Managing households' expectations with unconventional policies

by Francesco D'Acunto, Daniel Hoang and Michael Weber

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Abstract

Binding lower bounds on interest rates and large government deficits limit the scope of fiscal and monetary policies to stimulate households' spending through financial intermediaries and firms. Policymakers have thus been implementing unconventional policies that aim to increase households' spending directly through managing their expectations. We first show theoretically and empirically that higher inflation expectations increase households' consumption. We then design a difference-in-differences strategy to assess the effectiveness of unconventional fiscal policy and forward guidance, both of which aim to raise aggregate demand via managing expectations. Whereas unconventional fiscal policy increases households' expectations and spending, forward guidance announcements do not.

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"[...] inflation will start rising and the usual pattern of central bank reaction would dictate a resolute firming of the stance. Its promise not to follow that usual pattern of reaction will be painful to fulfill, when that time comes, because the central bank will have to watch inflation rising while remaining atypically passive. But that promise has a value today, as it generates optimistic expectations, supports spending and thus facilitates the central bank's job at present."

Peter Praet (2013): Forward guidance and the ECB.

"This [VAT] tax-induced inflation would give households an incentive to spend sooner rather than waiting until prices are substantially higher."

Martin Feldstein (2002): Discretionary fiscal policy in a low interest rate environment.

Stimulating households' consumption is one of the most powerful transmission channels of fiscal and monetary policy because consumption is the largest component of GDP (Agarwal and Qian (2014); Andersen et al. (2020)). When nominal interest rates fall below the reversal rate and high debt-to-GDP ratios limit the fiscal space—two conditions most developed economies have been facing since the Great Recession—stimulating consumption requires unconventional policies that can manage households' expectations directly rather than indirectly through financial intermediaries and firms (Roth and Wohlfart (2019); Coibion et al. (2018); D'Acunto et al. (2018)). Policies that raise the inflation expectations of households are viable candidates, because in times of fixed nominal rates, higher inflation expectations should reduce households' perceived real interest rates (Fisher equation), which should increase their incentives to consume (consumer Euler equation).

Macroeconomists and policy makers have recently proposed two unconventional policies that aim to manage households' inflation expectations and hence consumption—unconventional fiscal policy (Correia et al. (2013)) and forward guidance (Eggertsson and Woodford (2003)). Although theoretically both policies should stimulate aggregate demand through raising households' inflation expectations, their empirical effectiveness is highly debated (e.g., see Del Negro et al. (2015) and D'Acunto, Hoang, and Weber (2018)). In this paper, we provide an empirical setting to identify the causal effect of these unconventional policies on households' inflation expectations and spending plans, if any.

Empirically, the relationship between inflation expectations and consumption is debated (see, e.g., Bachmann et al. (2015) and Crump et al. (2015)). We start with a simple theoretical framework that relates households' consumption and savings decisions to their inflation expectations and emphasizes the assumptions needed for a positive effect of inflation expectations on spending. We then provide empirical support for the positive association

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using household micro data across European countries in which we jointly observe households' expectations and consumption plans. This relationship varies significantly across households alongside two dimensions—education and proxies for patience. Once we absorb the variation in education and patience, other demographic characteristics play a marginal role.

We then exploit a set of unique institutional features of our setting to compare the effectiveness of unconventional fiscal policy—the pre-announcement of higher future consumption taxes—and forward guidance—the explicit guidance by central banks about the future path of monetary policy rates. Both policies should generate higher inflation expectations and hence higher immediate spending. Unconventional fiscal policy announcements do so by trivially communicating higher future prices for consumption goods. Forward guidance announcements are effective if households understand and trust that keeping policy rates low for longer than a conventional policy function prescribes will generate future inflation.

Identifying periods of unconventional fiscal policies is challenging. Generic consumption-tax changes do not qualify (D'Acunto et al. (2018)). First, the policy announcement should be unexpected. Moreover, the announcement should happen several months before the implementation of the tax increase so that households have the time to re-optimize their medium- and long-run consumption and saving plans. Also, the announcement should not trigger a change in nominal interest rates, so that higher inflation expectations result in lower real interest rates, reduce households' saving motives, and increase their consumption via intertemporal substitution.

Although it was not originally labeled as unconventional fiscal policy, we consider the unexpected announcement of a value-added tax (VAT) increase in Germany in November 2005, to be implemented in January 2007. Two features make this pre-announcement uniquely suited. First, the European Union (EU) largely imposed this policy on the German administration to avoid an infringement procedure for the breach of the Maastricht Treaty, which imposes an arbitrary cap of government deficit to gross GDP of 3%. The VAT-increase announcement was unexpected and due to inherited fiscal deficits (Romer and Romer (2010) and Alesina, Favero, and Giavazzi (2015)).[1] Second, Germany has no monetary sovereignty as a member of the European Monetary Union (EMU), and the ECB excluded any increase in nominal interest rates to counteract the price pressure from a higher VAT in Germany.[2]

The German setting is viable for our analysis because the same population also faced two forward-guidance announcements by former ECB President Mario Draghi. Mr. Draghi

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[1] In appendix section A.2 we discuss this point and the institutional setting in detail.

[2] Then ECB board member Axel Weber stated that "We know what the effects of the VAT increase are; as is the case for oil prices, we do not consider one-off effects" (Weber (2006)). See appendix section A.3 for a detailed discussion.

announced the introduction of forward guidance as a policy tool in the Euro Area on July 4 2013 and "firmly reiterate(d)" it on January 9 2014.

Our individual-level data include a large representative population across several European countries. Based on these data, Figure 1 plots the average inflation expectations (top panels) and propensity to purchase durable goods (bottom panels) of German households around the unconventional fiscal policy announcement (left panels) and the two forward guidance announcements (right panels). Although theoretically both policies should raise households' inflation expectations and spending on impact, only unconventional fiscal policy announcements produce these outcomes in the raw data. Forward guidance announcements appear unable to manage expectations or spending plans.

Figure 1: **Inflation Expectations & Durable Purchases**
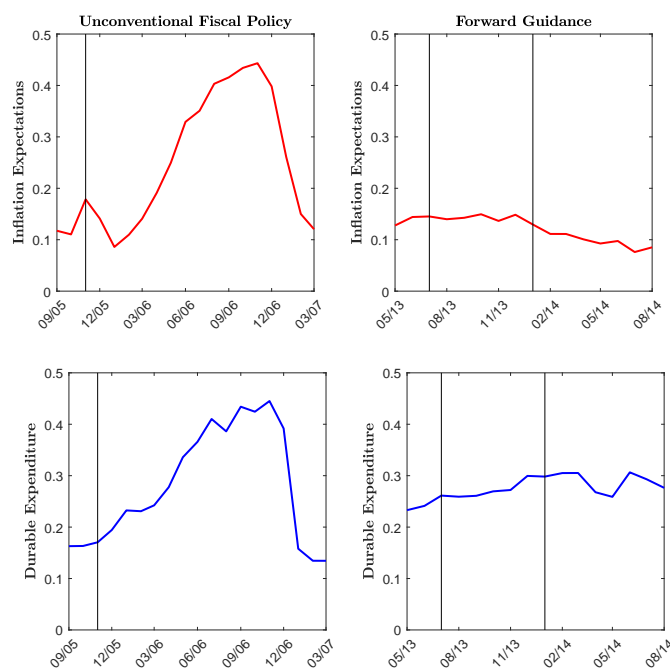
This figure plots the share of German consumers that expect higher inflation in the next 12 months compared to the previous 12 months in the top panels and the share of German consumers that think it is a good time to purchase larger ticket items in the bottom panels. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables. In the left panels, the vertical line signals the unconventional fiscal policy announcement (November 2005). In the right panels, the two vertical lines signal the forward-guidance announcements by the president of the European Central Bank, Mario Draghi (July 2013 and January 2014).

The time-series evidence in Figure 1 does not allow us to make conclusive statements about whether the two policies have successfully managed households' expectations and/or their spending decisions: Any unobserved shock contemporaneous to the announcements could explain the dynamics of beliefs and spending plans. To tackle this identification challenge,

we propose a difference-in-differences strategy that uses consumers in European countries that were not exposed directly to the German VAT shock and/or to the ECB forward guidance as counterfactual for the behavior of Germans had the policy announcements not happened.

Because we have access to micro data from the harmonized European Commission (EC) consumer survey program for Germany, France, the UK,[3] and Sweden, for the forward guidance announcements, we use counterfactual households in the UK and Sweden who were not exposed directly to these announcements because their countries did not belong to the Euro Area. For unconventional fiscal policy, we consider French households as a counterfactual, who faced the same nominal interest rates as Germans but not the VAT-change announcement.

German and foreign consumers are likely to differ along several dimensions. Our identification design allows us to absorb systematic time-invariant differences between Germany and other countries, such as differences in legal systems and cultural attitudes. To further dismiss the concern that the changing demographic composition of our samples across countries and over time might be responsible for any results, we also match German and foreign consumers based on demographic characteristics before computing the average treatment effects of the policy announcements in our difference-in-differences setting.

A remaining concern with our strategy is that unobserved time-varying country-level shocks concurrent to the policy announcements might determine changes in expectations and spending plans. The main assumption our strategy requires is that Germans' inflation expectations and spending plans would have followed the same trend as those of foreigners had the announcements not happened. Although this assumption is untestable, we can compare the average expectations of Germans and foreigners around the policy announcements, and we can test the null hypothesis that foreign consumers' expectations did not change around the shock. We fail to reject this null hypothesis. Moreover, we cannot reject either economically or statistically that Germans' and others' expectations and spending plans followed parallel trends before the announcements. In terms of internal validity, we also show that Germans' expectations about other macroeconomic variables did not change around the announcements, which rules out a reaction of spending plans due to general equilibrium effects.

The difference-in-differences results are consistent with the raw-data evidence in Figure 1: Unconventional fiscal policy increased German households' inflation expectations as well as their willingness to purchase durable goods throughout 2006, the period after the announcement and before the increase. A back-of-the-envelope calculation suggests that the announcement resulted in 10.3% higher real durable consumption growth throughout 2006. The forward-guidance announcements, instead, had no detectable effects on expectations and/or readiness to

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[3]For the periods we study, the UK was part of the EU.

spend on durables.

Whereas both forms of unconventional policy should operate through the consumer Euler equation, households' reactions might differ for several reasons. For instance, households might find forward guidance announcements not credible because this policy is not time consistent, whereas unconventional fiscal policy can be time consistent. Yet, Andrade and Ferroni (2021) show that both the stock market and inflation swap rates reacted positively to the forward guidance announcements we consider. Moreover, professional forecasters updated their GDP outlook and inflation expectations upward subsequent to the forward-guidance announcements. These reactions constitute evidence that experts found the forward guidance announcements we study time consistent and credible.[4]

Reactions to the two unconventional policies might also differ based on households' sophistication in economic matters: The implications of unconventional fiscal policy for future price changes are trivial—prices will increase at a specified date in the future—whereas grasping the implications of forward guidance requires sophistication in economic matters. This interpretation is motivated by evidence that the accuracy of households' expectations and their understanding of conventional measures of fiscal and monetary policy varies systematically with sophistication.[5] A recent theoretical literature in macroeconomics also explains households' underreaction to forward guidance announcements through various forms of limited cognition (see, e.g., Farhi and Werning (2018); Gabaix (2020); Woodford (2018); Angeletos and Lian (2017); and Ilut and Valchev (2017)).

We find that all households in our sample reacted similarly to the VAT announcement irrespective of demographic differences. Only financially-constrained households displayed a lower increase in spending plans, even if their inflation expectations increased similarly to those of unconstrained households. For forward guidance announcements, instead, we find no reaction in terms of either inflation expectations or spending plans across all the demographic characteristics we observe.

Unconventional fiscal policy might also be more effective due to media coverage and retailers' advertisement policies.[6] For instance, after announcements of future consumption-tax increases, retailers might increase advertisements because consumers could purchase goods at a lower price before the tax increase is implemented. Moreover, the media might report more about unconventional fiscal policy because it is easier to communicate and explain relative to

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[4]The reactions also directly rule out that market participants and professional forecasters interpreted the announcements as a signal of worse future economic conditions, so-called Delphic forward guidance (Campbell et al. (2012)).

[5]See, e.g., Agarwal et al. (2009); D'Acunto, Malmendier, Ospina, and Weber (2021); D'Acunto, Malmendier, and Weber (2020); D'Acunto, Hoang, Paloviita, and Weber (2020b)).

[6]We thank the editor, Tarun Ramadorai, and two anonymous referees for suggesting this analysis.

commitments about future interest rates (D'Acunto et al. (2020a); D'Acunto et al. (2020)). And, indeed, using data on the coverage of the policy announcements in the German media by *Mediatenor*, we find that the VAT-increase announcement was heavily covered, especially at salient times (the first announcement of the measure, the parliamentary approval of the measure, and its actual implementation). To the contrary, we barely detect any coverage of monetary policy interventions around the forward guidance announcements. The media, which have been shown to influence households' beliefs in other domains (Barone et al. (2015)), are thus likely to play an important role also for the transmission of unconventional fiscal policy. At the same time, media coverage cannot explain our results in full, because we find that inflation expectations and spending plans build up throughout 2006 rather than only around the times of heightened media coverage.

Our analysis contains some caveats. The data consist of repeated cross sections of household respondents. We cannot exploit within-household variation in inflation expectations to absorb unobserved time-invariant heterogeneity across households. Also, the survey elicits consumers' willingness to purchase durable goods but we do not observe actual purchases. In different contexts, Kreiner et al. (2014) and Coibion et al. (2020a) find that survey-based plans align with field choices. We also show directly that the average survey-based willingness to spend closely tracks the average realized durable consumption expenditure in Germany based on administrative data.

Note also that the survey we use elicits qualitative rather than quantitative measures of inflation expectations. We show, though, that the average of our qualitative measure tracks closely future realized inflation, whereas quantitative measures of expectations are typically upward biased (Armantier et al. (2015); D'Acunto et al. (2020)). Households seem to have correct *directional* expectations about inflation—which we capture with our qualitative measure—but ignore the *level* of inflation (see Vellekoop and Wiederholt (2017)). We discuss these points in more detail in section II.

Our results contribute to the growing literature in empirical macroeconomics and macro-finance that documents the micro-level channels through which macroeconomic policies are effective in the aggregate using micro data (Kaplan and Violante (2018)). It also contributes to the literature on household finance by studying how heterogeneous demographics and financial constraints across households might determine differential pass through of macroeconomic policies to outcomes such as saving and borrowing (Gomes et al. (2020); D'Acunto et al. (2019b)).

Our paper also speaks to the recent revival of research on subjective expectations. Bernanke (2007) motivates this agenda by arguing that inflation expectations should drive consumers' consumption, saving, and borrowing decisions, workers' wage bargaining with firms as well

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as managers' price-setting decisions and hence the effectiveness of fiscal and monetary policy. Most of the literature so far has focused on the determinants of individual beliefs (e.g., see Malmendier and Nagel (2016), Kuchler and Zafar (2018), D'Acunto et al. (2021), Cavallo et al. (2017), and D'Acunto et al. (2019a,b, 2020b)). We contribute to this line of work by analyzing the effectiveness of policy interventions that aim to manage subjective expectations and choice.

Methodologically, the paper belongs to the empirical macro-finance literature that uses micro data to obtain causal identification (Fuchs-Schuendeln and Hassan (2016); D'Acunto, Prokopczuk, and Weber (2018); D'Acunto (2014); Coibion, Gorodnichenko, and Weber (2019); D'Acunto (2018); Roth and Wohlfart (2019); Andre, Pizzinelli, Roth, and Wohlfart (2019); Coibion, Gorodnichenko, and Weber (2020b); Coibion et al. (2020); Roth et al. (2021); Link et al. (2020)). We contribute by proposing a difference-in-differences strategy paired with individual-level matching to compare macroeconomic expectations and spending plans.

Finally, our paper opens questions that future research should address. Given the dramatic differences in the effectiveness of alternative macroeconomic policies that require understanding and direct action on the part of households, an important open question is understanding how policy makers can reach households more directly and make them understand the implications of their policy choices. Potential fruitful directions include simpler and more direct modes of communication (Coibion et al. (2019); D'Acunto et al. (2020a)), building on households' trust in policy-making institutions and peers rather than targeting their understanding of the economic channels behind policy choices (D'Acunto et al. (2020); D'Acunto et al. (2021); D'Acunto (2015); D'Acunto et al. (2019)); and, forms of robo-advising and algorithmic advice to simplify households' understanding of policy choices (D'Acunto and Rossi (2020); D'Acunto and Rossi (2021); D'Acunto et al. (2020); Rossi and Utkus (2020)).

I Inflation Expectations and Consumption: Theoretical Framework

Basic macroeconomic models predict that consumers' inflation expectations should affect their saving and consumption decisions: Higher inflation expectations should result in lower real interest rates (Fisher equation effect). Lower real interest rates, in turn, should stimulate consumption expenditure via intertemporal substitution (Euler equation effect). This substitution effect should be especially strong for durable consumption goods, which are more interest-rate sensitive and easier to substitute intertemporally. For this reason, we need a framework in which households choose between durable and non-durable consumption. We sketch a simple version of such model economy to emphasize and discuss the key assumptions

behind these predictions, which we aim to bring to the data.

Assume that individuals derive flow utility from nondurable consumption, C_t and the stock of durable consumption, D_t. The stock of durable consumption depreciates at a rate θ, and households discount future utility by a factor β. Both θ and β are between 0 and 1. Households receive a nominal endowment each period of Y_t and enter the period with bond holdings B_t. Bonds earn a nominal net return of i_t. P_t, which denotes the price index in period t, includes the VAT, which for ease of exposition applies to both durable and nondurable consumption. Gross prices P_t equal $(1 + \tau_t)p_t$, where τ_t indicates the period t tax rate and p_t is the net price. The utility function is additively separable, and households derive flow utility, which is proportional to the stock of durables with a factor of proportionality of 1. Households have CRRA preferences with the same coefficients of relative risk aversion γ for nondurable consumption and the flow of durable consumption. The representative household maximizes:

$$\mathbb{E}_t^j \sum_{s=0}^{\infty} \beta^s \left(\frac{C_{t+s}^{1-\gamma}}{1-\gamma} + \frac{D_{t+s}^{1-\gamma}}{1-\gamma} \right)$$

$$\text{s.t.} \quad P_t C_t + P_t \left[D_t - (1-\theta)D_{t-1} \right] + B_{t+1} = Y_t + (1+i_t)B_t,$$

where $\mathbb{E}_t^j$ is the subjective expectations operator conditional on period t information for individual j. For ease of exposition, we abstract from uncertainty for now but we discuss how heterogeneity in subjective expectations might play a role below. The flow budget constraint states that nominal consumption expenditure for nondurable goods, investments in the stock of durable consumption goods, and bond purchases have to equal the nominal endowment and the payoff from previous-period bond purchases that pay a nominal interest rate i.

Let λ denote the Lagrange multiplier on the household's budget constraint. The first-order conditions for the representative household with respect to nondurable consumption, durable consumption, and bond holdings are:

$$C_t^{-\gamma} = \lambda_t P_t \tag{1}$$

$$D_t^{-\gamma} = \lambda_t P_t - \beta \lambda_{t+1} P_{t+1}(1-\theta) \tag{2}$$

$$\lambda_t = \beta \lambda_{t+1}(1+i_{t+1}). \tag{3}$$

Combining the first-order condition for nondurable consumption (equation (1)) with the law of motion for the Lagrange multiplier (equation (3)), we get the familiar intertemporal Euler

equation for nondurable consumption:

$$\left(\frac{C_{t+1}}{C_t}\right)^{\gamma} = \beta\frac{1 + i_{t+1}}{1 + \pi_{t+1}}, \tag{4}$$

where π_{t+1} denotes consumer price inflation between period t and $t+1$, that is $\frac{(1 + \tau_{t+1}p_{t+1})}{(1 + \tau_t p_t)}$. This expression for inflation already indicates that announcements today about future increases in VAT generate inflation in overall prices.

Combining all three first-order conditions, we get the intratemporal Euler equation for the choice between durable and nondurable consumption goods:

$$\left(\frac{C_t}{D_t}\right)^{\gamma} = 1 - (1 - \theta)\frac{1 + \pi_{t+1}}{1 + i_{t+1}}. \tag{5}$$

We see from equation (4) that higher inflation leads to a drop in consumption growth given fixed nominal interest rates, $1 + i_{t+1}$, and $\gamma > 0$. We see from equation (5) that under fixed nominal interest rates, $\gamma > 0$, and $\theta < 1$, we also expect an intratemporal substitution from nondurable consumption to durable consumption. If we allowed for differential price indices and tax rates for durable and nondurable inflation, we would also expect intratemporal substitution from nondurables to durables and a stronger intertemporal substitution for durable goods in case the VAT increase would primarily apply to durable goods.

Equation (2) provides intuition for intratemporal substitution between durable and non-durable consumption. One unit of the durable consumption good depreciates to $(1 - \theta)$ units in period $t+1$. We therefore take the future discounted marginal utility of the non-depreciated stock of durables into account when equating the marginal utility of purchasing one more unit of the durable good and its marginal cost.

A crucial insight of this simple model for the scope of unconventional policies is that the future marginal utility of one unit of the durable good purchased today increases in the future price level. For this reason, in a setting in which VAT increases are pre-announced as a form of unconventional fiscal policy, we expect the strongest reaction for durable purchases right before the increase is implemented because the stock of durables provides consumption utility after the VAT increase until it is fully depreciated. Crossley et al. (2014) call this effect an arbitrage effect.

The theoretical framework we propose includes several assumptions. First, the Fisher equation is an accounting identity that does not say anything about equilibrium relationships and adjustments. We have assumed that nominal interest rates do not immediately and fully increase to offset increasing inflation expectations, which is meaningful in settings in which

the effective-lower bound on nominal interest rates binds and/or in a currency union like the Euro Area. Second, we have assumed that the shock to inflation expectations only affects current-period marginal utility and have treated the marginal utility of future consumption as given. This assumption implies that shocks to inflation expectations are sufficiently short-lived.

Third, we have assumed that changes in inflation do not affect future nominal endowments. In this setup, higher inflation expectations increase the price of future consumption and the substitution effect increases current-period consumption. Higher inflation leads to a drop in the present discounted value of real endowments, and hence both current and future consumption will decrease. Stickiness of wages can justify this assumption: If inflation increases future nominal endowments, increases in inflation expectations—given fixed nominal interest rates— have similar implications as lower nominal interest rates. An income effect might work against the substitution effect but empirically the substitution effect seems to dominate (see Christiano et al. (2005)).

Fourth, we abstract from heterogeneity of households' asset positions, marginal propensities to consume, and expectations about future endowments (see Auclert (2019)). We will allow for differences in expectations regarding future income in the empirical analysis.

Fifth, we might expect heterogeneity in the response of consumption to announcements of future policy changes if we allowed for uncertainty in our setting:

$$\mathbb{E}_t^j \, \pi_{t+1} = \mathbb{E}_t^j \, \frac{(1 + \tau_{t+1} p_{t+1})}{(1 + \tau_t p_t)}. \tag{6}$$

Sixth, heterogeneity in households' sophistication might play a role when assessing the effectiveness of policies that differ in terms of their complexity. Pre-announcing an increase in VAT has trivial implications for future prices, whereas understanding the relationship between future policy rates and inflation might be less intuitive for unsophisticated households. Seventh, systematic heterogeneity in households' consumption baskets might expose them to different signals about inflation and affect their reaction to unconventional policy announcements (D'Acunto et al. (2021); D'Acunto et al. (2020)). Eighth, a housing wealth channel and whether households are net debtor or creditors might be important mediating factors through wealth effects for how inflation expectations affect spending propensities.

Ultimately, because of these potential alternative channels the relationship between inflation expectations and consumption expenditure is theoretically ambiguous. We thus study empirically several channels different from intertemporal substitution in Section III and verbally discuss the role of other channels and confounding factors in Section VII.

II   Data

A.   Data Sources

Our main data source are the confidential micro data underlying the GfK Consumer Climate MAXX survey. GfK conducts the survey on behalf of the Directorate General for Economic and Financial Affairs (DG ECFIN) of the EC. We use similar data from the harmonized surveys of DG ECFIN for several other European countries.[7] GfK asks a representative repeated cross section of 2,000 German households questions about general and personal economic conditions, inflation expectations, and willingness to spend on consumption goods at the monthly frequency. We obtained access to the micro data for the period starting in January 2000 and ending in February 2016. The Online Appendix contains the original survey and a translation to English.

   We use the answers to the following two questions in the survey to construct the main variables in our baseline analysis:

Question 8 *Given the current economic situation, do you think it's a good time to buy larger items such as furniture, electronic items, etc.?*

Households could answer, "It's neither a good nor a bad time," "No, it's a bad time," or "Yes, it's a good time."

Question 3 *How will consumer prices evolve during the next twelve months compared to the previous twelve months?*

Households could answer, "Prices will increase more," "Prices will increase by the same," "Prices will increase less," "Prices will stay the same," or "Prices will decrease." We create a dummy variable that equals 1 when households answered, "Prices will increase more," to get a measure of higher expected inflation.

   We also use questions regarding expectations about general economic variables, personal income or unemployment, and a rich set of socio-demographics.

B.   Descriptive Statistics

Table 1 contains descriptive statistics. On average, 22% of individuals said it was a good time to buy durables, 22% said it was a bad time, and the others are indifferent. Thirteen percent of individuals expected higher inflation in the following 12 months. More than 80% of respondents thought prices in the previous 12 months increased substantially, somewhat, or slightly, with almost equal proportions for each answer. Only 15% thought prices remained the same, and essentially nobody thought prices decreased.

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[7]We discuss the data for other European countries in more detail in the Online Appendix.

The sample is roughly balanced between women and men. Most respondents completed high school, but had no college education.[8] The mean household's size was 2.5, and the majority of households lived in cities with fewer than 50,000 inhabitants.

Panel C of Table 1 reports statistics for individuals' personal expectations. Most individuals thought their financial situation had not changed in the previous 12 months, and they expected the same for the future. Moreover, most individuals barely saved, and expected a constant or slightly increasing unemployment rate.

B.1   Inflation Expectations and Actual Inflation

In quantitative surveys, respondents often report extreme levels of expected inflation. For instance, in the Michigan Survey of Consumers (MSC), 3% of households expect deflation of up to 50%, and 17% expect an increase in inflation by more than 9% per year. A recent literature also discusses an effect of question wording on answers (see Armantier et al. (2013)). Assessing whether our qualitative elicitation of inflation expectations captures meaningful variation in ex-post realized inflation rates is thus crucial to corroborate the validity of our data. Appendix figure A.2 shows that our average survey answers are highly correlated with subsequent realized inflation, which is prima facie evidence that our measures of inflation expectations capture meaningful variation in subsequent realized inflation.

In fact, our qualitative measures might be more appropriate than quantitative measures in our repeated cross sections setting. Consider the following example of two households, A and B. Household A perceives an existing inflation rate of 2%. Household B perceives a 20% inflation rate. Now, suppose that household A expects inflation to increase from 2% to 3%, and hence thinks now it is a good time to purchase durables. Household B instead expects inflation to decrease from 20% to 15%, and hence wants to postpone durable purchases. If we ran a cross-sectional regression of the reported willingness to purchase durable goods on quantitative inflation expectations, and we could not observe within-household inflation expectations over time, we would estimate a negative relationship between inflation expectations and spending, even though the true underlying relationship is positive. Our qualitative measures avoid this problem.

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[8]Most respondents completed either *Hauptschule* or *Realschule*, and only 8% of respondents had a college degree.

III Inflation Expectations and Consumption: Empirical Evidence

The unconventional policies we study can affect purchasing propensities via an inflation-expectations channel only if households' willingness to purchase larger ticket items reacts to changes in their inflation expectations. In times of fixed nominal interest rates, the Euler and Fisher equations predict a positive association between consumption and inflation expectations. Earlier literature, however, found conflictive evidence in micro data for the United States. In this section, we document a positive association between households' inflation expectations and their willingness to purchase durable goods. This result is crucial to support the basic economic mechanism behind our difference-in-differences identification strategy, which compares the changes in expectations and readiness to spend of German households and demographically-similar households in other EU countries over time.

A. Empirical Specification

Consumers' readiness to purchase durable goods derives from discrete, non-ordered choices in a survey. We therefore model the response probabilities in a multinomial-logit setting.[9] We assume the answer to the question on the readiness to spend is a random variable representing the underlying population. The random variable may take three values, $y \in \{0, 1, 2\}$: 0 denotes it is neither a good nor a bad time to purchase durable goods; 1 denotes it is a bad time to purchase durable goods; and 2 denotes it is a good time to purchase durable goods.

We define the response probabilities as $P(y = t|X)$, where $t = 0, 1, 2$, and X is an $N \times K$ vector where N is the number of survey participants. The first element of X is a unit vector, and the other $K - 1$ columns represent a rich set of household-level observables, including demographics and expectations.

We assume the distribution of the response probabilities is

$$P(y = t|X) = \frac{e^{X\beta_t}}{1 + \sum_{z=1,2} e^{X\beta_z}} \tag{7}$$

for $t = 1, 2$, and β_t is a $K \times 1$ vector of coefficients. The response probability for the case $y = 0$ is determined, because the three probabilities must sum to unity. We estimate the model via maximum likelihood to obtain the vector β_t of coefficients for $t = 1, 2$, and set the category $y = 0$ as the baseline response. We compute the marginal effects of changes in the covariates on the probability that households choose any of three answers in the survey, and report them in

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[9]Results are similar if we estimate a probit model.

the tables.

B. Baseline Results

Table 2 reports the average marginal effects computed from the multinomial logit regressions. We cluster standard errors at the quarter level to allow for correlation of unknown form in residuals across contiguous months. In all columns, we report the marginal effect of the inflation-increase dummy on the likelihood that households respond that it is a good time to buy durables. Columns (1)-(5) focus on the sample of German households, whereas columns (6)-(8) report the results for estimating the same specification separately for households abroad.

In column (1), the inflation-increase dummy is the only explanatory variable. Germans who expect increasing inflation over the following 12 months are on average 5.8% more likely to answer that it is a good time to buy durables compared to individuals that expected constant or decreasing inflation. Column (2) augments the specification by adding a set of controls, which include perceptions of past inflation (Jonung (1981)), a rich set of demographic characteristics that might determine both purchasing propensities and inflation expectations (see, e.g., Attanasio and Weber (1993)), as well as expectations about personal and macroeconomic variables. The baseline association between expecting higher inflation and readiness to purchase durable goods becomes larger (8.8%), which suggests that omitted factors in this analysis are unlikely to dramatically change the results.

In columns (3)-(5) of Table 2, we estimate the conditional correlation between inflation expectations and readiness to spend by subperiods. The correlation is higher during the VAT announcement period, which is consistent with the possibility that unconventional fiscal policy successfully increased households' propensity to purchase durable goods.

A back-of-the-envelope calculation reveals that the marginal effect of inflation expectations on the willingness to buy durables would translate into 4.8% higher real durable consumption expenditure if all Germans expected higher inflation. During the period after the announcement and before the actual VAT increase, the 3-percentage-point higher VAT should have resulted in a 10.3% higher real durable consumption growth.[10]

In columns (6)-(8), we find that the baseline association between inflation expectations and readiness to spend is also true, on average, in each of the countries whose households we use as counterfactuals in our difference-in-differences analysis below.

To further confirm that households behave in line with the consumer Euler equation, we

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[10]To reach this suggestive conclusion, we regress the natural logarithm of real durable consumption expenditure at the quarterly frequency on the end-of-quarter value of the average durable purchasing propensity and quarterly dummies, and multiply the resulting coefficient of 0.5396 by the marginal effect of 8.76% (column (2) of Table 2) and 19.09% for the unconventional fiscal policy period (see column (3)).

consider their saving rather than spending plans. Higher inflation expectations should reduce the willingness to save unless households substituted between nondurable and durable spending without any effects on overall consumption. Table 3 confirms that higher inflation expectations increase the likelihood German households declare it is a bad time to save and decrease the likelihood they declare it is a good time to save.

C. Heterogeneity

Because our data consist of repeated cross-sections, if the baseline positive association between inflation expectations and readiness to spend varied across demographic groups changes in the demographic compositions of our cross sections might be problematic. We therefore assess whether the baseline positive association between inflation expectations and readiness to spend varies systematically across subsamples in Table 4.

We first consider respondents' education. Columns (1)-(2) of Table 4 report the marginal effects for our specification estimated separately for survey participants with a *Hauptschule* degree (lowest level of formal education) and those with college education. Households with low levels of education that expect inflation to increase are about 6.9% more likely to have a positive stance toward buying durables compared to households that expected constant or decreasing inflation (column (1)). This marginal effect seems to increase with education, and is about 11% for household heads that hold a college degree (column (2)). In Table 4, we also report the test statistic for a Z-test whose null hypothesis is that the coefficients in columns (1) and (2)—which are estimated in different subsamples—are equal. Even if the difference in the estimated coefficients is not negligible in terms of magnitude, we fail to reject the null that the coefficients are the same at standard levels of significance.

For all the other demographic splits we observe in the data, we find that not only the estimated association between inflation expectations and readiness to spend barely differs in terms of magnitudes, but we also fail to reject the null that the coefficients across splits are equal at any level of significance.

We find only a 5% higher marginal effect of inflation expectations on the likelihood of richer survey participants with a monthly net income above EUR 2,500 replying that it was a good time to buy durables (column (4)), compared to survey participants with a monthly net income less than EUR 1,000 (column (3)), and this difference is not significant. Moreover, the marginal effect of inflation increases on the willingness to spend is slightly lower for those aged 65 or higher (column (6)) than for the younger population (column (5)), and even in this case we find that this difference is statistically insignificant.

We detect small and statistically insignificant differences in the sensitivity to buy large-ticket

items to inflation expectations even in splits by gender, income expectations, and socioeconomic status (see columns (7)–(12)).

We interpret the results in columns (1)-(12) of Table 4 as broadly suggesting that the differences in the reaction of the readiness to spend to inflation expectations across demographic groups exist but are economically small and generally statistically insignificant. This result reduces the concern that the changing demographic compositions of the cross sections of respondents to the EC survey might be a concern for the interpretation of our difference-in-difference strategy. To fully eliminate any remaining concerns, we will implement a matching estimator that compares households in Germany and foreign countries whose demographic characteristics are similar for each monthly cross section we observe.

The last heterogeneity dimension we can assess empirically in our setting relates to a preference dimension that is likely to mediate the extent to which consumers engage in intertemporal substitution when planning their durable spending—patience. Intuitively, irrespective of financial constraints, impatient consumers cannot take advantage of incentives to substitute their durable spending intertemporally because they do not optimize intertemporally to begin with. To the contrary, patient consumers who do not face financial constraints take full advantage of intertemporal substitution and hence are more sensitive to their changing inflation expectations when making decisions about durable spending.

Unfortunately, in the survey—contrary to other recent surveys in the European context (D'Acunto et al. (2020))—we do not observe an individual-level-elicited measure of patience. Absent direct elicitation of respondents' patience, we consider the combination of income levels and saving propensities. On the one hand, the propensity to save is likely influenced by households' patience. On the other hand, non-saving households might merely be financially constrained rather than having lower patience. For this reason, we consider the split between regular savers and regular non-savers among respondents that belong to the top groups in terms of nominal income, which are less likely to be financially or liquidity constrained. We consider respondents above the median income for this analysis.

We implement this test in columns (13)-(14) of Table 4. We find that, consistent with our conjecture, the baseline association between higher inflation expectations and the willingness to purchase durable goods is about 40% higher for savers than for non-savers among respondents with high levels of income, who are unlikely to not save due to liquidity or financial constraints. Note that this difference is the only one that has not only economic but also statistical significance—the Z-statistic for a test of equality of the estimated marginal effects across the two groups is larger than 2.

IV Unconventional Policies: Setting and Identification Strategy

After documenting the positive association between inflation expectations and the willingness to purchase durable goods, we move on to discuss the institutional setting of the unconventional policy announcements we study in the rest of the paper and our empirical strategy.

A. Institutional Setting

The ideal experiment to test for the effects of unconventional fiscal policy on households' readiness to spend would require an unexpected pre-announced increase in future consumption taxes that is not counterbalanced by an increase in nominal interest rates. We isolated one such policy announcement in Germany. In November 2005, the newly formed government unexpectedly announced a 3-percentage-point increase in the VAT, effective in January 2007.

The narrative record, which we discuss in more detail in the Online Appendix, suggests that the increase was legislated to comply with EU law. In each year between 2001 and 2004, Germany had posted a deficit-to-GDP ratio above 3%. In 2003, the EU opened a procedure against Germany for infringement of the 3% deficit-to-GDP rule in the Maastricht Treaty. The German government proposed plans to reduce the ratio to 2.9% in 2005 and yet the deficit-to-GDP ratio was forecasted to be 3.3% at the end of 2005. In November 2005, the EU announced it would fine Germany absent immediate actions to reduce the deficit. A few days later, the newly established right-left coalition announced a 3-percentage-point increase in VAT, from 16% to 19%, to be implemented after 14 months (January 2007). Based on the taxonomy of Romer and Romer (2010), this increase was due to an "inherited budget deficit," which is also how Alesina et al. (2019) categorize the increase.

For our purposes, the fundamental feature of this policy announcement is that Germany has had no monetary sovereignty since joining the EMU in 1999. Because the ECB did not tighten monetary policy to counteract the increase in inflation expectations in Germany (see the Online Appendix for more details about this decision by the ECB), under a Fisher equation logic a change in consumers' inflation expectations should have translated one-to-one into a change in perceived real interest rates and hence should have decreased the propensity to save and increased spending on impact (Euler equation).

Moving on to forward guidance, we consider the first two announcements by the ECB in 2013 and 2014. During the introductory remarks to the press conference on 4 July 2013, President Mario Draghi used an explicit forward guidance announcement as a policy tool for the first time: "The Governing Council expects the key ECB interest rates to remain at present or

lower levels for an extended period of time."[11] On 9 January 2014, Mr. Draghi reinforced this stance: "Accordingly, we firmly reiterate our forward guidance that we continue to expect the key ECB interest rates to remain at present or lower levels for an extended period of time."[12]

The ECB Executive Board discussed explicitly the idea that the forward guidance announcement should have increased households' inflation expectations and hence pulled spending forward. For instance, Mr. Praet explained that "longer-term interest rates determine the borrowing conditions that are most relevant for a large component of aggregate spending: first and foremost, durable consumption." He moved on to argue that by committing to a future path of short-term interest rates the ECB would be able to stimulate durable spending.[13] He also argued that "inflation will start rising and the usual pattern of central bank reaction would dictate a resolute firming of the stance. Its promise not to follow that usual pattern of reaction will be painful to fulfill, when that time comes, because the central bank will have to watch inflation rising while remaining atypically passive. But that promise has a value today, as it generates optimistic expectations, supports spending and thus facilitates the central bank's job at present."

Time inconsistency, as Mr. Praet emphasized in the quotes above, is a potential concern with this form of forward guidance: to avoid generating inflation, central banks have an incentive to deviate from the policy once the liquidity trap, that is, the binding lower bound on policy rates, is over. Consumers might realize the time inconsistency and not react to the announcement for this reason. For the announcements we consider, though, Andrade and Ferroni (2021) document that financial markets, inflation swaps, and professional forecasters all reacted on impact, which is direct evidence that they all found the announcements credible. Because experts found these measures credible, the possibility that consumers did not change their inflation expectations because of lack of credibility seems unlikely.[14]

B. Difference-in-Differences Strategy

Assessing the effects of the policy announcements on German consumers alone would not allow any causal interpretation, because all German households were exposed to the same announcements and hence any shock contemporary to the announcements could have caused

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[11]See: https://www.ecb.europa.eu/press/pressconf/2013/html/is130704.en.html.

[12]See: https://www.ecb.europa.eu/press/pressconf/2014/html/is140109.en.html.

[13]See https://voxeu.org/article/forward-guidance-and-ecb.

[14]This form of forward guidance announcement, which publicly commits the ECB to future actions, falls under the "Odyssean" category based on the taxonomy of Campbell, Evans, Fisher, Justiniano, Calomiris, and Woodford (2012). Andrade and Ferroni (2021) argue that "Odyssean shocks became predominant over the post-2012 period during which policy rates went to zero (in July 2012) and the Governing Council started to give explicit guidance on future rates (in July 2013)."

the detected reactions. For identification purposes, we need a group of households not affected by the shock, but who behaved similar to German households before the shock so that they can act as a plausible counterfactual for the behavior of Germans absent the shock. To this aim, we propose a difference-in-differences empirical strategy in the spirit of Poterba (1996).

To implement this strategy, we obtained access to the confidential micro data for the same EU harmonized consumer sentiment survey for three additional countries (France, Sweden, and the UK) through national statistical offices and GfK subsidiaries. We use the households in these three countries to construct our control groups for the counterfactual behavior of German consumers had they not been exposed to the policy announcements.

Our difference-in-differences approach compares German consumers' readiness to purchase durables and inflation expectations with those of matched consumers in other European countries, whose observable characteristics are similar to German consumers, before and after the policy announcements. Because the micro-level cross-sectional estimation allows us to absorb any time-invariant country characteristic through country fixed effects, systematic differences across German and other European consumers cannot drive our results.

We estimate the average treatment effect of each policy announcement on consumers' readiness to purchase durables as follows:

$$(\overline{Dur}_{German,\ post} - \overline{Dur}_{German,\ pre}) - (\overline{Dur}_{foreign,\ post} - \overline{Dur}_{foreign,\ pre}), \tag{8}$$

where $\overline{Dur}_{German,\ post}$ is Germans' average readiness to purchase durable goods after each policy announcement; $\overline{Dur}_{German,\ pre}$ is Germans' average readiness to purchase durable goods before each policy announcement; and $\overline{Dur}_{foreign,\ post}$ and $\overline{Dur}_{foreign,\ pre}$ are the analogous averages for foreign households not exposed to the announcements.

C. Identifying Assumptions

The parallel-trends assumption is a necessary condition for identification. In our case, it states that the control group behaved similarly to German households both before and after the shock, had the shock not happened. We cannot test whether the parallel-trends assumption held after the shock, because we miss the counterfactual of no shock in Germany. We therefore test for the presence of differential pre-trends before the shock. In the presence of parallel pre-trends, our identifying assumption is that foreign households behaved like German households would have behaved absent the policy announcements in the post-announcement periods.

Figure 2 and Figure 3 provide graphical evidence that we fail to detect violations of parallel pre-trends. Based on the top left panels of the two figures, the trends in inflation

expectations and purchasing propensities are parallel for German and foreign consumers before the announcement of the VAT increase (November 2005). Starting in January 2006, both German consumers' inflation expectations and willingness to buy durable goods started to increase substantially. At the same time, the trends for foreign consumers did not move relative to the pre-shock period.

In the top right panels of both Figure 2 and Figure 3, we find that even in the case of the forward guidance announcements the trends in inflation expectations and purchasing propensities were parallel for German and foreign consumers. Contrary to the VAT announcement, we find no noticeable divergence of inflation expectations and purchasing propensities around the forward guidance announcements.

The bottom panels of Figure 2 and Figure 3 repeat the parallel-trends test on a subset of foreign countries. For the unconventional fiscal policy announcement, we only consider French consumers, who were not subject to a VAT increase but were facing the same nominal interest rates set by the ECB. The similarity of pre-shock trends is even more pronounced when we only use French households as control group (see bottom left panels of Figure 2 and Figure 3).

For the forward guidance announcements, we restrict the control group to consumers from the UK and Sweden (see bottom right panels of Figure 2 and Figure 3), who were not part of the EMU and hence not affected by the ECB forward guidance announcements. Again, we confirm these groups of consumers display parallel trends in the pre-announcement periods in terms of both individual inflation expectations and readiness to purchase durable goods. Figure A.4 in the Online Appendix repeats the tests for parallel trends for the forward guidance periods on households in the UK and Sweden separately and confirms the results.

As discussed above, foreign households also react to their inflation expectations in a similar fashion as German households, which alleviates concerns about the external validity of our strategy (see columns (6)-(8) in Table 2).

D.   Matching Foreign and German Households

To account for the potential heterogeneity in responsiveness to inflation expectations (Jappelli and Pistaferri (2014); see also section VII), we match German households with similar foreign households to construct our identification sample. We first match each German household in each month with a household in another country interviewed in the same month displaying similar demographic characteristics. Our samples are repeated cross sections, and hence we perform a second level of matching, which pairs up similar households interviewed before and after the shock separately within the German and the foreign survey waves.

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We use a nearest-neighbor algorithm to match households based on propensity scores.[15] We estimate propensity scores with a logit regression of the treatment indicator on gender, age, education, income, and social status, which are the demographic characteristics that are elicited homogeneously across EU countries by the survey.

The matching exercise is meaningful only if matched German and foreign households lie in the common support of the distributions of the propensity scores. We verify this condition in Figure 4, which plots the distributions for the treatment group for the VAT period in panel A (red, top half of panel A) and the control group (blue, bottom half of panel A) and for the forward guidance period in panel B.

To assess the performance of the matching procedure, we compare average household characteristics across German and foreign households both before and after matching. Table 5 assesses the balancing of the variables we use in the matching process. Panel A refers to the unconventional fiscal policy period and Panel B to the forward guidance period.

In each panel of Table 5, columns (1)-(3) report the sample average of the variables we use to compute the propensity score in the unmatched samples of German and foreign households. T-statistics for two-sided t-tests for whether the estimated means are equal reject the null at all plausible levels of significance, for both policy types. This result confirms that, without the matching step, German and foreign households differ systematically.

In columns (4)-(6), we report the same statistics for the treated and control observations of the matched samples, which we use in our difference-in-differences analysis. In this case, the differences in the estimated means across groups are economically and statistically negligible, which suggests the matching procedure effectively provides us with two similar groups of German and foreign households.

V The Effect of Unconventional Policies on Expectations and Consumption

In this section, we study the effect of policy announcements on inflation expectations, consumption plans, as well as the heterogeneity across demographics.

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[15]All the results are virtually identical if we perform the monthly matching using a group of control households for each German household, and we minimize the difference in observables of the German household and the group of foreign households.

A. Baseline Difference-in-Differences Estimates

We first consider the effects of unconventional fiscal policy announcements on consumers' inflation expectations and willingness to purchase durable goods. Figure 1 in the introduction shows a large increase in the share of individuals who expect higher inflation over the following 12 months after the announcement of a higher future VAT and before the implementation. In fact, the share quadruples after the announcement (left panel, vertical line) and stays high for the 13 months until the actual VAT increase in January 2007. After the increase, expectations revert to their pre-announcement level.

To estimate the average treatment effect of the VAT shock in equation (8), we run a set of cross-sectional regressions on the matched sample before and after the VAT announcement. We set the reference month to June 2005 and we change the end month m across regressions. All the results are similar if we use any other month before the announcement of the VAT increase in November 2005. The specification is as follows:

$$\Delta Dur_{i,\ 06/2005 \to m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,\ 06/2005 \to m} \times \gamma + \epsilon_i, \tag{9}$$

where $\Delta Dur_{i,\ 06/2005 \to m}$ is the difference in the willingness to spend on durable goods between month m and June 2005, $VATshock_i$ is an indicator equal to 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on household i's willingness to buy durables in month m, and $\Delta X'_{i,06/2005 \to m}$ is the difference in a set of observables between month m and the baseline month. The observables include the matching variables we use to construct household pairs, as well as income expectations. As we would expect from the fact that German and foreign households are matched based on the same demographic characteristics, the results are virtually identical if we change the set of observables or exclude them altogether.

The top left panel of Figure 5 plots the estimated coefficient $\hat{\beta}_m$ (solid line) of equation (9) for each month m from July 2005 to December 2007, as well as +/- one standard deviation bands around the estimates (dashed line). We find no differences in the readiness to spend on durable goods between German and matched households before the announcement of the VAT increase. Starting in December 2005, German households' willingness to spend increased relative to matched households: German households were 3.8 percentage points (s.e. 1.5 percentage points) more likely to declare it was a good time to purchase durable goods after the announcement compared to before, and compared to matched foreign households. The effect increased in magnitude throughout 2006 and peaked at 34 percentage points in November 2006. The fact that the average treatment effect increased over time is consistent with Crossley et al. (2014), who argue that intertemporal arbitrage should increase over time and be highest right before the tax

increase, because of irreversibility, uncertainty, and storage costs. The average treatment effect dropped to zero in January 2007 once the VAT increased and higher inflation materialized. In the bottom left panel of Figure 5, we plot the estimated coefficient for the average expectations that inflation will be higher over the next 12 months. We find similar patterns for inflation expectations as we do for the willingness to purchase durable goods.

In a second step, we study whether the two ECB forward-guidance announcement during the sample period affected consumers' willingness to spend on durable goods. The top right panel of Figure 5 plots the estimated coefficient $\hat{\beta}_m$ (solid line) of equation (9) for each month m from April 2013 to June 2014, as well as the standard error bands (dashed lines). We find no difference in the readiness to spend on durable goods between German and matched households before the first forward guidance announcement in July 2013. Germans' propensity to spend did not change after the first forward guidance announcement relative to before and relative to matched foreign households. Even around the second announcement in January 2014, the announcement had no effect on the willingness to spend. The propensity to spend did not move well after the second announcement either, which suggests that forward guidance announcements not only had no effect on impact, but did not have any delayed indirect effects either. In the bottom right panel, we see a similar null effect of the forward guidance announcements on inflation expectations.[16]

VI   Heterogeneous Effects of Unconventional Policies?

Earlier research has identified several individual-level characteristics that are relevant for households' understanding and reaction to economic policies. Examples of such characteristics include cognitive abilities—low-IQ men are less responsive to economic policies than high-IQ men (D'Acunto, Hoang, Paloviita, and Weber (2019a,b, 2020b)); gender—women have systematically higher inflation expectations than men (D'Acunto, Malmendier, and Weber (2020); D'Acunto, Malmendier, Ospina, and Weber (2021)); and socio-economic status—low-status individuals have systematically higher and more uncertain inflation expectations than high-status individuals (Kuhnen and Miu (2017)).

At the same time, our correlational analysis revealed that the baseline reaction of the readiness to spend to inflation expectations barely differed across demographic groups. As long as unconventional fiscal policy manages all consumers' inflation expectations, we do not expect heterogeneous effects on the readiness to spend. To assess whether the effects of unconventional

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[16]In Online Appendix Section A.6, we also show that the cross-sectional dispersion of expectations barely moved around the forward guidance announcements but decreased after the announcement of a future VAT increase.

policies are heterogeneous in the cross section of consumers, we perform the matching of German and foreign households each month within different demographic groups. We then estimate the average treatment effect of the policy announcement on households' readiness to purchase durable goods separately within each matched demographic group.

Figure 6 plots the estimated average treatment effects of the unconventional fiscal policy announcement when splitting the samples based on five demographic variables. First, we consider education levels—whether the respondent has a college degree (High Education) or the lowest level of formal education (Low Education). We find no noticeable differences in the reactions of respondents with different levels of education after the announcement.

The second characteristic we consider is gender, because, unconditionally, women have systematically higher inflation expectations than men (D'Acunto et al. (2020)). Differences in the reaction across genders throughout 2016 are economically negligible and we cannot reject the null hypothesis that such differences equal zero statistically.

We then split the sample between those expecting higher income over the following 12 months and those expecting the same or lower income over the same period. Different reactions by income expectations would suggest a role for income effects of the announcement. Instead, the reactions are almost identical for households with different income expectations.

When we consider respondents' age due to different lifetime experiences of the young and the elderly with economic matters, we also fail to detect any differences in the reaction to the VAT announcement for respondents of different ages.

Finally, we consider socio-economic status. Even in this case, we detect no systematic differences in the reactions of respondents in the lowest and highest socio-economic brackets.

Although consistent with our hypothesis, the striking similarity of reactions across demographics might raise the concern that our analysis captures some mechanical features of the data.[17] For this reason, we propose an assessment of our conjecture in the spirit of falsification tests. Fortunately, our conjecture of universal reaction irrespective of consumers' demographics and degrees of sophistication is falsifiable across the domain of financial and liquidity constraints. Intuitively, even if financial and/or liquidity-constrained consumers fully understood the implications of unconventional fiscal policy, their binding constraints would not allow them to bring forward all durable spending before the VAT increase. We should thus detect a muted effect of unconventional fiscal policy on the willingness to spend of constrained households even if all households understood the policy implications.

In Figure 7, we perform this test using three proxies for the likelihood of binding constraints.

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[17]Although we are unable to formulate a compelling reason for why the results might be "mechanical," we fully acknowledge that the consistently overlapping patterns by demographics might appear surprising.

The first proxy is a direct question about whether respondents are unable to save any of their income or borrow (high financial constraints) or whether respondents save regularly part of their monthly income (low financial constraints). The second proxy we consider is households' income levels. Intuitively, higher-income households are less likely to face financial constraints relative to low-income households. Third, we consider a split of homeowners and renting households. This split is justified by the fact that, in Germany, homeownership is the strongest predictor of household wealth.[18]

Across all the three proxies for financial/liquidity constraints, the reaction is economically and statistically weaker for more constrained respondents relative to unconstrained respondents.

If unconventional fiscal policy resulted in a homogeneous reaction across demographic groups because everyone understood the policy would result in higher future inflation, we should observe patterns similar to those in Figure 6 also when assessing the dynamics of inflation expectations across groups. We therefore repeat the heterogeneity analysis for the effects of unconventional fiscal policy when considering inflation expectations as the dependent variable in Figure 8. The patterns of inflation expectations across demographic groups mimic the patterns of changes in readiness to spend from Figure 6 and corroborate our interpretation that unconventional fiscal policy shapes consumption decisions through inflation expectations.

Considering inflation expectations rather than consumers' readiness to spend also provides us with a placebo test for our interpretation of the baseline results. Whereas the readiness to spend of constrained consumers should change differently over time than the readiness to spend of unconstrained consumers, because constrained consumers cannot take full advantage of the changing incentives to spend, this heterogeneity should *not* arise when we compare the inflation expectations of constrained and unconstrained consumers. Constrained consumers should update their inflation expectations similarly as unconstrained consumers despite the fact that they are constrained in substituting their consumption intertemporally. We detect evidence generally in line with this conjecture: Figure 9 plots the dynamics of inflation expectations around the unconventional fiscal policy announcement, which are broadly similar for constrained and unconstrained consumers.[19]

Finally, in the Online Appendix we report the results for a heterogeneity analysis across demographic groups around the two forward guidance announcements. Although we detected no average effect of these announcements on the overall population, sophisticated consumers

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[18]The Bundesbank (2019) shows that the average net worth of German homeowners is Euro 477.8K for non-mortgage holders and Euro 336.9K for mortgage holders, whereas it is only Euro 54.7K for renters using the micro data from the Panel of Household Finances.

[19]The only split in which the patterns differ sightly is the split between renters and homeowners who might have different inflation expectations because they observe different signals about prices (Kindermann, Le Blanc, Piazzesi, and Schneider, 2020).

might react. Unfortunately, we cannot measure financial literacy and economic sophistication directly in the survey.

Figure A.6 and Figure A.7 in the Online Appendix show the results for the heterogeneity tests for spending propensities and Figure A.8 and Figure A.9 for inflation expectations. Across all demographic splits, we fail to detect any significant reaction to forward guidance announcements. Even college graduates are non-reactive, although, as discussed above, more precise ways to isolate economic literacy might have allowed us to detect a reaction in the small fraction of the German population that has such expertise.

VII   Channels and Confounding Factors

In the last part of the paper, we consider a set of potential channels alternative to inflation expectations as well as confounding factors that might explain the effects of unconventional fiscal policy announcements on consumption plans. Here, we mainly focus on unconventional fiscal policy, because we failed to detect any effects of forward guidance announcements on spending plans and inflation expectations.

A.   Income Effects

Above and beyond intertemporal substitution, unconventional fiscal policy could also affect spending through income and wealth effects. For instance, expecting higher prices might lead households to expect higher (nominal) incomes. To assess the relevance of this potential channel, Figure 10 overlays the evolution of average income perceptions and income expectations over the following 12 months on inflation expectations. Contrary to inflation expectations, income perceptions and expectations stayed flat throughout the period and especially around the VAT announcement.

We do not know whether respondents think about nominal or real income when answer the survey question on income expectations, which complicates the interpretation of the stability in income expectations. If respondents interpreted the question as referring to real income, their flat income expectations would correspond to nominal income increasing one-to-one with inflation. If, instead, respondents interpreted the question as asking about nominal income, their flat expectations would point toward a negative income effect. But expecting a negative income effect would reduce both current and future consumption, which suggests that our estimates would be a lower bound of the potential effect of unconventional policy on spending if fiscal authorities could credibly commit to sustain real incomes over time.

To indirectly assess whether survey participants might have reported real or nominal income

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expectations, we gathered aggregate data on growth in average annual wages (which captures both hourly wages and hours worked) in Germany.[20] Between 2005 and 2007, average annual wages grew by 1.50%, 1.28%, and 1.59% per year in nominal terms but only by 0.41%, -0.02%, and -0.28% in real terms. These numbers suggest survey respondents reported real income expectations and perceptions.

B. Intratemporal Substitution Between Durable and Non-durable Consumption

Intratemporal substitution from non-durable to durable consumption without any increase in overall consumption might be another potential channel for our results. This channel might in principle be relevant because most services and products are subject to VAT in Germany,[21] but a reduced rate that was not changed applies to convenience goods including many non-durable goods. This alternative channel predicts no change in overall consumption and hence in saving propensities, whereas in Table 3 we find that households who expect higher inflation also decrease their saving plans.

C. Redistribution from Lenders to Borrowers

Modern heterogeneous-agent models also feature a redistribution channel of surprise inflation from lenders to borrowers (see Doepke and Schneider (2006)). Based on the VAT increase of 3 percentage points, if all goods were subject to the higher VAT and under full tax incidence on the consumer side, we would expect an increase in consumer price inflation of 2.59%. However, the change in inflation is only a surprise for loan contracts that existed before November 2005 and matured after December 2006. For this subset of contracts, we would expect a redistribution of nominal wealth from lenders to borrowers after the actual increase in VAT. At the same time, the increase in VAT was permanent and affected both borrowers and lenders. Hence, the overall wealth effect might have been negative for both groups of households.

D. Exposure to Changing Prices by Retailers

Also, one might wonder whether retailers increased prices before the VAT increase was implemented, which is what New Keynesian models with monopolistic competition and price-adjustment frictions predict (Gorodnichenko and Weber (2016)).[22] In this case, realized inflation might have increased in Germany well before the VAT increase was implemented

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[20]We use data from the OECD available at: https://stats.oecd.org/Index.aspx?DataSetCode=AV_AN_WAGE#.

[21]Rent, services for non-profit organizations, and medical expenses are not subject to VAT.

[22]We thank Tarun Ramadorai for suggesting this point.

in January 2007. Exposure to higher inflation could be the reason why households' inflation expectations increased (D'Acunto et al. (2021)), which triggered higher spending.

In Appendix Figure A.3, we show that inflation did not increase in 2006 and in fact only started to increase after January 2007. One reason for this delayed pass through might be the concern of customer antogonization (Anderson and Simester (2010)).[23] By early 2008, all the categories underlying the German CPI had fully adjusted their prices.[24] We discuss these institutional details in more detail in Online Appendix Section A.2.

E.   Differential Media Coverage of the Two Policies

Dimensions that are typically absent from macroeconomic models but might be relevant in our setting are supply-side forces such as time-varying advertisement policies or discounts by retailers. For instance, before the VAT increase of January 2007, several large German retailers offered discounts and promised to "return the VAT" to consumers: Figure A.10 in the Online Appendix shows an anecdotal example of this campaign, which is the ad of a large German consumer electronics retailer, Mediamarkt, on January 3rd, 2007.

To study the potential role of such supply-side forces, we conduct an analysis of media coverage of the two unconventional policies. We obtained data on media mentions in newspapers and on TV for topics related to inflation, tax policy, and consumption from *Mediatenor*.[25] Specifically, Mediatenor covers the following broad topics of interest for our analysis: (i) inflation, interest rates, and monetary policy; (ii) tax policy; (iii) consumption. Topic (i) includes the following keywords: "Decreasing inflation or low level", "Increasing inflation or high level", "Monetary Policy/EURO/Inflation", "Price indicators (e.g. inflation rate) in general", "Energy costs/prices", "Oil price", "Monetary policy, other", "Interest rate", "Role of central banks"; topic (ii) includes the following keywords: "Budget deficit", "Budget consolidation", "Budget policy, debt of nation or region", "Economic policy, other", "Excise duty (value-added tax)", "Tax rates", "Fiscal policy", "Income tax", "Personal tax/property tax/wealth tax", "Revenue, tax policy in general", "Revenue, tax policy, other", "Tax revenue in general", "public budget, debt, revenue in general"; and, topic (iii) includes the following keywords: "Consumer confidence", "Consumer protection in general", "Consumption", "Demand".

For most of our analysis, we focus on the overall media coverage across different channels,

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[23]Anecdotal evidence suggests that retailers delayed price increases because they feared a stark drop in demand. See: http://www.handelsblatt.com/politik/deutschland/staatsdefizit-unter-drei-prozent-deutsches-defizitverfahren-wird-eingestellt/2754740.html. For instance, Media Markt and Saturn, two of the largest German retail chains for consumer electronics, advertised extensively their plans to lower prices by 19% instead of increasing them by the higher VAT amount.

[24]See: https://www.destatis.de/DE/Publikationen/WirtschaftStatistik/Preise/MwSterhoehungJan2007.pdf.

[25]http://us.mediatenor.com/en/. The topics and covered media are pre-specified by the company.

because the number of reports and articles that refer specifically to consumption and inflation are rather small. The media cover topics related to tax policies much more frequently than those related to monetary policy, which is why we also report media mentions of tax-related topics separately for tabloids (Bild Zeitung, Bild am Sonntag), quality weekly magazines (Focus and Spiegel), and TV news shows on the two primary public TV channels (ARD Tagesschau, ARD Tagesthemen, ZDF Heute, ZDF Heute Journal).

Armed with these data, in Figure 12 we plot the number of newspaper, magazine, and TV mentions over time for the three topics described above. Panel A reports the results for the unconventional fiscal policy period (November 2005—June 2007) and Panel B for the forward guidance period (April 2013—June 2014). The vertical lines in Panel A indicate the VAT-increase announcement (November 2005), its parliamentary approval (May 2006), and its implementation (January 2007). The vertical lines in Panel B indicate the two forward guidance announcements by former ECB President Draghi (July 2013 and January 2014).

For the inflation and monetary policy topic, the number of media mentions before the actual increase in VAT barely vary (the overall number fluctuates below 20 mentions). Only once the VAT was increased in January 2007 we detect a noticeable increase in the media coverage for this topic. In the middle panel, we see a substantially higher coverage of tax-related topics overall and noticable spikes in November 2005 when the government announced the plan to increase VAT, in May 2006, when the law was passed in the German parliament, and again after the actual increase in VAT in January 2007.

Across different media types, news shows on TV had a spike in coverage both at the announcement and approval of the law and after the increase in VAT, whereas tabloids only increased coverage when the law passed and the increase was implemented. For weekly magazine coverage, we do not notice any consistent patterns.

The top right plot of Panel A focuses on the consumption topic, which does not appear to display any noticeable patterns in relationship to the VAT change.

Panel B displays the media coverage for the three topics during the forward guidance periods. While we do observe a larger average number of news reports for the inflation and monetary policy topic during this time period, we do not observe any particular spikes in the months of the forward guidance announcements. Similarly, for the tax and consumption topics, we detect no systematic patterns over time.

Overall, the media analysis suggests that tax topics are more frequently covered in newspapers, magazines, and on TV than topics related to inflation, monetary policy, or consumption. At the same time, though, the media coverage of tax topics spiked at salient dates related to the VAT increase, whereas our empirical analysis in the paper finds that average

inflation expectations and willingness to purchase durable goods increased steadily throughout 2006 and spiked in the months before the VAT increase was implemented. Hence, media coverage might have had a role in informing consumers about the upcoming VAT tax increase, the patterns of media coverage and changing inflation expectations over time during 2006 do not fully match.

F. Other Macroeconomic Channels

Finally, more elaborate macroeconomic models with financial constraints or hand-to-mouth consumers might also offer alternative channels for our results (Kaplan et al. (2018)). Although we cannot design a formal test of these channels in our setting, we note that financial constraints and hand-to-mouth consumers are unlikely to drive our findings, because tax increases would result in lower consumption expenditure in such models. In recent heterogeneous-agent New Keynesian (HANK) models (Slacalek, Tristani, and Violante (2020)), labor-force participation and unit labor costs could also be additional indirect channels. Aggregate data from the OECD show unit labor costs decreased in Germany during 2006 and 2007 in absolute terms and relative to France, Sweden, and the UK (see: http://stats.oecd.org/Index.aspx?QueryName=426). Labor force participation, instead, barely moved over the same period from 58.4% in 2005 to 59.1% in 2007 (see: http://data.worldbank.org/indicator/SL.TLF.CACT.ZS?locations=DE).

G. Confound: Housing Policies and Wealth Shocks

In terms of confounding factors, a housing-wealth channel might help explain households' consumption plans in our context (Leth-Petersen (2010)), because the German homeowner subsidy was abolished in 2006.[26] First, note that the homeownership rate is below 43% in Germany and house-price inflation was largely negative in the 2000s.[27] Moreover, using data from the German Sample Survey of Income and Expenditure, we find that the homeownership rate was strikingly stable around the policy announcements we study: the rate moved from of 43.0% in 2003 to 43.2% in 2008 and back to 43.0% in 2013. A substitution away from home purchases to purchases of other durable goods is therefore unlikely to explain our findings.

VIII   Concluding Remarks

We assess the effectiveness of expectations-based unconventional policies that have been recently proposed by macroeconomic theory and policymakers—unconventional fiscal policy and forward

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[26]We discuss other minor policy changes that were implemented in the same years as unconventional fiscal policy and forward guidance in more detail in Section A.2 of the Online Appendix

[27]Empirically, we find similar associations between inflation expectations and spending propensities for renters and home owners.

guidance. Unconventional fiscal policy consists of announcing higher consumption taxes in the future, whereas forward guidance consists of commitments about the future path of monetary policy rates. Theoretically, these policies operate through identical channels, but we find substantial differences in their empirical effectiveness: in the same representative population, unconventional fiscal policy increased individual inflation expectations and willingness to purchase durable goods, and all demographic subgroups reacted similarly to the policy. Instead, we do not detect any effects of forward guidance announcements on individual expectations or readiness to spend.

Our results open questions for theoretical and empirical scholars in household finance, macro-finance, and macroeconomics. For instance, what are the distributional consequences of consumers' lack of reaction to hard-to-grasp policies such as forward guidance? The fact that only financial-market participants and economic experts reacted to forward guidance announcements in the EMU opens the possibility of unintended redistributive consequences of policy announcements.

Moreover, the universal reaction to a simple policy like unconventional fiscal policy stresses a potentially relevant but overlooked role for the extent to which ordinary households understand the implications of economic policy. For policies that aim to reach households directly, and not through financial intermediaries or firms, policymakers and researchers should consider the simplicity of the policy implications when designing effective policy making.

Finally, our results are among the first steps to connect the large body of research on the biases and mistakes of households in the financial domain to the effectiveness of macroeconomic policies. Macroeconomists and policymakers can learn from applying the body of work in household finance and behavioral finance into macroeconomic policy design (see also D'Acunto et al. (2020a)).

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Figure 2: **Expected Increase in Inflation: Germany and European Countries**
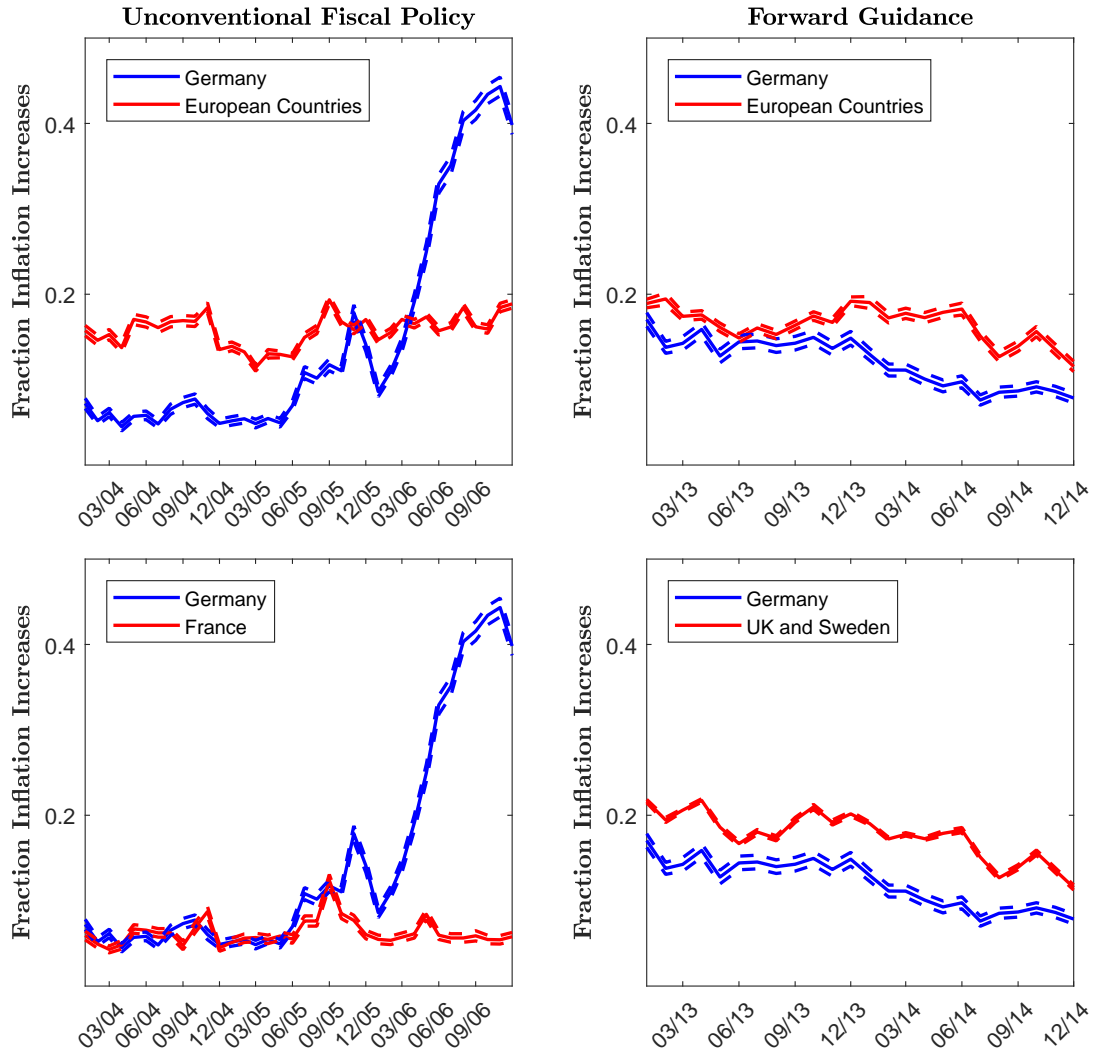
This figure plots average monthly inflation expectations (solid line) and one standard error bands (dashed line) over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct the variables for Germany and similar data from national statistical agencies and GfK subsidiaries for the United Kingdom, Sweden, and France. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months. We create a dummy variable which equals 1 when a household expects inflation to increase. The sample periods are January 2004—December 2006 and January 2013—December 2014.

Figure 3: **Readiness to Spend on Durables: Germany and European Countries**
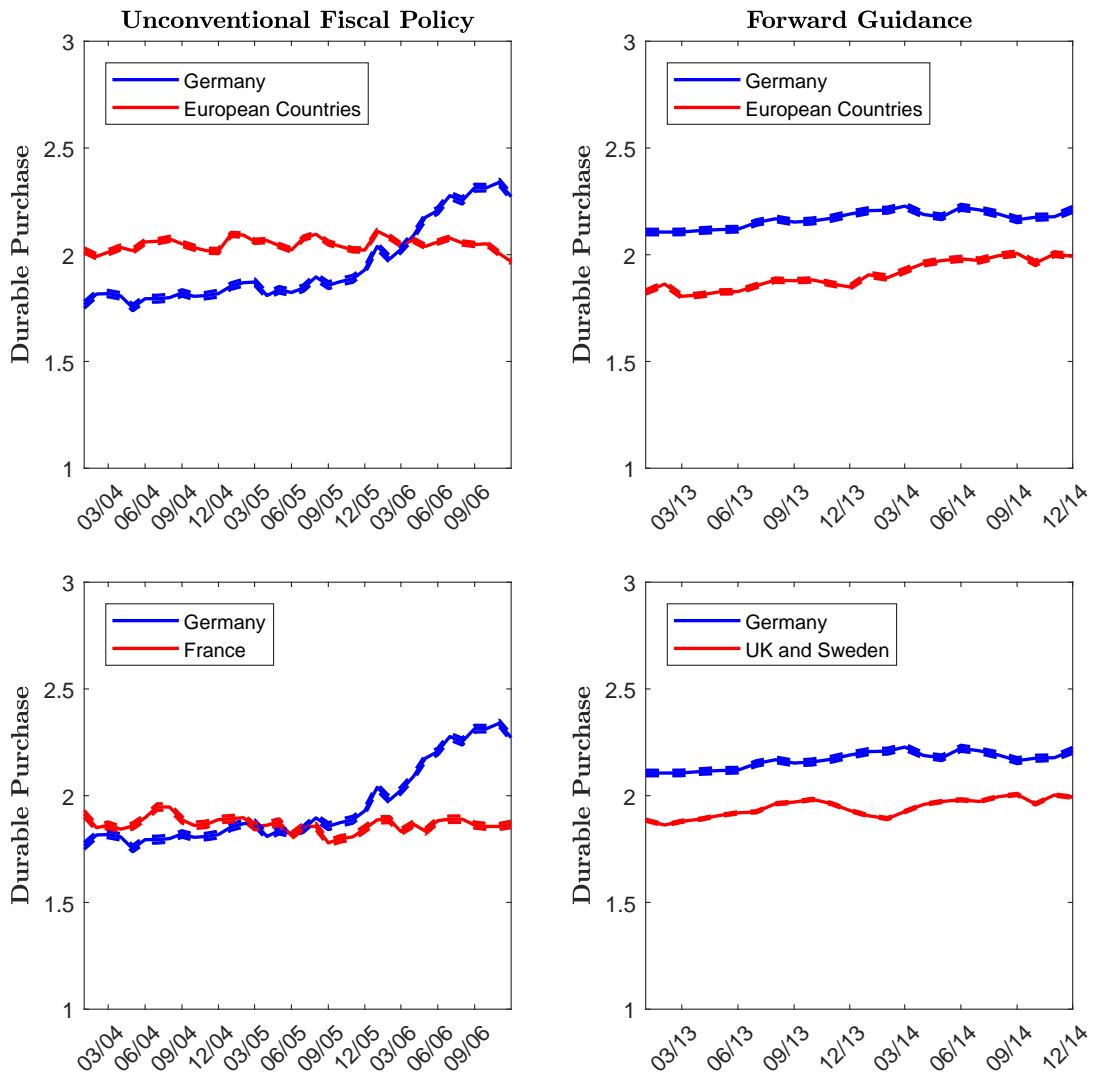

This figure plots the average monthly readiness to purchase durables (solid line) and one standard error bands (dashed line) over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables for Germany and similar data from national statistical agencies and GfK subsidiaries for the United Kingdom, Sweden, and France. GfK asks a representative sample of 2,000 households whether it is a good time to purchase durables given the current economic conditions. Higher values correspond to better times to purchase durables. The sample periods are January 2004—December 2006 and January 2013—December 2014.

Figure 4: **Common Support of Treated and Matched Households**

Panel A. Unconventional Fiscal Policy


Panel B. Forward Guidance
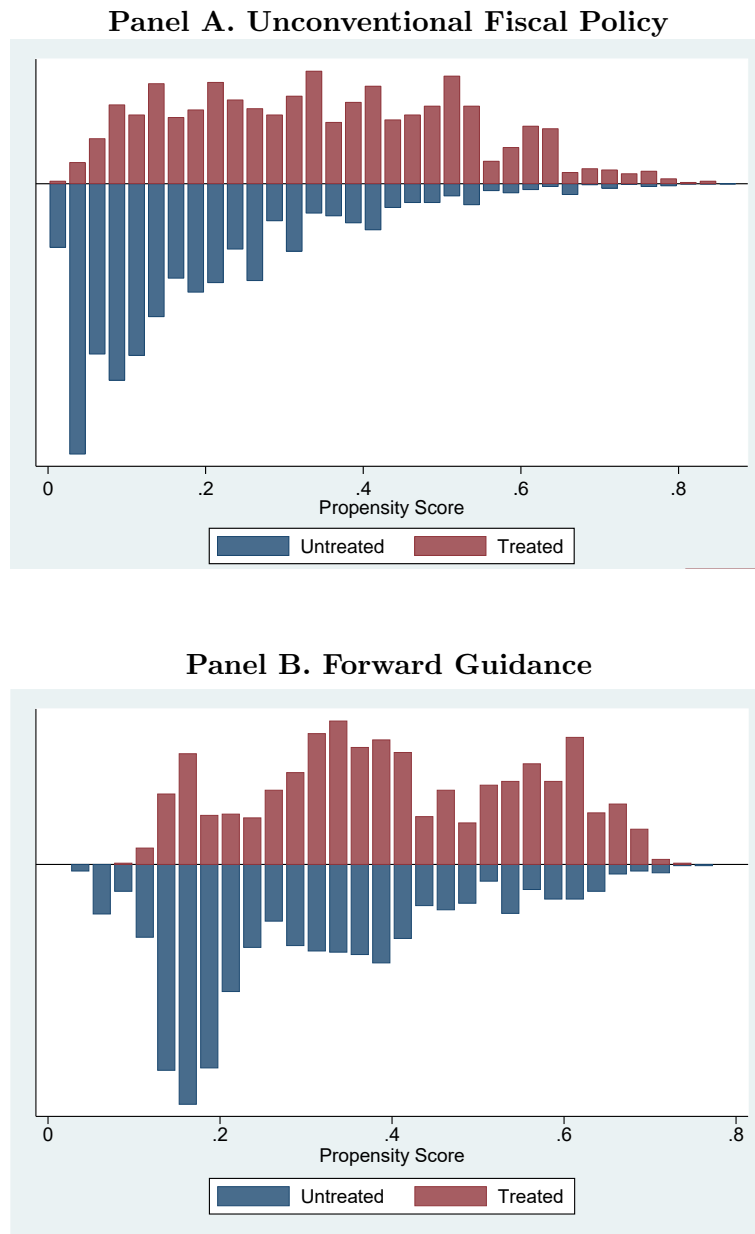
This figure plots the number of households in the untreated (blue) and treated (red) groups across forty equal-length partitions of the distribution of the propensity score in the baseline months (June 2005 and March 2013) for the difference-in-differences analyses. We estimate the propensity score with a logit specification whose outcome variable is the indicator for whether a household is in the treated or control group. The controls are the observables we use for the matching of households: age group, gender, education group, income group, and socio-economic status group. The treated group includes German households, whereas the control group includes households from the UK, France, and Sweden in Panel A and from the UK and Sweden in Panel B.

Figure 5: **Change in the Readiness to Spend on Durables and Inflation Expectations for German vs. Foreign Households**
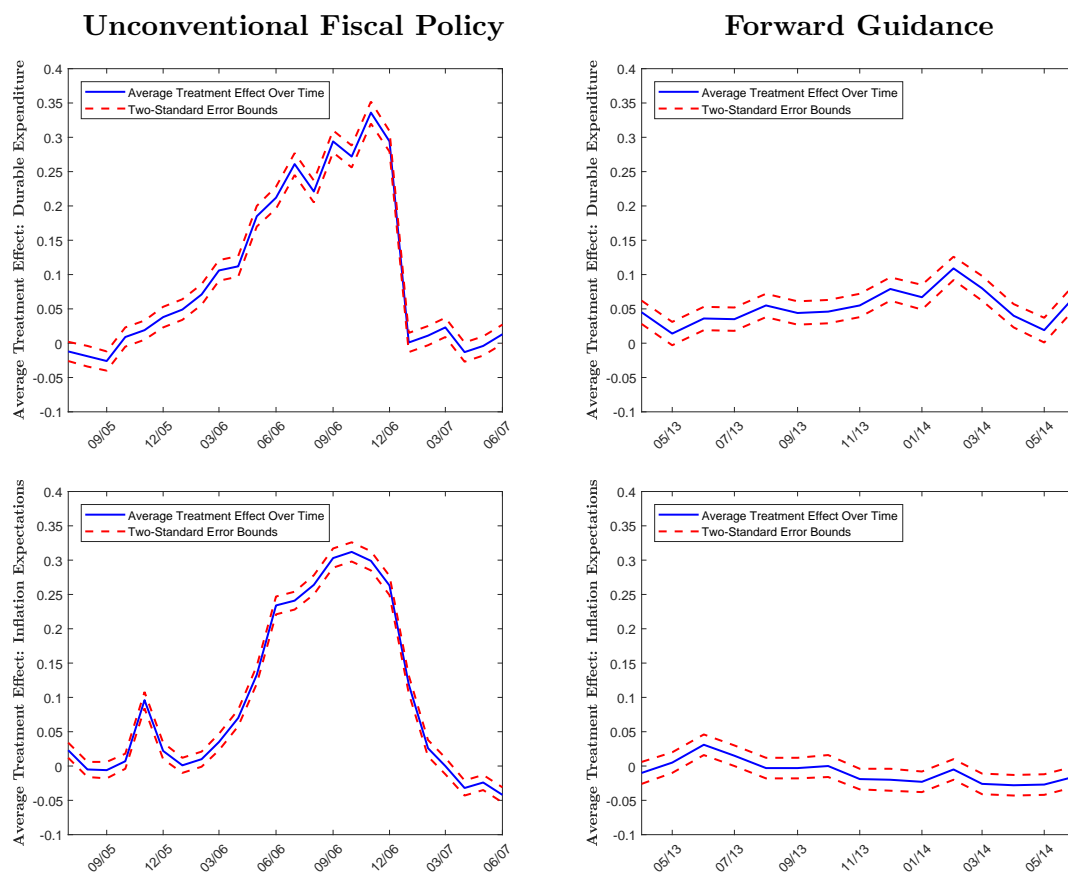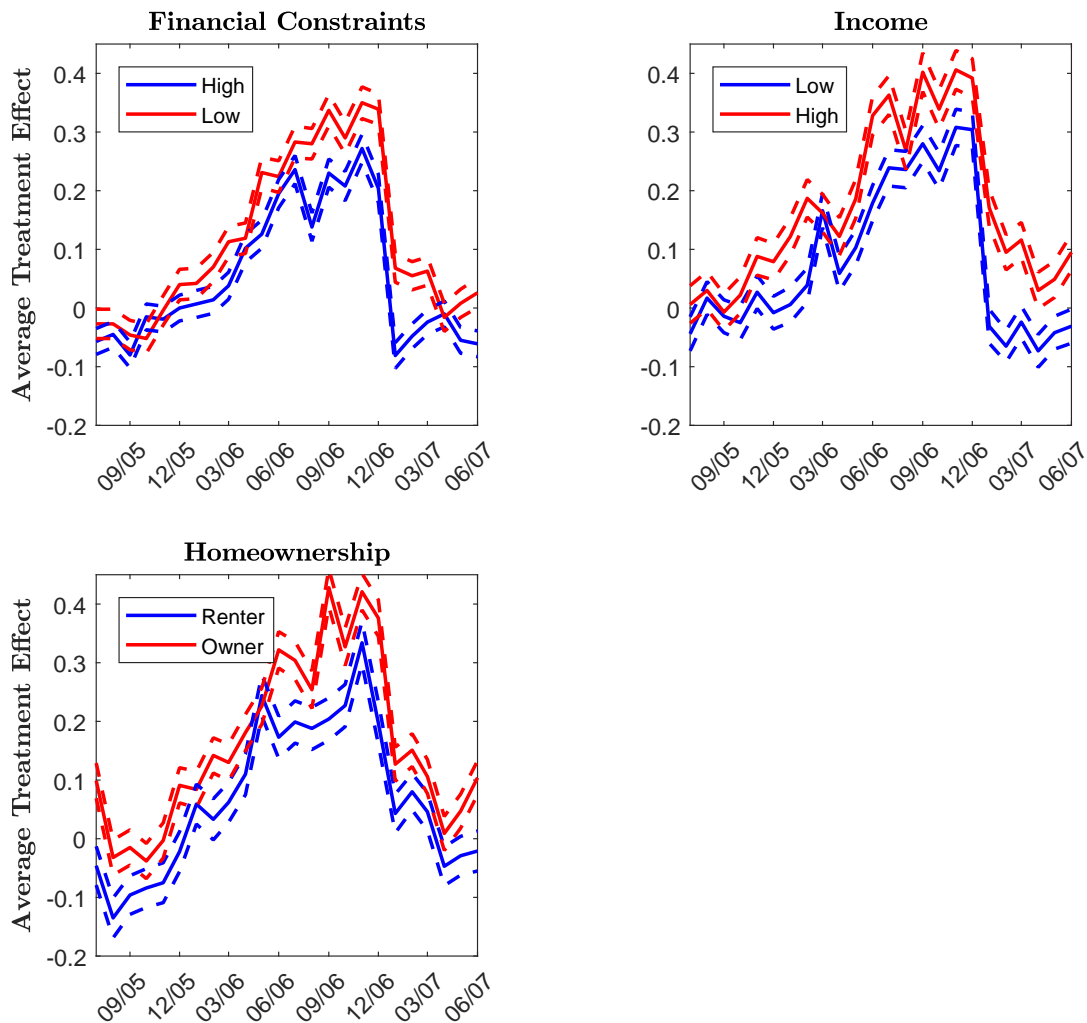

Unconventional Fiscal Policy　　　　　**Forward Guidance**

This figure plots the β_m coefficient (solid line) estimated from the following specification: $Outcome_{i,base \to m} = \alpha + \beta_m \times Shock_i + \Delta X'_{i,base \to m} \times \gamma + \epsilon_i$. Dashed lines are one standard error bands. $Outcome_{i,base \to m}$ is the difference in the willingness to spend on durable goods between month m and the base month in the top panels and inflation expectations in the bottom panels. Shock is an indicator that equals 1 if the household was exposed to the VAT shock in the left panel or to the Forward Guidance announcements in the right panel. For the VAT shock, the base month m is June 2005. For the Forward Guidance announcement, the base month m is March 2013. β_m captures the effect of each shock on the willingness to buy durables and inflation expectations for household i in month m. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure 6: **Effect of Unconventional Fiscal Policy by Sophistication and Demographics**
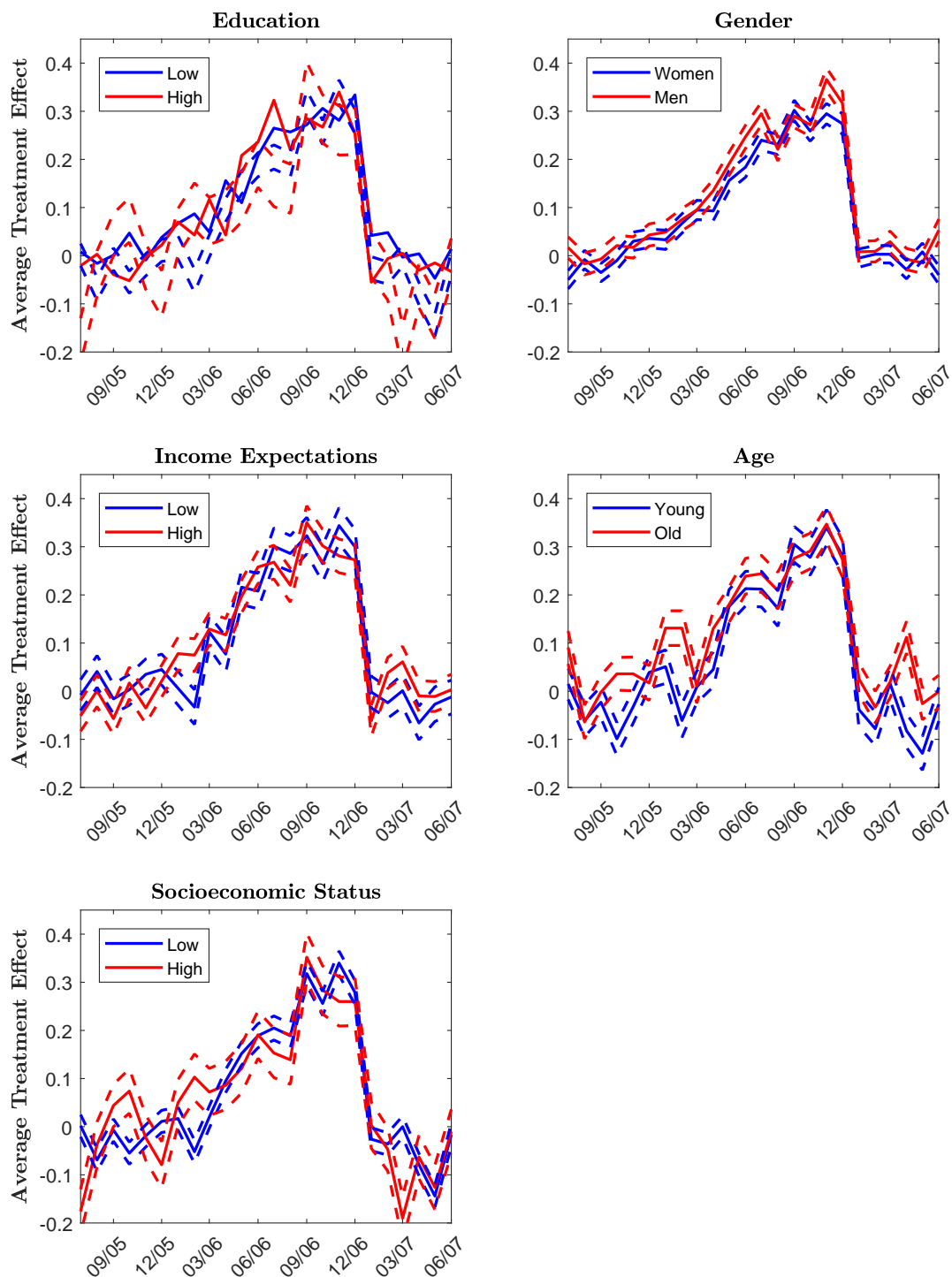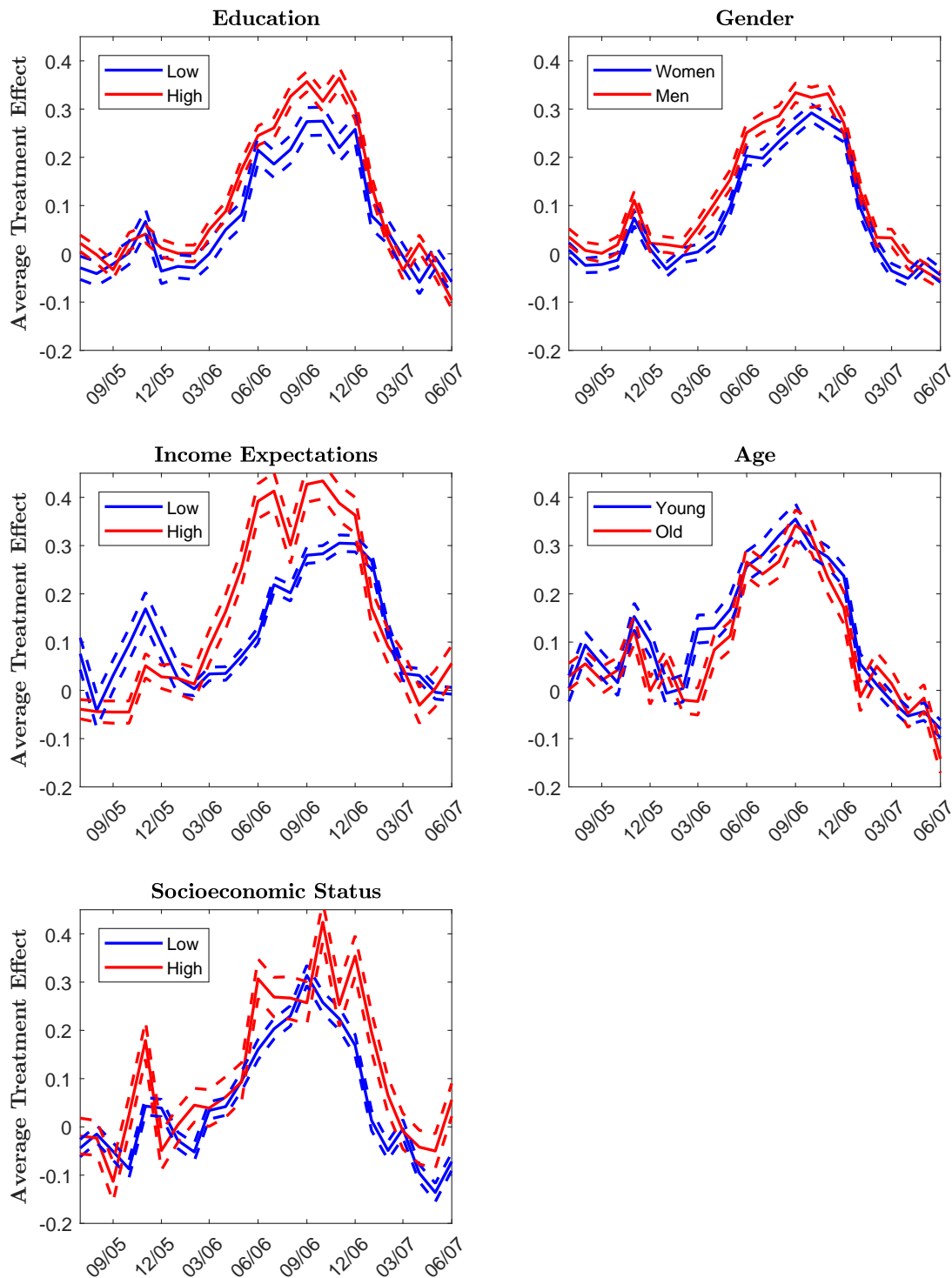

This figure plots the β_m coefficient (solid line) estimated from the following specification: $\Delta Dur_{i,06/2005 \to m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,06/2005 \to m} \times \gamma + \epsilon_i$, for different sample splits by demographic characteristics. Dashed lines are one standard error bands. $\Delta Dur_{i,06/2005 \to m}$ is the difference in the willingness to spend on durable goods between month m and June 2005, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,06/2005 \to m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure 7: **Effect of Unconventional Fiscal Policy by Proxies of Financial Constraints**
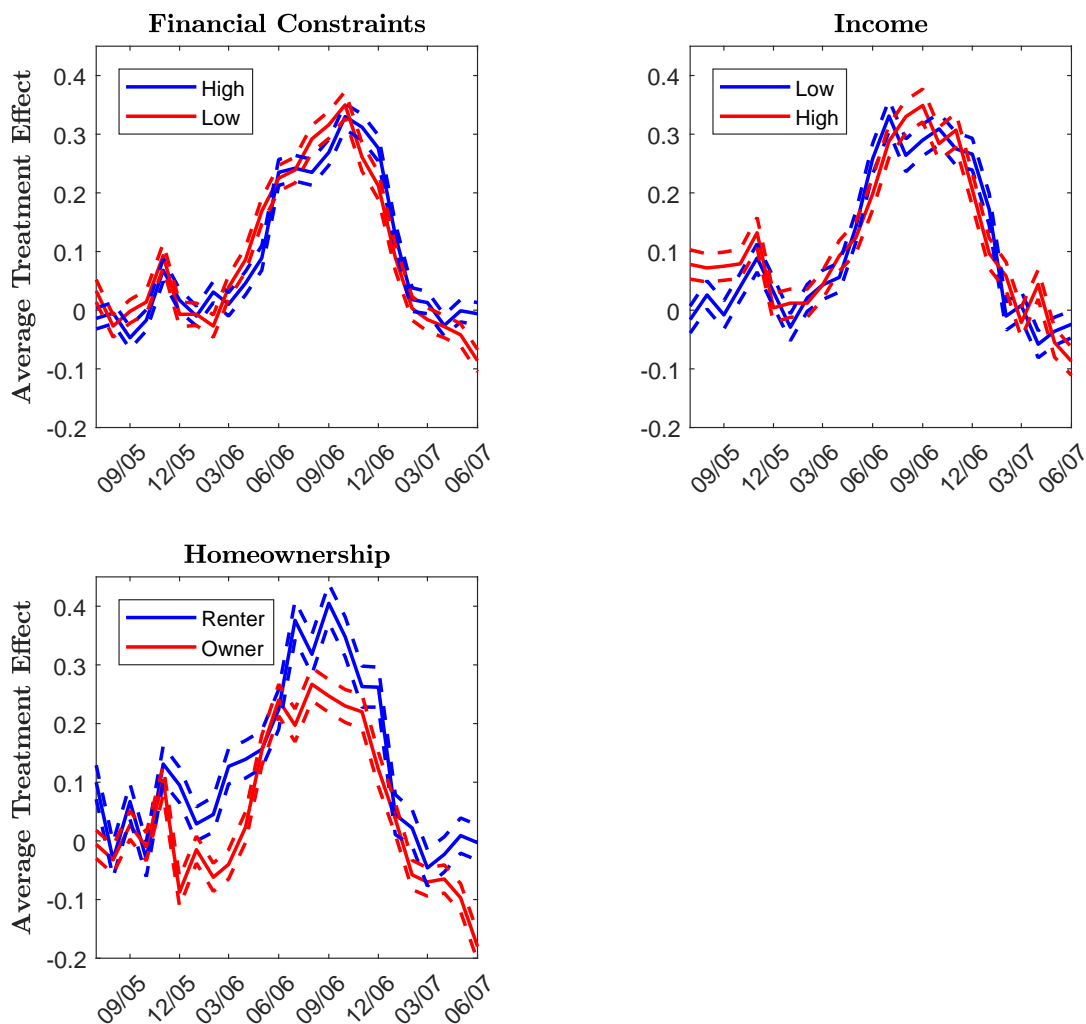

This figure plots the β_m coefficient (solid line) estimated from the following specification: $\Delta Dur_{i,06/2005 \to m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,06/2005 \to m} \times \gamma + \epsilon_i$, for different sample splits by financial constraints. $Outcome_{i,base \to m}$ is the difference in the willingness to spend on durable goods between month m and the base month in the top panels and inflation expectations in the bottom panels. $\Delta Dur_{i,06/2005 \to m}$ is the difference in the willingness to spend on durable goods between month m and June 2005, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,06/2005 \to m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

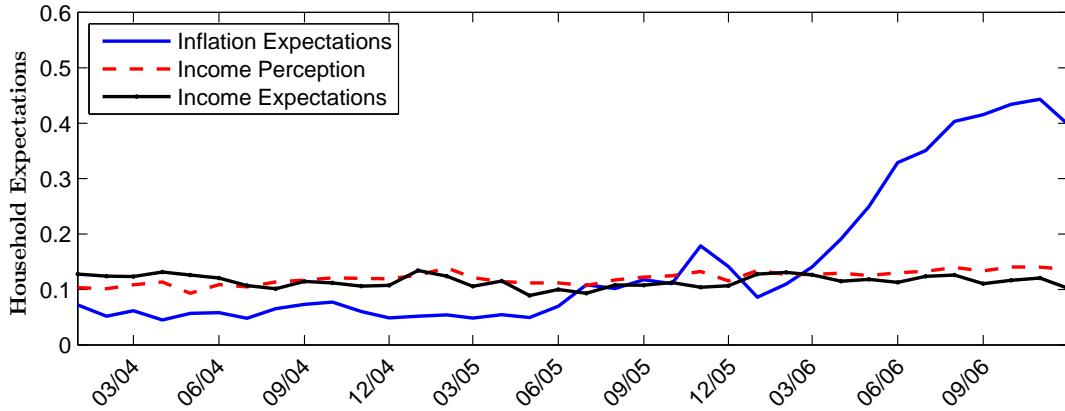## Figure 8: **Effect of Unconventional Fiscal Policy on Inflation Expectations by Sophistication and Demographics**

This figure plots the β_m coefficient (solid line) estimated from the following specification: $\Delta\,\mathbb{E}\,\pi_{i,06/2005\rightarrow m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,06/2005\rightarrow m} \times \gamma + \epsilon_i$, for different sample splits by demographic characteristics. $Outcome_{i,base\rightarrow m}$ is the difference in the willingness to spend on durable goods between month m and the base month in the top panels and inflation expectations in the bottom panels. $\Delta\,\mathbb{E}\,\pi_{i,06/2005\rightarrow m}$ is the difference in the share of individuals expecting higher inflation in the next 12 months compared to the previous 12 months between month m and June 2005, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,06/2005\rightarrow m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure 9: **Effect of Unconventional Fiscal Policy on Inflation Expectations by Proxies of Financial Constraints**
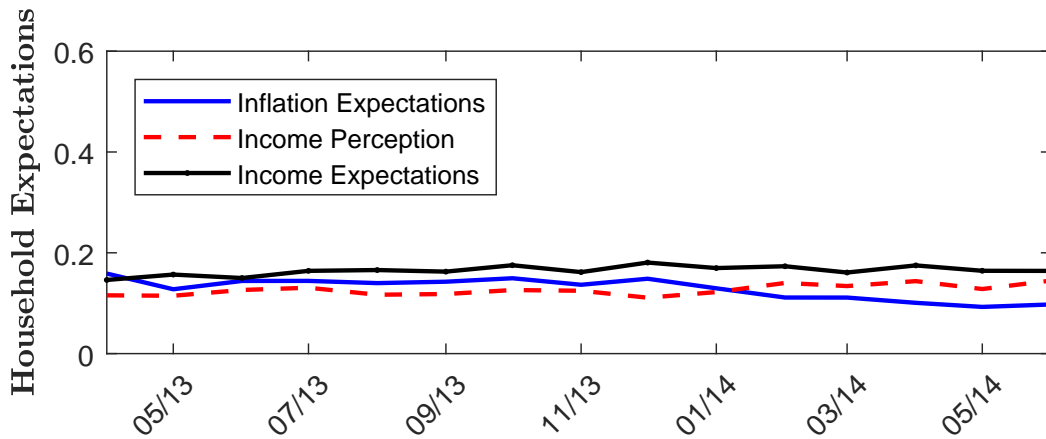

This figure plots the β_m coefficient (solid line) estimated from the following specification: $\Delta \mathbb{E} \pi_{i,06/2005 \rightarrow m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,06/2005 \rightarrow m} \times \gamma + \epsilon_i$, for different sample splits by financial constraints. $Outcome_{i,base \rightarrow m}$ is the difference in the willingness to spend on durable goods between month m and the base month in the top panels and inflation expectations in the bottom panels. $\Delta \mathbb{E} \pi_{i,06/2005 \rightarrow m}$ is the difference in the share of individuals expecting higher inflation in the next 12 months compared to the previous 12 months between month m and June 2005, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,06/2005 \rightarrow m}$ is the difference in a set of observables between month m and the baseline month. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct the variables. GfK asks a representative sample of 2,000 households questions about general economic expectations, inflation expectations, and willingness to buy.

Figure 10: **Channels of Unconventional Fiscal Policy: Income Effect?**

This figure plots average monthly inflation expectation, perception of past income, and expectation of future income over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct those variables. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months, how the financial situation of the household evolved during the past 12 months, and how the financial situation of the household will evolve during the next 12 months. We create a dummy variable that equals 1 if a household expects inflation to increase, perceives an improved financial situation, and expects an improved financial situation. The sample period is January 2004 to December 2006 for a total of 3 years.

Figure 11: **Channels of Forward Guidance: Income Effect?**

This figure plots average monthly inflation expectation, perception of past income, and expectation of future income over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct those variables. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months, how the financial situation of the household evolved during the past 12 months, and how the financial situation of the household will evolve during the next 12 months. We create a dummy variable that equals 1 if a household expects inflation to increase, perceives an improved financial situation, and expects an improved financial situation. The sample period is April 2013 to June 2014.

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Figure 12: **Overall Media Coverage of Inflation, Tax Policy, and Consumption**

Panel A. Unconventional Fiscal Policy

Panel B. Forward Guidance
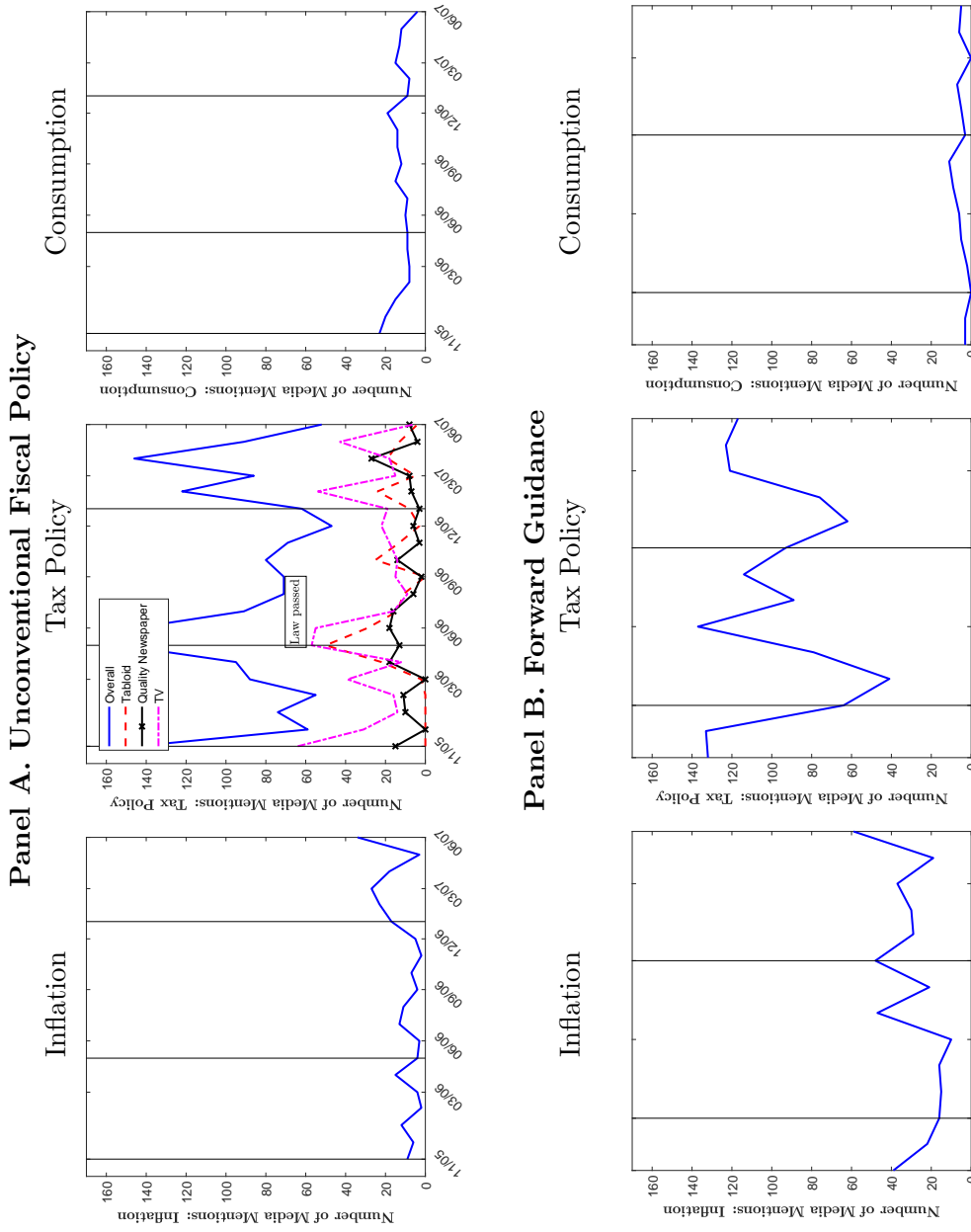
This figure plots over time the overall media mentions for topics related to inflation, tax policy, and consumption during the unconventional fiscal policy period from November 2005 to June 2007 in Panel A and the forward guidance period from April 2013 to June 2014 in Panel B using data from Mediatenor. The vertical lines in Panel A indicate when the VAT increased was announced (November 2005), when it was passed in parliament (May 2006), and when it was implemented (January 2007). The vertical lines in Panel B indicate the two announcements of forward guidance by former ECB president Draghi (July 2013 and January 2014).

Table 1: **Descriptive Statistics**

		Nobs	Mean	Std	Min	p25	p50	p75	Max
Panel A: Inflation expectations and readiness to spend									
Readiness to buy durables	Good time	377,064	21.85%						
	Neither		56.43%						
	Bad time		21.72%						
Inflation increase		408,776	13.17%	0.34	0	0	0	0	1
Inflation perception	increased substantially	400,169	25.79%						
	increased somewhat		29.39%						
	increased slightly		28.67%						
	remained the same		14.82%						
	decreased		1.33%						
Panel B: Household demographics									
Sex	Male	408,776	45.99%						
	Female		54.01%						
Age		408,776	46.56	17.57	14	33	46	60	99
Education	Hauptschule	402,624	41.99%						
	Realschule		39.30%						
	Gymnasium		10.48%						
	Universitaet		8.23%						
Household members		408,776	2.47	2.47	1	2	2	3	5
City	City<9,999	408,776	28.05%						
	9,999<=City<49,999		34.46%						
	50,000<=City<199,999		15.56%						
	199,999<=City		21.94%						
Kids at home	yes	408,776	26.11%						
	no		73.89%						
Number of kids		363,476	0.45	0.80	0	0	0	1	4
Net income (inc)	inc< 1,000	312,224	42.40%						
(EUR per month)	1,000<=inc<1,500		28.52%						
	1,500<=inc<2,500		21.73%						
	2,500<=inc		7.36%						
Panel C: Household expectations and perceptions									
Past Financial situation	Improved substantially	404,494	1.53%						
	Improved somewhat		12.29%						
	Identical		62.32%						
	Worsened somewhat		19.46%						
	Worsened substantially		4.39%						
Financial outlook	Improves substantially	392,898	1.17%						
	Improves somewhat		11.43%						
	Identical		73.83%						
	Worsens somewhat		11.67%						
	Worsens substantially		1.91%						
Current financial situation	Save a lot	398,014	4.35%						
	Save little		41.06%						
	Don't save		40.49%						
	Dissave		11.96%						
	Take on debt		2.14%						
Expected unemployment rate	Increases substantially	408,776	13.08%						
	Increases somewhat		31.75%						
	Identical		36.71%						
	Decreases somewhat		17.35%						
	Decreases a lot		1.10%						

This table reports descriptive statistics for households' inflation expectations and readiness to purchase durables in Panel A; household demographics in Panel B; and household expectations and perceptions in Panel C. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct the variables. GfK asks a representative sample of 2,000 households questions about general economic expectations, inflation expectations, and willingness to buy. For Panel A, GfK asks whether it is a good time to purchase durables given the current economic conditions. GfK also asks how consumer prices will evolve in the next 12 months compared to the previous 12 months. Inflation increase is a dummy variable that equals 1 if a household replies that inflation will increase. GfK also asks how consumer prices evolved in the previous 12 months. See the Online Appendix for data sources and detailed survey questions. The sample period is January 2000 to February 2016.

Table 2: **Inflation Expectations and Readiness to Spend**

| | | German Households | | | | European Households | | |
	Baseline (1)	Controls (2)	VAT Period (3)	Forward Guidance (4)	No VAT or Forward Guidance (5)	France (6)	Sweden (7)	UK (8)
Inflation expectation	0.0582*** (0.0147)	0.0876*** (0.0157)	0.1909*** (0.0094)	0.0508*** (0.0132)	0.0540*** (0.0031)	0.0391*** (0.0072)	0.0371*** (0.0052)	0.0254*** (0.0031)
Demographics		X	X	X	X	X	X	X
Expectations		X	X	X	X	X	X	X
Pseudo R^2	0.0030	0.0663	0.0631	0.0517	0.0689	0.0540	0.0301	0.0438
Nobs	377,064	227,027	19,477	11,685	195,865	63,264	176,389	180,646

Standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

This table reports the average marginal effects of a multinomial logit regression. Households' readiness to purchase durables is the dependent variable. Inflation expectation is a dummy variable that equals 1 if a household expects inflation to increase. We also control for household demographics and household expectations where indicated. Demographics include: gender, age, age squared, education level, household size, rural or urban residence, socio-economic status group, number of children, rental or owned housing, employment status, income level group. Expectations include: income expectations and perceptions, expected financial situation, expected GDP growth, expected unemployment rate, saving expectations and perceptions, inflation perceptions. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables and similar data from national institutes for the European households. GfK asks a representative sample of 2,000 households on a monthly basis whether it is a good time to purchase durables given the current economic conditions. Households can reply that it is a good time, it is a bad time, or it is neither a good time nor a bad time. Standard errors are clustered at the quarter level. The sample period is January 2000 to February 2016.

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Table 3: **Inflation Expectations and Readiness to Save**

	Not at all (1)	Not really (2)	Good time (3)
Inflation expectation	0.0282***	0.0015	−0.0297***
	(0.0027)	(0.0057)	(0.0069)
Demographics	X	X	X
Individual expectations	X	X	X
Pseudo R^2		0.1471	
Nobs		242,820	

Standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

This table reports the average marginal effects of a multinomial logit regression. Households' readiness to save is the dependent variable. Inflation expectation is a dummy variable that equals 1 if a household expect higher inflation. Demographics include: gender, age, age squared, education level, household size, rural or urban residence, socio-economic status group, number of children, rental or owned housing, employment status, income level group. Expectations include: income expectations and perceptions, expected financial situation, expected GDP growth, expected unemployment rate, saving expectations and perceptions, inflation perceptions. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables and similar data from national institutes for the European households. GfK asks a representative sample of 2,000 households on a monthly basis whether it is a good time to save given the current economic conditions. Households can reply that it is a good time, it is a bad time, or it is neither a good time nor a bad time. Standard errors are clustered at the quarter level. The sample period is January 2000 to February 2016.

Table 4: **Is the Reaction of Readiness to Spend to Inflation Expectations Heterogeneous Across Demographic Groups?**

	Education		Income		Age		Gender		Income Expectations		Socioeconomic Status		Patience vs. Constraints	
	High School	College	<= 1,000	2,500 <	<= 21	65 <	Men	Women	Low	High	Low	High	Rich Savers	Rich Non-savers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Inflation expectation	0.069***	0.108***	0.090***	0.094***	0.092***	0.070***	0.085***	0.090***	0.049***	0.043*	0.091***	0.077***	0.106***	0.060***
	(0.015)	(0.018)	(0.016)	(0.020)	(0.021)	(0.014)	(0.016)	(0.016)	(0.015)	(0.022)	(0.017)	(0.016)	(0.018)	(0.013)
Z-stat difference		-1.639		-0.158		0.889		-0.254		0.227		0.582		2.072**
Demographics	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Expectations	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pseudo R^2	0.068	0.051	0.064	0.051	0.044	0.063	0.068	0.065	0.086	0.052	0.057	0.068	0.049	0.058
Nobs	91,936	19,008	93,249	17,487	15,319	35,023	107,002	120,025	5,103	3,097	47,555	36,882	57,501	48,438

Standard errors in parentheses

$*p < 0.10, **p < 0.05, ***p < 0.01$

This table reports the average marginal effects of a multinomial logit regression. Households' readiness to purchase durables is the dependent variable. Inflation expectation is a dummy variable that equals 1 if a household expects inflation to increase. Demographics include: gender, age, age squared, education level, household size, rural or urban residence, socio-economic status group, income level group. Expectations include: income expectations and perceptions, expected financial situation, expected GDP growth, expected unemployment rate, saving expectations and perceptions, inflation perceptions. Z-stat difference is the test statistic for a Z-test whose null hypothesis is that the coefficients of each pair of heterogeneity splits are equal. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables and similar data from national institutes for the European households. GfK asks a representative sample of 2,000 households on a monthly basis whether it is a good time to purchase durables given the current economic conditions. Households can reply that it is a good time, or it is neither a good time nor a bad time. The sample period is January 2000 to February 2016.

Table 5: **Balancing of Variables - German and Foreign Households**

	Unmatched Sample			Matched Sample		
	Mean Treated	Mean Control	t-stats	Mean Treated	Mean Control	t-stats
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Unconventional Fiscal Policy Period						
Age (four groups)	2.38	2.49	-15.32	2.38	2.38	0.00
Male	0.46	0.44	5.61	0.46	0.46	-0.01
Education (three groups)	1.77	2.32	-109.47	1.77	1.77	0.00
Income (four quartiles)	2.36	2.77	-41.53	2.36	2.36	0.01
Social Status (three groups)	2.65	1.93	107.50	2.65	2.65	0.00
Nobs in common support				28,642	95,890	
Panel B: Forward Guidance Period						
Age (four groups)	2.57	2.46	13.48	2.57	2.57	0.00
Male	0.46	0.49	-7.96	0.46	0.46	0.00
Education (three groups)	1.85	2.43	-105.57	1.85	1.85	0.00
Income (four quartiles)	2.59	3.39	-53.60	2.59	2.59	0.00
Social Status (three groups)	2.65	2.41	30.89	2.65	2.65	0.00
Nobs in common support				24,321	49,535	

This table describes the balancing of the observables we use to match treated and control households during the unconventional fiscal policy period (11/2005–12/2006) in Panel A and during the forward guidance period in Panel B (03/2013–06/2014) for the difference-in-differences analysis. For each variable, columns (1) and (4) report the mean within the pool of treated German households in the raw and matched samples. Columns (2) and (5) report the mean within the pool of control households (UK, France, and Sweden) in the raw and matched samples. Columns (3) and (6) report the results for a two-sided t-test whose null hypothesis is that the means across groups are equal.

Online Appendix:
Managing Households' Expectations with Unconventional Policiess

Francesco D'Acunto, Daniel Hoang, and Michael Weber

A.1 Survey Questions

Below we report the original survey questions with answer choices for Germany, the English translation, and the harmonized surveys from the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys used in Section IV for the matching estimator.

A. Germany

Question 1 *Wie hat sich Ihrer Meinung nach die "allgemeine Wirtschaftslage" in Deutschland in den letzten 12 Monaten entwickelt?*

Sie ...

- hat sich wesentlich verbessert
- hat sich etwas verbessert
- ist in etwa gleich geblieben
- hat sich etwas verschlechtert
- hat sich wesentlich verschlechtert
- weiss nicht

Question 2 *Wie haben sich Ihrer Ansicht nach die Verbraucherpreise in den letzten 12 Monaten entwickelt?*

Sie sind ...

- stark gestiegen
- in Massen gestiegen
- leicht gestiegen
- in etwa gleich geblieben
- gesunken
- weiss nicht

Question 3 *Wie werden sich Ihrer Ansicht nach die Verbraucherpreise in den kommenden 12 Monaten im Vergleich zu den letzten 12 Monaten entwickeln?*

Sie werden ...

- staerker als bisher steigen
- etwa im gleichen Masse wie bisher steigen
- weniger stark als bisher steigen

- in etwa gleich bleiben
- gesunken
- weiss nicht

Question 4 *Wie hat sich die finanzielle Lage Ihres Haushaltes in den letzten 12 Monaten entwickelt?*

Sie ...

- hat sich wesentlich verbessert
- hat sich etwas verbessert
- ist in etwa gleichgeblieben
- hat sich etwas verschlechtert
- hat sich wesentlich verschlechtert
- weiss nicht

Question 5 *Wie wird sich Ihrer Ansicht nach die finanzielle Lage Ihres Haushaltes in den kommenden 12 Monaten entwickeln?*

Sie wird ...

- sich wesentlich verbessern
- sich etwas verbessern
- in etwa gleichbleiben
- sich etwas verschlechtern
- sich wesentlich verschlechtern
- weiss nicht

Question 6 *Wie wird sich Ihrer Ansicht nach die allgemeine Wirtschaftslage in Deutschland in den kommenden 12 Monaten entwickeln?*

Sie wird ...

- sich wesentlich verbessern
- sich etwas verbessern
- in etwa gleichbleiben
- sich etwas verschlechtern
- sich wesentlich verschlechtern
- weiss nicht

Question 7 *Wie ist die derzeitige finanzielle Lage Ihres Haushaltes?*

- wir sparen viel
- wir sparen ein wenig
- wir kommen mit unseren finanziellen Mitteln so gerade aus
- wir greifen etwas unsere Ersparnisse an
- wir verschulden uns
- weiss nicht

Question 8 *Glauben Sie, dass es in Anbetracht der allgemeinen Wirtschaftslage derzeit guenstig ist, groessere Anschaffungen (Moebel, elektrische/elektronische Geraete usw.) zu taetigen?*

- ja, jetzt der Augenblick ist guenstig
- der Augenblick ist weder besonders guenstig noch besonders unguenstig
- nein, der Augenblick ist nicht guenstig
- weiss nicht

Question 10 *Wie wird sich Ihrer Ansicht nach die Zahl der Arbeitslosen in Deutschland in den kommenden 12 Monaten entwickeln?*

Die Zahl wird ...

- stark steigen
- leicht steigen
- in etwa gleich bleiben
- leicht zurueckgehen
- stark zurueckgehen
- weiss nicht

Question 11 *Wollen Sie in den kommenden 12 Monaten fuer groessere Anschaffungen (Moebel, elektrische /elektronische Geraete usw.) mehr oder weniger ausgeben als in den letzten 12 Monaten?*

Ich werde ...

- wesentlich mehr ausgeben
- etwas mehr ausgeben
- in etwa gleich viel ausgeben
- etwas weniger ausgeben
- wesentlich weniger ausgeben
- weiss nicht

Question 12 *Wie wahrscheinlich ist es, dass Sie in den kommenden 12 Monaten Geld sparen werden?*

- sehr wahrscheinlich
- recht wahrscheinlich
- unwahrscheinlich
- sehr unwahrscheinlich
- weiss nicht

Question 13 *Glauben Sie, dass es in Anbetracht der allgemeinen Wirtschaftslage derzeit ratsam ist, zu sparen?*

- ja, auf alle Faelle
- wahrscheinlich ja
- eher nicht
- auf keinen Fall
- weiss nicht

Question 1 *How did you perceive the general economic situation in Germany over the last 12 months?*

It ...

- improved substantially

3

- improved somewhat
- remained about the same
- worsened somewhat
- worsened substantially
- don't know

Question 2 *What is your perception on how consumer prices evolved during the last 12 months?*

They ...

- increased substantially
- increased somewhat
- increased slightly
- remained about the same
- decreased
- don't know

Question 3 *How will consumer prices evolve during the next 12 months compared to the previous 12 months?*

They will ...

- increase more
- increase the same
- increase less
- stay the same
- decrease
- don't know

Question 4 *How did the financial situation of your household evolve during the past 12 months?*

It ...

- improved substantially
- improved somewhat
- remained about the same
- worsened somewhat
- worsened substantially
- don't know

Question 5 *How will the financial situation of your household evolve during the next 12 months?*

It will ...

- improve substantially
- improve somewhat
- remain the same
- worsen slightly
- worsen substantially
- don't know

Question 6 *How will the general economic situation in Germany evolve during the next 12 months?*

It will ...

- improve substantially
- improve slightly
- remain the same
- worsen slightly
- worsen substantially
- don't know

Question 7 *What is the current financial situation of your household?*

- we save a lot
- we save a bit
- we just manage to live from our financial inflows and don't save
- we have to de-save
- we become indebted
- don't know

Question 8 *Given the current economic situation, do you think it's a good time to buy larger items such as furniture, electronic items etc?*

- yes, it's a good time
- the time is neither good nor bad
- no, it's a bad time
- don't know

Question 10 *What is your expectation regarding the number of unemployed people in Germany in the next 12 months?*

It will ...

- increase substantially
- increase somewhat
- remain the same
- decrease somewhat
- decrease a lot
- don't know

Question 11 *Do you plan to spend more money during the next 12 months on larger items such as furniture, electronics, etc compared to the previous 12 months?*

I will ...

- spend substantially more
- spend somewhat more
- spend about the same
- spend somewhat less
- spend substantially less
- don't know

Question 12 *How likely is it that you will save money during the next 12 months?*

- very likely
- quite likely
- unlikely
- very unlikely
- don't know

Question 13 *Given the current economic situation, do you think it's a good time to save right now?*

- yes, it's a good time
- probably yes
- not really
- not at all
- don't know

B. France

Question 1 *A votre avis, au cours des douze derniers mois, la situation économique générale de la France ...*

- s'est nettement améliorée
- s'est un peu améliorée
- est restée stationnaire
- s'est un peu dégradée
- s'est nettement dégradée
- ne sait pas

Question 2 *A votre avis, au cours des douze prochains mois, la situation économique générale de la France ...*

- va nettement s'améliorer
- va un peu s'améliorer
- va rester stationnaire
- va un peu se dégrader
- va nettement se dégrader
- ne sait pas

Question 3 *Pensez-vous que, dans les douze prochains mois, le nombre de chômeurs va ...*

- fortement augmenter
- un peu augmenter
- rester stationnaire
- un peu diminuer
- fortement diminue
- ne sait pas

Question 4 *Trouvez-vous que, au cours des douze derniers mois, les prix ont ...*

- fortement augmenté
- moyennement augmenté
- un peu augmenté
- stagné
- diminué
- ne sait pas

Question 5 *Par rapport aux douze derniers mois, quelle sera Ã votre avis l'évolution des prix au cours des douze prochains mois?*

- elle va être plus rapide
- elle va se poursuivre au même rythme
- elle va être moins rapide
- les prix vont rester stationnaires
- les prix vont diminuer
- ne sait pas

Question 6 *Dans la situation économique actuelle, pensez-vous que les gens aient intérêt à faire des achats importants? (meubles, machines à laver, matériels électroniques ou informatiques ...)*

- oui, le moment est plutôt favorable
- le moment n'est ni favorable ni défavorable ...
- non, le moment est plutÃ´t défavorable
- ne sait pas

Question 7 *Dans la situation économique actuelle, pensez-vous que ce soit le bon moment pour épargner?*

- oui, certainement
- oui, peut-ètre
- non, probablement pas
- non, certainement pas
- ne sait pas

Question 8 *A votre avis, au cours des douze derniers mois, le niveau de vie en France, dans l'ensemble s'est ...*

- nettement amélioré
- un peu amélioré
- restée stationnaire
- un peu dégradé
- nettement dégradé
- ne sait pas

Question 9 *A votre avis, au cours des douze prochains mois, le niveau de vie en France, dans l'ensemble va ...*

- nettement s'améliorer
- s'améliorer un peu
- rester stationnaire
- se dégrader un peu
- nettement se dégrader
- ne sait pas

Question 10 *Laquelle des affirmations suivantes vous semble décrire le mieux la situation financière actuelle de votre foyer?*

- vous arrivez à mettre pas mal d'argent de còté
- vous arrivez à mettre un peu d'argent de còté
- vous bouclez juste votre budget
- vous tirez un peu sur vos réserves
- vous ètes en train de vous endetter
- ne sait pas

Question 11 *Au cours des douze derniers mois, la situation financière de votre foyer s'est ...*

- nettement améliorée
- un peu améliorée
- restée stationnaire
- un peu dégradée
- un peu dégradée
- ne sait pas

Question 12 *Pensez-vous que, au cours des douze prochains mois, la situation financière de votre Foyer va ...*

- nettement s'améliorer
- un peu s'améliorer
- rester stationnaire
- un peu se dégrader
- nettement se dégrader
- ne sait pas

Question 13 *Pensez-vous réussir à mettre de l'argent de côté au cours des douze prochains mois?*

- oui, certainement
- oui, peut-être
- non, probablement pas
- non, certainement pas
- ne sait pas

Question 14 *Au cours des douze prochains mois, par rapport aux douze mois passés, avez-vous l'intention de dépenser, pour effectuer des achats importants ...*

- beaucoup plus
- un peu plus
- autant
- un peu moins
- beaucoup moins
- ne sait pas

C. Sweden

Question 1 *Hur ar ditt hushalls ekonomiska situation for narvarande jamfort med for 12 manader sedan? Ar den ...*

- Mycket battre
- Nagot battre
- Ungefar lika
- Nagot samre
- Mycket samre
- Vet inte

Question 2 *Hur tror du att ditt hushalls ekonomiska situation ar om 12 manader? Ar den ...*

- Mycket battre
- Nagot battre
- Ungefar lika
- Nagot samre
- Mycket samre
- Vet inte

Question 3 *Hur tycker du att den ekonomiska situationen ar i Sverige for narvarande jamfort med for 12 manader sedan? Ar den ...*

- Mycket battre
- Nagot battre
- Ungefar lika
- Nagot samre
- Mycket samre
- Vet inte

Question 4 *Hur tror du att den ekonomiska situationen ar i Sverige om 12 manader? Ar den...*

- Mycket battre
- Nagot battre
- Ungefar lika
- Nagot samre
- Mycket samre
- Vet inte

Question 5 *Jamfort med for 12 manader sedan, tycker du att priserna i allmanhet for narvarande ar...*

- Mycket hogre
- Ganska mycket hogre
- Nagot hogre
- Ungefar desamma
- Lagre
- Vet inte

Question 6 *Om du jamfor med dagens situation, tror du att priserna i allmanhet om 12 manader kommer att ...*

- Stiga snabbare
- Stiga i samma takt
- Stiga langsammare
- Vara i stort sett oforandrade
- Sjunka nagot
- Vet inte

Question 7 *Hur tror du att arbetslosheten kommer att utvecklas under de narmaste 12 manaderna? Kommer den att ...*

- Oka mycket
- Oka nagot
- Vara ungefar som nu
- Minska nagot
- Minska mycket
- Vet inte

Question 8 *Har risken for att Du sjalv ska bli arbetslos under de senaste 12 manaderna ...?*

- Oka mycket
- Oka nagot
- Vara ungefar som nu
- Minska nagot
- Minska mycket
- Vet inte

Question 9 *Tycker du att det i dagslaget ar fordelaktigt for folk i allmanhet att gora stora inkop, som exempelvis mabler, tvattmaskiner, TV osv.?*

- Ja, det ar ratt tidpunkt
- Varken ratt eller fel tidpunkt
- Nej, det ar fel tidpunkt, inkapet bar ske senare
- Vet inte

Question 10 *Hur mycket pengar tror du att ditt hushall kommer att anvanda till inkop av sadana kapitalvaror under de narmaste 12 manaderna jamfort med de senaste 12 manaderna? Blir det ...*

- Mycket mer
- Nagot mer
- Ungefar lika mycket
- Nagot mindre
- Mycket mindre
- Vet inte

Question 11 *Mot bakgrund av det allmanna ekonomiska laget, hur tycker du att det ar att spara for narvarande? Som sparande raknas aven minskning av eventuella lan. Ar det...*

- Mycket fordelaktigt
- Ganska fordelaktigt
- Varken fordelaktigt eller ofordelaktigt
- Ganska ofordelaktigt

- Mycket ofordelaktigt
- Vet inte

Question 12 *Hur troligt ar det att Ditt hushall kommer att kunna spara nagot under de narmaste 12 manaderna? Som sparande raknas aven minskning av eventuella lan. Ar det ...?*

- Mycket troligt
- Ganska troligt
- Inte sarskilt troligt
- Inte alls troligt
- Vet inte

Question 13 *Vilket av faljande pastaenden beskriver bast ditt hushalls nuvarande ekonomiska situation?*

- Vi skuldsatter oss och/ eller utnyttjar sparade medel i stor utstrackning
- Vi skuldsatter oss och/ eller utnyttjar sparade medel
- Vi gar ungefar jamnt upp
- Vi sparar nagot
- Vi sparar mycket
- Vet inte

D. United Kingdom

Question 1 *How has the financial situation of your household changed over the last 12 months?*

It has ...

- Got a lot better
- Got a little better
- Stayed the same
- Got a little worse
- Got a lot worse
- Don't Know

Question 2 *How do you expect the financial position of your household to change over the next 12 months?*

It will ...

- Get a lot better
- Get a little better
- Stay the same
- Get a little worse
- Get a lot worse
- Don't Know

Question 3 *How do you think the general economic situation in this country has changed over the past 12 months?*

It has ...

- Got a lot better
- Got a little better
- Stayed the same
- Got a little worse
- Got a lot worse
- Don't Know

Question 4 *How do you expect the general economic situation in this country to develop over the next 12 months?*

It will ...

- Get a lot better
- Get a little better
- Stay the same
- Get a little worse
- Get a lot worse
- Don't Know

Question 5 *How do you think consumer prices have developed over the last 12 months?*

They have ...

- Risen a lot
- Risen moderately
- Risen slightly
- Stayed about the same
- Fallen
- Don't Know

Question 6 *In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months?*

They will ...

- Increase more rapidly
- Increase at the same rate
- Increase at a slower rate
- Stay about the same
- Fall
- Don't Know

Question 7 *How do you expect the number of people unemployed in this country will change over the next 12 months?*

The number will ...

- Increase sharply
- Increase slightly
- Remain the same
- Fall slightly
- Fall sharply
- Don't Know

Question 8 *In view of the general economic situation, do you think now is the right time for people to make major purchases such as furniture or electrical goods?*

- Yes, now is the right time
- It is neither the right time nor the wrong time
- No, it is the wrong time
- Don't Know

Question 9 *Compared to the last 12 months, do you expect to spend more or less money on major purchases such as furniture and electrical goods?*

I will spend ...

- Much more
- A little more
- About the same
- A little less
- Much less
- Don't Know

Question 10 *In view of the general economic situation, do you think that now is?*

- A very good time to save
- A fairly good time to save
- Not a good time to save
- A very bad time to save
- Don't Know

Question 11 *Over the next 12 months, how likely will you be to save any money?*

- Very likely
- Fairly likely
- Not likely
- Not at all likely
- Don't Know

Question 12 *Which of these statements best describes the current financial situation of your household?*

- We are saving a lot
- We are saving a little
- We are just managing to make ends meet on our income
- We are having to draw on our savings
- We are running into debt
- Don't Know

A.2 Additional Institutional Features on the Measure of Unconventional Fiscal Policy

In this section, we describe in detail the narrative records surrounding the 2005 general elections in Germany, and the relationship between willingness to spend and actual spending, inflation expectations and actual inflation, the potential mapping of our findings into the framework of Correia et al. (2013), the marginal effect of inflation expectations on consumption expenditure over time, salience of VAT changes, and the differences between reduced and full VAT rates.

Relevant Narrative about the 2005 German Elections. The Christian Democrats (CDU, center-right) were the only German party in the 2005 electoral campaign advocating an increase in VAT by 2% starting in January 2006 to lower non-wage labor costs (see CDU (2005), page 14). The Social Democrats (SPD, center-left) strongly opposed an increase in VAT, and instead favored a 3% increase in income tax for top income earners (see SPD (2005), page 39). The Greens (center-left) and Liberals (center-right) also strongly opposed an increase in VAT. The Liberals, for example, promised to decrease the general tax burden by EUR 19bn.

All parties except the CDU strongly opposed raising VAT, including CDU's preferred coalition partner, the Liberals. The projections of the election outcomes were highly uncertain (see below), as were the fiscal policy measures the new government would have implemented. A VAT increase of 3% was therefore highly unexpected. Consistently, the opposition parties and the popular press accused the new government between CDU and SPD of electoral fraud after it announced this policy measure in November 2005, and they fiercely criticized the new government. The Section A.5 of the Online Appendix contains press clippings commenting on the VAT policy.

Empirically, households' inflation expectation over the next 12 months did not increase until January 2006, after the new government had announced its plans in November 2005 to increase VAT in 2007, rather than 2006 as the CDU had planned initially which is direct evidence German households did not expect an increase in VAT in 2006, as the CDU proposed.[1]

Neither of the two blocks—CDU and Liberals on the one hand, and SPD and Greens on the other hand—had a majority in polls before the elections.[2] In the actual election on September

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[1]If voters had considered the CDU proposal credible, we should already see an increase in inflation expectation during the campaign in the summer of 2005, because the plan was to increase VAT in January 2006.

[2]Eleven days before the elections, the polling institute Infratest Dimap predicted a vote share of 41% for the CDU, 34% for the SPD, 8.5% for the Left, 7% for the Greens, and 6.5% for the Liberals. See http://www.infratest-dimap.de/en/umfragen-analysen/bundesweit/sonntagsfrage/. All parties explicitly ruled out any coalition with the Left. The media mentioned all other possible combinations, including non-traditional combinations, as possible coalitions, including a "traffic-light" coalition among SPD, Greens, and Liberals and a "Jamaica" coalition among CDU, Liberals, and Greens.

18, 2005, the CDU gained 35.2% electoral support; the SPD, 34.2%; the Liberals, 9.8%; the Left, 8.7%; and the Greens, 8.1%. Neither the CDU nor the SPD were able to form a "small" coalition with their preferred coalition partner (Liberals and Greens, respectively). The CDU and SPD therefore agreed to form a "grand" coalition.

The coalition agreed on an overall contractionary fiscal policy (see below), including the 3% increase in VAT, and the use of one third of the additional tax revenue to decrease non-wage labor costs by two percentage points. The government planned to use two thirds of the VAT increase to consolidate the federal budget to comply with the Maastricht Treaty and hinder an infringement procedure by the European Commission. Total tax revenue indeed increased in 2007, and Germany no longer violated the EU Stability and Growth Pact.

Concurrent Policy Measures. The new government announced additional policy measures as part of its coalition agreement. The preamble of the official agreement emphasizes the need to reduce Germany's public debt as the major challenge for the new government, and the set of agreed-upon policy measures would be contractionary overall. In addition to the VAT increase and the non-wage labor-costs reduction, the government announced an investment program of 0.25% of 2005 GDP per year over the following four years. The government planned to finance the majority of the program through budget cuts. Moreover, the government announced an increase in the top marginal income tax rate from 42% to 45% for incomes above EUR 250,000 for singles and EUR 500,000 for couples. The Panel of Household Finances of the Deutsche Bundesbank reports for 2014 a 95th percentile of gross income of EUR 113,900, which implies the tax increase only affected a small fraction of households. Lastly, the government planned to increase indirect taxes for retirement from 19.4% to 19.9%, and it abolished the home-buyer subsidy, which had been guaranteed since 1949, and amounted to EUR 11.4 billion in 2004.[3] The overall contractionary nature of this set of policies suggests our estimates in section V represent a lower bound of the positive effect of the announcement to increase VAT in 2007 on households' willingness to purchase durables.

Willingness to Spend versus Actual Spending. We are ultimately interested in how inflation expectations transform into *actual* consumption expenditure. Our survey only reports the willingness to purchase durable goods. Figure A.1 in the Online Appendix is a scatter plot of the cyclical components of log real durable consumption expenditure and the average propensity to purchase durables.[4] Real and reported spending on durables are positively related, which is consistent with Bachmann et al. (2015). The correlation is 0.46.

The reported willingness to purchase has potential advantages compared to measures of

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[3]See http://www.kas.de/upload/ACDP/CDU/Koalitionsvertraege/Koalitionsvertrag2005.pdf for details.

[4]We use a Hodrick-Prescott filter with smoothing parameter λ of 1,600 to extract the cyclical component.

actual expenditures elicited with surveys. Spending data in surveys typically contain noise, because survey participants might not recall their actual purchases, or they might overstate their purchases of visible products, such as cars, and understate the consumption of "sin" products, such as tobacco and alcohol (see Hurd and Rohwedder (2015) and Atkinson and Micklewright (1983)).

Empirical Evidence and Relationship with Theory. Correia et al. (2013) formalize the ideas in Shapiro (1991), Feldstein (2002), and Hall (2011) and study unconventional fiscal policy in a New Keynesian model. They show unconventional fiscal policy can fully circumvent the zero-lower-bound constraint on nominal interest rates in a budget-neutral and time-consistent manner. Their benchmark model is a textbook New Keynesian model, in which labor is the only factor of production. This model suggests that an increasing path of consumption taxes generates inflation expectations and negative real interest rates. Lower labor income taxes ensure consumption taxes do not affect the intratemporal margin between leisure and consumption, and hence the real wage. Firms' pricing decisions are independent of the change in consumption taxes, and marginal costs do not change either. Therefore, the production allocation across firms is efficient and the government can offset the distortion coming from monopoly rents with taxes as in the textbook model.

Our natural experiment resembles the proposals in Shapiro (1991), Feldstein (2002), and Hall (2011), but deviates from the setting in Correia et al. (2013) in a few dimensions. First, the German government used 2 percentage points of the 3% increase in VAT to consolidate the federal budget, and 1 percentage point to lower indirect labor taxes by 2%.[5] Empirically, we do not find any effect on labor force participation or unit labor costs.[6] Moreover, we find similar marginal effects of inflation expectations on the propensity to purchase durables for full-time, part-time, and unemployed survey participants.

Second, we only observe attitudes towards purchases of durable goods. In a model with both durable and non-durable consumption, the intertemporal substitution effect of higher future consumption taxes is larger for durable goods (see Barsky et al. (2007) and Barsky et al. (2016)).[7] A potential concern for policymakers aiming to stimulate overall consumption is that households might substitute intratemporally from non-durable to durable consumption, because the VAT

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[5] Efficiency gains in the unemployment insurance system financed the second percentage-point decrease in indirect labor taxes.

[6] Data from the OECD show unit labor costs decreased in Germany during 2006 and 2007 in absolute terms and relative to France, Sweden, and the UK (see: http://stats.oecd.org/Index.aspx?QueryName=426). Labor force participation, instead, barely changed from 58.4% in 2005 to 59.1% in 2007 (see: http://data.worldbank.org/indicator/SL.TLF.CACT.ZS?locations=DE).

[7] Shapiro (1991) already emphasizes the effect of unconventional fiscal policy should mainly operate through expenditure on durable goods. Storability of durable goods can lead to an increase in durable expenditure due to a future increases in VAT even if the IES is small through an arbitrage effect.

change did affect nondurable goods less than durable goods (see discussion below). We do not observe households' attitudes towards purchases of non-durable goods. To address this concern directly, we show realized non-durable consumption growth increased during 2006. German households also lowered their savings attitudes during 2006 in absolute terms and relative to matched foreign households, supporting the conclusion that households increased *overall* consumption (see Table 3).

Third, Correia et al. (2013) study unconventional fiscal policies during a liquidity trap, whereas we study the effect for a single country in a currency union. To predict higher consumption, the consumption Euler equation requires only that nominal interest rates not increase sufficiently to offset the increase in inflation expectations rather than being in a liquidity trap. The ECB explicitly excluded an increase in nominal interest rates to counteract the announcement of a higher VAT in Germany, because it believed the increase in consumer price inflation would be temporary and limited to Germany. The then-president of the German Bundesbank excluded an increase in nominal rates to offset inflationary pressure: "We know what the effects of the VAT increase are; as is the case for oil prices, we do not consider one-off effects" (see Weber (2006); see also Section A.3 in the Online Appendix). Nominal interest rates for consumption loans also barely changed and were 6.7% in January 2006 and 6.4% in December 2007. Moreover, in our difference-in-differences estimation in Section IV, we compare the behavior of German households to matched French households that face the same nominal interest rates as German households.

Last, we study the pre-announced increase in VAT rather than consumption taxes. Correia et al. (2013) already highlight both VAT and consumption taxes should have similar implications because of "the extensive evidence of very high pass-through of consumption taxes even in the cases in which the usual practice is to quote after-tax prices, as is the case for the value-added tax in Europe." This point is consistent with the ex-ante expectations for the specific case of the VAT increase in Germany and the actual ex-post result. The Association of Consumer & Home Electronics expected the increase in VAT would be fully passed through to consumers (see Stehle (2006)). Ex-post, the German statistical office shows some categories immediately and fully adjusted prices, such as tobacco and services, whereas other categories adjusted prices with a delay, such as electronics and furniture. By early 2008, all categories underlying the German CPI had fully adjusted their prices by the theoretical amount.[8]

Farhi et al. (2014) show an increase in VAT coupled with a decrease in payroll subsidy can, under certain conditions, replicate an exchange-rate devaluation even within a currency union.

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[8]See https://www.destatis.de/DE/Publikationen/WirtschaftStatistik/Preise/MwSterhoehungJan2007.pdf.

Theoretically, this fiscal devaluation makes goods in Germany cheaper than French goods and results in an increase in the demand for goods produced in Germany by both French and German households. Crucially, the fiscal devaluation should barely affect the overall consumption decision of French households, and hence the spending attitudes of French households represent a plausible counterfactual for the spending attitudes of German households in our setting.

A.3 ECB View on German VAT Increase

In this section, we report the answer of the former president of the ECB, Jean-Claude Trichet, during a Q&A after the introductory remarks following the council meeting on October 5 2006. The full transcript can be found here: https://www.ecb.europa.eu/press/pressconf/2006/html/is061005.en.html

Question: [...] Seeing how you have to think ahead as good central bankers, I wondered if you could tell us what your working hypothesis is regarding the effects on price stability and on growth of the value added tax increase that is coming in a large European country on 1 January?

Trichet: [...] As regards your second question I will not enter into our baseline scenario. If the baseline scenario was not confirmed, whether it would be upward or downward, we would draw the appropriate consequences. We have a compass and we have a needle in our compass: it is price stability, the delivery of price stability in the medium-term and the credibility of the delivery of price stability. It is because we are credible in the delivery of price stability that our inflationary expectations are anchored in line with our definition of price stability. This solid anchoring is essential, as I have said, for sustainable growth and job creation in the medium and long-term. As regards the profile of HICP due to the VAT increase in one big economy in the euro area, clearly there we have, I would say, a mainstream analysis which is suggesting that we will have a hump in HICP, starting in January 2007 it is extraordinarily likely, arithmetically speaking, and there is also a probability of having more consumption in the last quarter of this year, and less consumption in the first quarter of next year. That's also clearly suggested by the situation. As you know, there are several schools of thought around the mainstream analysis, and we will see exactly what happens. My sentiment–and I am communicating the overall sentiment of the Governing Council–is that after a relatively short period of volatility we will go back to more normal behaviour. We should not pay too much attention to the short-term volatility that would be induced by this phenomenon. In any case we think in the Governing Council that we must extract information from all sources we have as far as data, facts, figures are concerned, and extract from that an assessment on the trend. You remember we had a very poor quarter in the last quarter last year. It was, until the recent revision upward, only 0.3%, it was disappointing obviously but we said it doesn't put into question our understanding of what is the trend growth. And the results of the first and second quarters of this year confirmed that our assessment of the situation was fully justified.

A.4 Data

When conducting the survey, GfK also collects a rich set of demographics. We enlist the variables below, and report the possible values the variables obtained in the sample in parentheses.

Sex (male, female), age (continuous), household size (1, 2, 3, 4, 5 and more), city size ($0 \leqslant$ size $\leqslant 1,999$, $2,000 \leqslant$ size $\leqslant 2,999$, $3,000 \leqslant$ size $\leqslant 4,999$, $5,000 \leqslant$ size $\leqslant 9,999$, $10,000 \leqslant$ size $\leqslant 19,999$, $20,000 \leqslant$ size $\leqslant 49,999$, $50,000 \leqslant$ size $\leqslant 99,999$, $100,000 \leqslant$ size $\leqslant 199,999$, $200,000 \leqslant$ size $\leqslant 499,999$, $500,000 \leqslant$ size), marital status (single, couple, married, widowed, divorced, separated), children at home (yes, no), number of children (1, 2, 3, 4 and more), homeownership (house owner, apartment owner, renter), household head (yes, no), education (*Hauptschule*, *Realschule*, *Gymnasium*, University), employment (full-time, part-time, not employed), state (Schleswig-Holstein, Hamburg, Bremen, Berlin(West), Niedersachen, Nordrhein-Westfalen, Hessen, Rheinland-Pfalz, Saarland, Baden-Wuerttemberg, Bayern, Mecklenburg-Vorpommern, Sachsen-Anhalt, Brandenburg, Thueringen, Sachsen, Berlin(Ost)), monthly net income (inc) (inc $\leqslant 500$, $500 <$ inc $\leqslant 750$, $750 <$ inc $\leqslant 1,000$, $1,000 <$ inc $\leqslant 1,2500$, $1,2500 <$ inc $\leqslant 1,500$, $1,500 <$ inc $\leqslant 2,000$, $2,000 <$ inc $\leqslant 2,500$, $2,500 <$ inc $\leqslant 3,000$, $3,000 <$ inc $\leqslant 3,500$, $3,500 <$ inc $\leqslant 4,000$, $4,000 <$ inc), job (farmer, liberal profession, self-employed, civil servant, white-collar worker, blue-collar worker, student, trainee, draftee, housewife, retiree, unemployed).

Data on the consumer price index, the unemployment rate, real durable consumption expenditure, real GDP, and industrial production are from the German Statistical Office (DeStatis); Data on the European and German uncertainty index are from Baker et al. (2016); Data on DAX and Volatility DAX are from the Deutsche Boerse; and oil price data are from Bloomberg.

We obtain the harmonized consumer price indexes (CPI) from the Statistical Data Warehouse at the European Central Bank. The data ID for the harmonized overall CPI is ICP.M.DE.N.000000.4.INX; for the all items CPI excluding food and energy it is ICP.M.DE.N.XEF000.4.INX; for the major durables CPI it is ICP.M.DE.N.0921_2.4.INX; and for the non-durable households goods CPI it is ICP.M.DE.N.056100.4.INX.

We obtain data for bank interest rates for loans to households in Germany for consumption from the Statistical Data Warehouse at the European Central Bank. The data ID is MIR.M.DE.B.A2B.A.R.A.2250.EUR.N. The rate is the annualized agreed rate, narrowly defined effective rate, for new loans for consumption excluding revolving loans and overdrafts, convenience and extended credit card debt.

Inflation expectations data for European Union member countries are from the European Commission Directorate on Economic and Financial Affairs.

A.5 Press Clippings

We briefly cite a few media quotes following the announcement of the newly-elected administration in 2005 to increase VAT by 3%.

"Mehrwertsteuer ist glatter Betrug an den Waehler." Gruenen-Vorsitzende Claudia Roth haelt den Koalitionsvertrag fuer unsozial

"VAT is electoral fraud." Green party leader Claudia Roth calls coalition agreement antisocial

Berliner Morgenpost, 11/21/2005

Opposition kritisiert"Wahlbetrug." Vor allem hoehere Mehrwertsteuer stoesst auf Protest

Opposition criticizes "electoral fraud." Especially higher VAT fiercely criticized

Frankfurter Rundschau, 11/14/2005

Opposition spricht von Wahlbetrug.

Opposition stresses "electoral fraud."

Die Welt, 11/13/2005

Die dreissten Steuerluegen.

Unapologetic tax lies.

Berliner Morgenpost, 5/19/2006

Westerwelle geisselt Steuererhoehungen.

Westerwelle criticizes tax hike.

Sueddeutsche Zeitung, 5/15/2006

Warum luegen Politiker?

Why do politician lie?

Welt am Sonntag, 5/14/2006

A.6 Dispersion of Inflation Expectations

Our baseline analysis focuses on the first moment of inflation expectations, but the policy announcements might also imply an indirect effect on the cross sectional dispersion of expectations across individuals.[9] Indeed, Coibion et al. (2019) show if priors are symmetrically distributed around a signal and agents update expectations in a Bayesian fashion, the average expectations would not change after the signal even if everyone updated their expectations. Providing common signals such as information treatments about macroeconomic variables reduces the dispersion of expectations. In noisy expectations models, we would expect an immediate decrease in the cross-sectional dispersion of beliefs because of the common signal, whereas in sticky-expectations models, we might only expect a gradual decrease in the dispersion of beliefs across individuals (Coibion and Gorodnichenko (2015)).

Unfortunately, our survey does not include direct elicitation of the full distribution of individual beliefs about inflation, and hence we cannot measure the second moment of inflation expectations at the individual level.

We can still assess, though, a potential effect of the two unconventional policies on the cross-sectional dispersion of expectations in the population. Note that, even in this case, we do not observe quantitative beliefs but only qualitative beliefs. For this reason, we need to measure dispersion based on the standard deviation of a categorical variable (a dummy that equals 1 if the respondent expects that inflation will be higher over the following 12 months relative to the previous 12 months). This definition limits the scope of our analysis, because the estimated cross-sectional standard deviation of the dummy variable will be higher as the share of respondents who expect inflation to increase approaches 50% from the left.[10]

In Figure A.5, we plot the average monthly coefficient of variation of inflation expectations around the unconventional policy announcements. We compute the coefficient of variation as the ratio between the monthly cross sectional standard deviation and the monthly average inflation expectations in the German sample. The left panel of Figure A.5 refers to unconventional fiscal policy. We detect a notable drop in the coefficient of variation starting in January 2006 through the end of 2006. Although the normalization by average inflation expectations drives, at least in part, this drop, because we know from above that average inflation expectations increase over this period, the evidence is at least inconsistent with a substantial increase in the cross-sectional variation of inflation expectations during the period between policy announcement and implementation of the VAT increase. The right panel of Figure A.5 considers the two forward

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[9]We thank Tarun Ramadorai for suggesting this point.

[10]The share of respondents who expect inflation to increase is never higher than 50%, including during the peaks of inflation expectations around the VAT announcement period in Germany in 2006.

guidance announcements. Similar to the first moment, we fail to detect a drop in the dispersion of expectations around these announcements.

Figure A.1: **Cyclical Readiness to Spend on Durables and Real Durable Consumption**
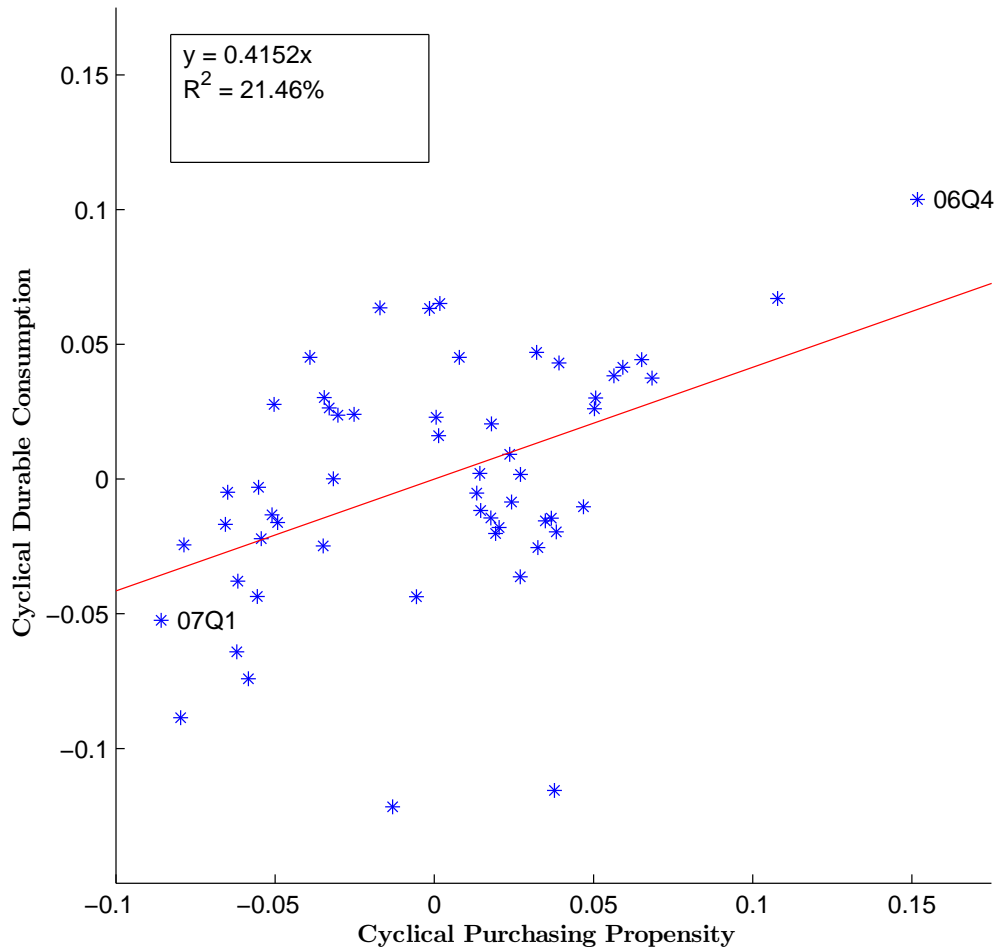
This figure is a scatter plot of the cyclical components of the average monthly readiness to purchase durables over time and of the natural logarithm of the real durable consumption at the quarterly frequency. We use a Hodrick–Prescott filter with smoothing parameter $\lambda = 1,600$ to estimate the cyclical component. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct the readiness to purchase durables index. GfK asks a representative sample of 2,000 households whether it is a good time to purchase durables given the current economic conditions. Higher values correspond to better times. We use the end of quarter value to get a quarterly time series. The sample period is fist quarter 2000 to fourth quarter 2013 for a total of 14 years.

Figure A.2: **Inflation Expectations and Lagged Realized Durable Inflation Rate**
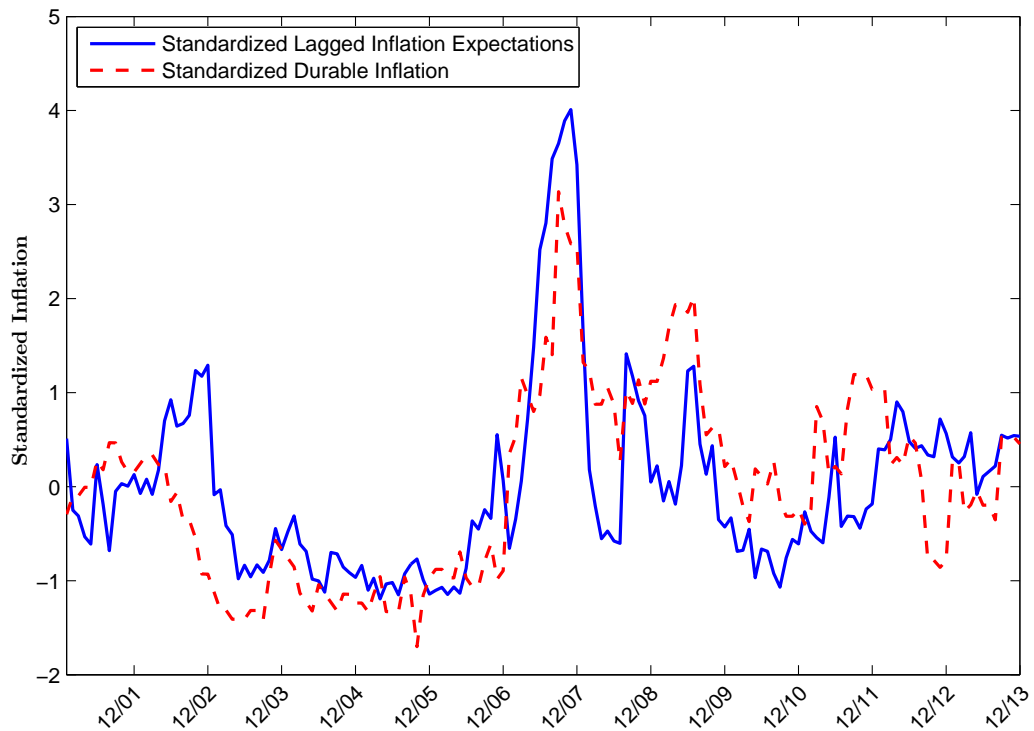
This figure plots the monthly time series of the one-year standardized average monthly inflation expectation and the lagged harmonized major durables consumer price inflation rate in percent at an annual rate. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct inflation expectations. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months. We create a dummy variable which equals 1 when a household expects inflation to increase. The sample period is January 2000 to December 2013 for a total of 14 years.

Figure A.3: **Time Series of CPI Inflation rate**
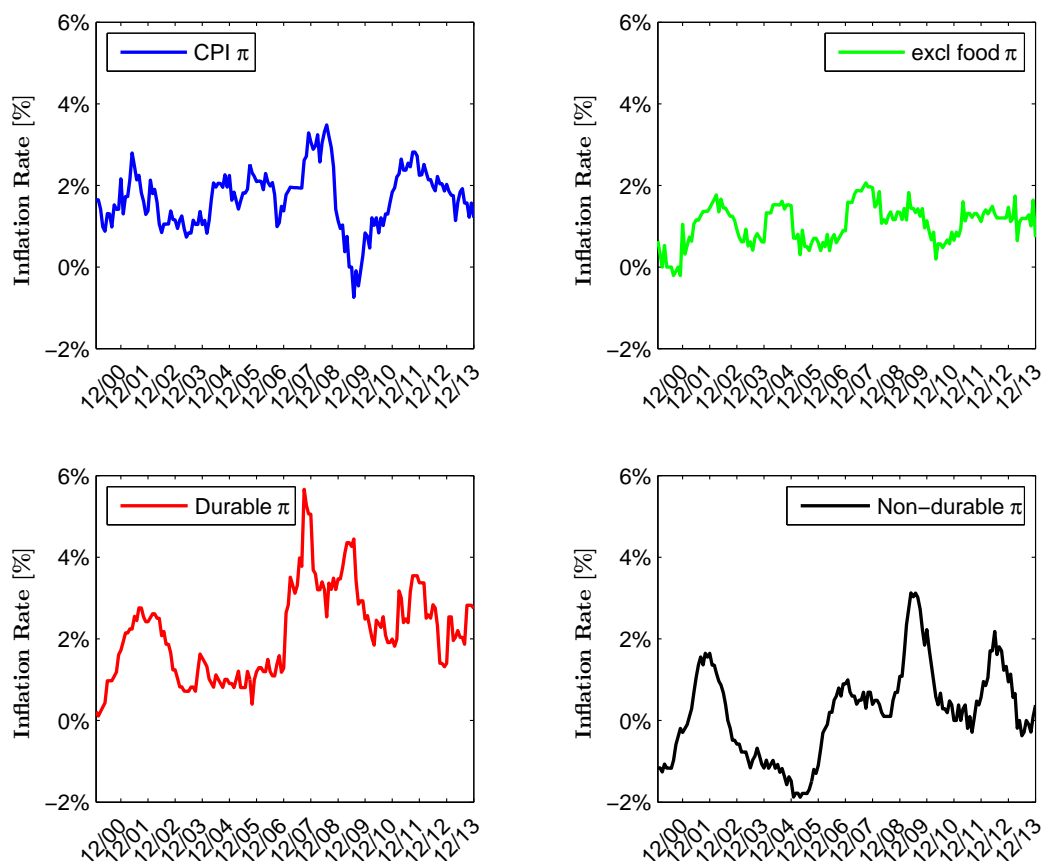
This figure plots the monthly time series of the German consumer price (CPI) inflation rate π in percent at an annual rate. The top left panel plots the harmonized overall consumer price inflation rate. The top right panel plots the all items CPI excluding food and energy. The bottom left panel plots major durables CPI. The bottom right panel plots the non-durable households goods CPI. The sample period is January 2000 to December 2013 for a total of fourteen years.

Figure A.4: **Expected Increase in Inflation and Readiness to Spend on Durables: Germany and UK and Sweden**
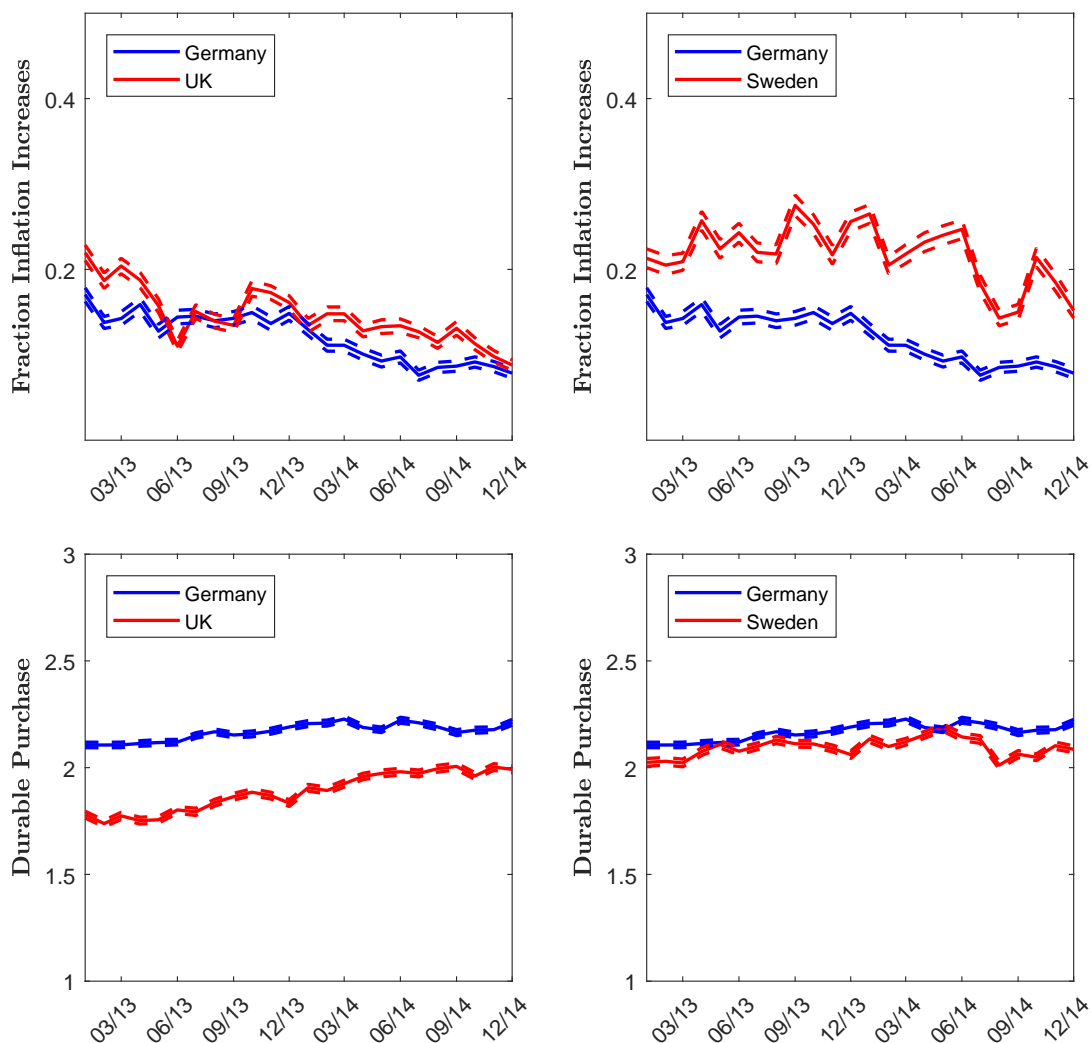
The top panel plots average monthly inflation expectations over time (solid line) and one standard error bands (dashed line) over time. The bottom panel plots the average monthly readiness to purchase durables over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct these variables for Germany and similar data from national statistical agencies and GfK subsidiaries for the United Kingdom and Sweden. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months. We create a dummy variable which equals 1 when a household expects inflation to increase. They also ask whether it is a good time to purchase durables given the current economic conditions. Higher values correspond to better times to purchase durables. The sample periods are January 2013—December 2014.

Figure A.5: Coefficient of Variation in Inflation Expectations

Unconventional Fiscal Policy

Forward Guidance
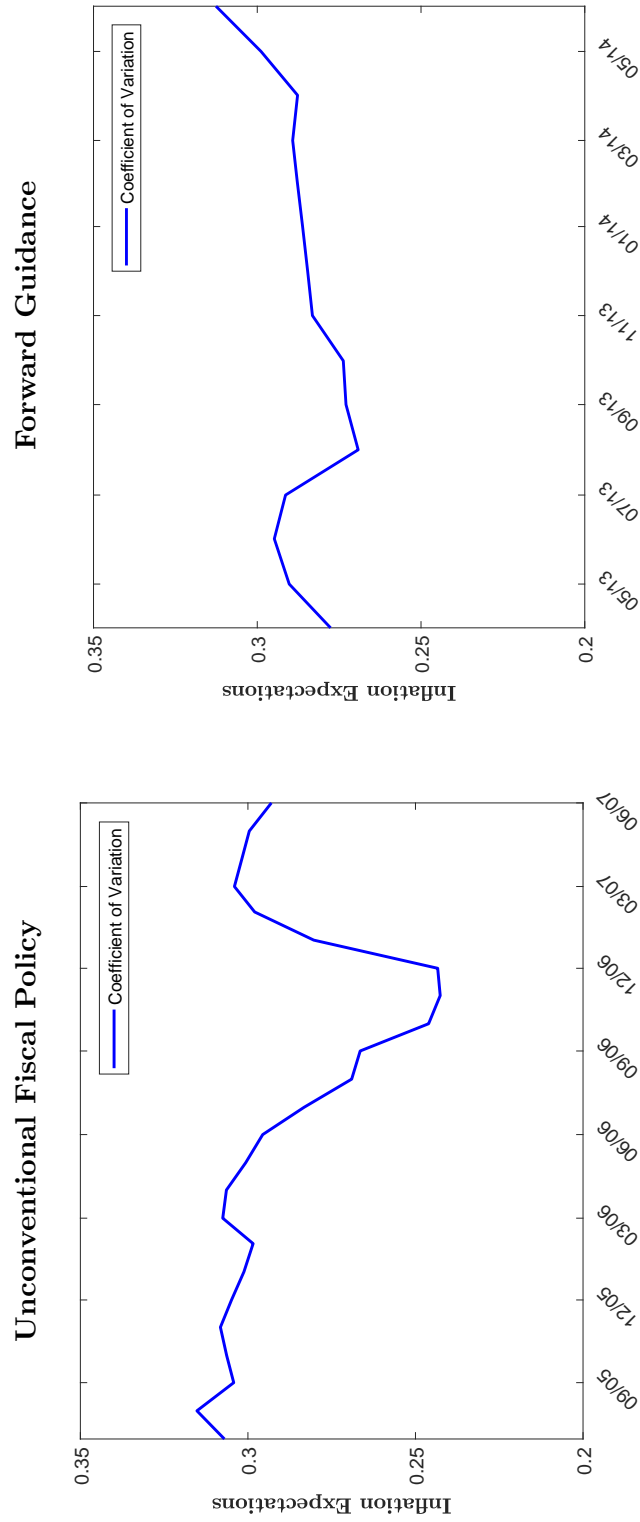
This figure plots the coefficient of variation of monthly inflation expectation over time. We use the confidential micro data underlying the GfK Consumer Climate MAXX survey to construct those variables. GfK asks a representative sample of 2,000 households how consumer prices will evolve in the next 12 months compared to the previous 12 months, how the financial situation of the household evolved during the past 12 months, and how the financial situation of the household will evolve during the next 12 months. We create a dummy variable that equals 1 if a household expects inflation to increase, perceives an improved financial situation, and expects an improved financial situation. The sample period is September 2005 to June 2007 for a total of 3 years.

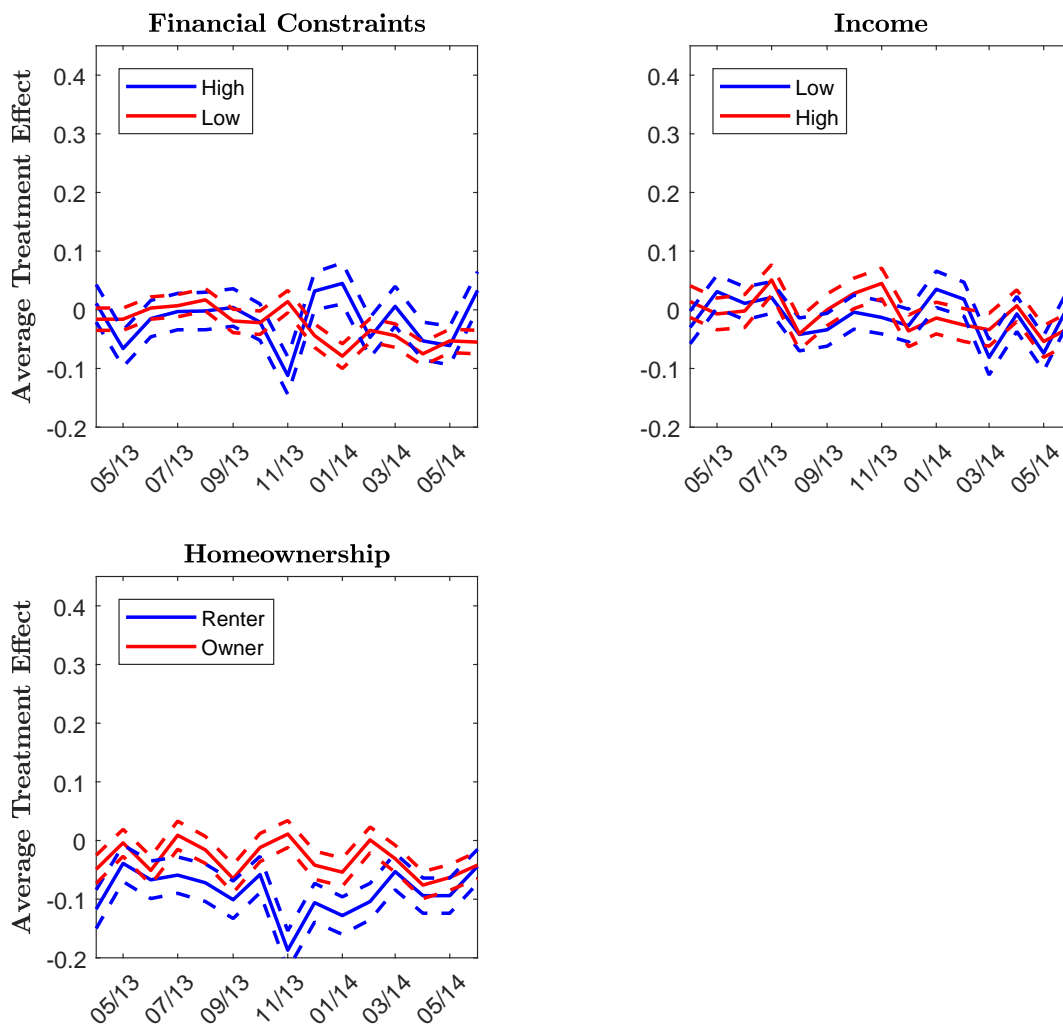Figure A.6: **Effect of Forward Guidance by Sophistication and Demographics**

This figure plots β_m coefficient (solid line) of $\Delta Dur_{i,03/2013 \to m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,03/2013 \to m} \times \gamma + \epsilon_i$, for different sample splits by demographics. Dashed lines are one standard error bands. $\Delta Dur_{i,03/2013 \to m}$ is the difference in the willingness to spend on durable goods between month m and March 2013, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,03/2013 \to m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

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Figure A.7: Effect of Forward Guidance by Proxies of Financial Constraints

This figure plots β_m coefficient (solid line) of $\Delta Dur_{i,03/2013\rightarrow m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,03/2013\rightarrow m} \times \gamma + \epsilon_i$, for different sample splits by financial constraints. Dashed lines are one standard error bands. $\Delta Dur_{i,03/2013\rightarrow m}$ is the difference in the willingness to spend on durable goods between month m and March 2013, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,03/2013\rightarrow m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure A.8: **Effect of Forward Guidance on Inflation Expectations by Sophistication and Demographics**

This figure plots β_m coefficient (solid line) of $\Delta\,\mathbb{E}\,\pi_{i,03/2013\to m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,03/2013\to m} \times \gamma + \epsilon_i$, for different sample splits by demographics. Dashed lines are one standard error bands. $\Delta\,\mathbb{E}\,\pi_{i,03/2013\to m}$ is the difference in the share of individuals expecting higher inflation in the next 12 months compared to the previous 12 months between month m and March 2013, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,03/2013\to m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure A.9: **Effect of Forward Guidance on Inflation Expectations by Proxies of Financial Constraints**

This figure plots β_m coefficient (solid line) of $\Delta\,\mathbb{E}\,\pi_{i,03/2013\rightarrow m} = \alpha + \beta_m \times VATshock_i + \Delta X'_{i,03/2013\rightarrow m} \times \gamma + \epsilon_i$, for different sample splits by financial constraints. Dashed lines are one standard error bands. $\Delta\,\mathbb{E}\,\pi_{i,03/2013\rightarrow m}$ is the difference in the share of individuals expecting higher inflation in the next 12 months compared to the previous 12 months between month m and March 2013, $VATshock_i$ is an indicator which equals 1 if the household was exposed to the VAT shock, β_m captures the effect of the VAT shock on the willingness to buy durables for household i in month m, and $\Delta X'_{i,03/2013\rightarrow m}$ is the difference in a set of observables between month m and the baseline month. We use the micro data underlying the Directorate-General for Economic and Financial Affairs of the European Commission harmonized consumer surveys to construct these variables.

Figure A.10: **Supply-Side Forces of Transmission**

This figure plots the advertisement of a large consumer electronics retail chain in Germany, Mediamarkt, on January 3rd 2007.

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