes, my partner / other household member works in the civil service.
- No

Q22 **Skills [Question 10]**: What follows are statements pairing opposites. Please indicate for each row whether you align more with the left or right statement. Please use numbers from "0" to "10": "0" means you fully agree with statement on the left, and "10" means you fully agree with the statement on the right.

- **Analytical:**
  I am a analytical person. 0_____ 1_____ 2_____ 3_____ 4_____ 5_____ 6_____ 7_____ 8_____ 9_____ 10_____ I rather respond intuitively.

- **Financial literacy:**
  I have very good knowledge of finance and mathematics related to finance. 0_____ 1_____ 2_____ 3_____ 4_____ 5_____ 6_____ 7_____ 8_____ 9_____ 10_____ I have no knowledge whatsoever about finance and mathematics related to finance.

Q23 **Planning in advance [Question 14]**: When making consumption-savings decisions, how far ahead in the future do you typically budget?

1. I do not budget ahead, but rather decide spontaneously.
2. I do budget ahead.

Additionally, as control in our regression analysis, we include a variable based on the following question (we take the other socio-economic controls, including household income, from the regular GfK dataset):

Q24 **Net wealth [Question 20]**: How high is the net wealth of your household? Net wealth is the value of all assets minus debt.

- Below 0 €
- 0 € and more, but less than 2.500 €
- 2.500 € and more, but less than 5.000 €
- 5.000 € and more, but less than 10.000 €
- 10.000 € and more, but less than 25.000 €
- 25.000 € and more, but less than 50.000 €
- 50.000 € and more, but less than 75.000 €
- 75.000 € and more, but less than 100.000 €
- 100.000 € and more, but less than 250.000 €
- 250.000 € and more, but less than 500.000 €
- More than 500.000 €
- I rather not answer this question.

To study intertemporal substitution directly, we make use of the following question:

Q25 **Spending durables [Question 5e]**: How much do you plan to spend on larger purchases (e.g., car, furniture, electronic devices, etc)?
Note: Please enter an amount into each field. Provide an estimate if you do not remember the exact amount.

- In the first half of 2021 (January up to end of June 2021) I plan to spend: _____ Euro

Finally, we use the following question for data cleaning purposes:

Q26 **Past monthly expenditures [Question 4b]**: Please consider your monthly expenditure on essential consumer goods (food, clothing, leisure activities including restaurant visits, gas and more) and finalize the following statement. In the second half of 2020 (July up to end of December 2020) I have spent on average per month: _____ Euro. *Note:* Please enter an amount into each field and round up to full Euros. If you do not remember the exact amount, please provide an estimate.