

Djuric, Uros; Neugart, Michael

Conference Paper

Helicopter money: survey evidence on expectation formation and consumption behavior

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2017: Alternative Geld- und Finanzarchitekturen - Session: Monetary Policy and Consumption, No. B06-V1

Provided in Cooperation with:

Verein für Socialpolitik / German Economic Association

Suggested Citation: Djuric, Uros; Neugart, Michael (2017) : Helicopter money: survey evidence on expectation formation and consumption behavior, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2017: Alternative Geld- und Finanzarchitekturen - Session: Monetary Policy and Consumption, No. B06-V1, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/168062>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Helicopter money: survey evidence on expectation formation and consumption behavior

Uros Djuric* and Michael Neugart†

January 2017

Abstract

The effects of helicopter money on expectations and economic outcomes is empirically largely unexplored. We fielded a representative survey among the German population randomly assigning respondents to various unconventional monetary policy scenarios that raise household income. We find that in all policy treatments people spend almost 40% of the transfer. Spending shares are independent of whether the transfer is debt financed and provided by the government or provided by the central bank as ‘helicopter money’. Policies do not raise inflation expectations but induce uncertainty. Individuals’ spending decisions are hardly correlated with measures on expectations.

Keywords: helicopter money, unconventional monetary policy, quantitative easing, inflation expectations, consumer behavior, Ricardian equivalence, mental accounting

JEL-classification: E21, E52, E58, E63

*Technische Universität Darmstadt and GSEFM, Department of Law and Economics, Bleichstraße 2, D-64283 Darmstadt, Germany, E-mail: duric@vwl.tu-darmstadt.de

†Corresponding author: Technische Universität Darmstadt, Department of Law and Economics, Bleichstraße 2, D-64283 Darmstadt, Germany, E-mail: neugart@vwl.tu-darmstadt.de, phone: +49 6151 1657266

“Let us suppose now that one day a helicopter flies over this community and drops an additional \$1000 in bills from the sky, which is, of course, hastily collected by the members of this community. Let us suppose further that everyone is convinced that this is a unique event which will never be repeated.” (Friedman, 1969, p. 4-5)

1 Introduction

After the emergence of the world economic crisis in 2007, central banks have implemented a collection of monetary policy measures with the aim to stimulate nominal demand, ranging from standard downward adjustments in nominal interest rates to unconventional quantitative easing and forward guidance. Notwithstanding some positive effects, the final outcomes and effectiveness of these measures stay ambiguous (Kapetanios et al., 2012). Recently, there have been repeated discussions to extend the toolbox of unconventional monetary policies and recur to helicopter money as a measure to directly inject money into the economy by giving cash to households, thus circumventing the indirect monetary policy channels. Helicopter money was first talked about by Milton Friedman (1969), taken up in a speech by Ben Bernanke¹ addressing the Japanese slump, and has been recently discussed by various academics and policy makers.² The idea of helicopter money as another actual means of monetary policy making – Milton Friedman introduced it as a thought experiment – is intriguing. Its potential implications are, however, largely unexplored, most importantly from an empirical point of view.

In this paper we analyze the potential consequences of helicopter money on households’ spending decisions and how it changes their expectations on inflation and the development of the economy. To this end we fielded questions in a survey which constitutes a representative sample of the German population. The survey allowed us to randomly divide the participants into four sub-groups who were confronted with distinct versions of unconventional monetary and fiscal policy

¹“Some thoughts on Monetary Policy in Japan”, The Federal Reserve Board, Remarks by Governor Ben S. Bernanke before the Japan Society of Monetary Economics, Tokyo, Japan, May 31, 2003.

²See, for example, the blog “mainly macro” by Simon Wren-Lewis <https://mainlymacro.blogspot.de/> or John Muellbauer at <http://voxeu.org/article/combating-eurozone-deflation-qe-people>.

scenarios. They were subsequently asked about the amount they would eventually spend if they received the money out of such a policy, and about their expectations on the policy impact on the economy. The policy scenarios differed in terms of how the policy would be funded, and in terms of the pace of policy implementation.

Combining the participants answers about their economic expectations and consumption behavior we are not only able to evaluate the likely outcomes of the policies in comparison. We are also able to elaborate on the validity of different economic theories such as the permanent income hypothesis, Ricardian equivalence, and behavioral approaches to explain consumption such as mental accounting.

We find that households consume almost 40% of the transfers given to them. Quite intriguingly the spending shares are hardly affected by the way in which the policy is financed, i.e whether the central bank would print the money and transfer it directly to the households or whether the treasury would borrow the money from the central bank and transfer it to the households. Furthermore, there is no difference in spending shares between households who were asked what to do with an individual lottery win, and households who were told that they as all other households would receive money from the treasury or the central bank. An economy wide transfer program seems to be considered as the same kind of a windfall as an individual lottery win questioning the effectiveness of the policies to positively influence expectations on future output. In relation to forward-looking behavior of households we also find little support for the proposition of Ricardian equivalence when comparing the effect of helicopter money drops with transfers paid out by the treasury on households' spending shares. While all policies have little effect on raising expected inflation rates, they seem to introduce a great deal of uncertainty about future inflation rates. Economically more interested persons are more likely to answer that any kind of expansionary policy will increase future inflation rates while less interested respondents are not. Moreover, expectations about inflation, economic conditions, and government behaviour are not strongly correlated with the individuals' spending decisions. Finally, while we do not confirm earlier results on mental accounting theories as a behavioural explanation of the respondents' answers, we do find interesting correlations between peoples' budgeting plans and spending decisions.

We proceed with a literature overview. Section 3 describes the survey from

which our data stems. Section 4 introduces the treatments, and Section 5 presents the results. In Section 6 we conclude.

2 Related literature

As the insufficiency of conventional monetary policies in post-crisis periods became more obvious³, both debt and money financed fiscal stimulus gained more attention in recent macroeconomic research. Koo (2009) and DeLong and Summers (2012) provide evidence on the high efficacy of activist fiscal policy during such periods. But for political reasons and the fear of high government debts, the debate among the members of the European Monetary Union serves as a prominent example, those policies are very often not applied. Helicopter money as a yet another policy option thus became a hot topic.

Although still little is known about this concept, the researchers seem to agree on its (in theory) high efficacy in stimulating nominal demand. Using a rigorous macro model Buiter (2014) concludes that “a permanent helicopter drop of irredeemable fiat base money boosts demand both when Ricardian equivalence does not hold and when it does. It makes the deficient demand version of secular stagnation a policy choice, not something driven by circumstances beyond national policy makers’ control”. Turner (2015) asserts that “money financed fiscal deficits will certainly and in all circumstances stimulate aggregate nominal demand. While monetary stimulus working through expectations channels might”. Galí (2014) used DSGE models to examine the effects of the monetary finance under classical and New-Keynesian assumptions and concluded that under a realistic calibration of nominal rigidities, “a money-financed fiscal stimulus is shown to have very strong effects on economic activity, with relatively mild inflationary consequences”.

There is an emerging empirical literature which touches upon the consequences of unconventional monetary and fiscal policies. Giirkaynak et al. (2005) use a high-frequency event-study analysis to asses the effects of US forward guidance on asset prices. They find that statements about the future path of policy has bigger effects

³For a discussion on the ineffectiveness of monetary policy in recessions and the role of deleveraging cycles see Koo (2009) or McCulley and Pozsar (2013)

on asset prices than the FED's actions regarding current fed funds rate target. Similarly, Campbell et al. (2012) examine the possibility of the FED to influence the longer-term interest rates using the communication about the future short-term rates and argue that forward guidance can be effectively used for additional monetary accomodation.

In addition to forward guidance, a large part of the literature focuses on the effects of quantitative easing on financial markets. Using an event-based methodology Krishnamurthy and Vissing-Jorgensen (2011) present evidence on the negative effect of quantitative easing on bond yields, differentiating several channels of influence. That the channels of influence can differ among countries is shown in Christensen and Rudebusch (2012) who conclude that the fall in yields in the US reflects lower expectations of future short-term interest rates while the influence in the United Kingdom is asserted mainly through a reduction of the term premium. Gagnon et al. (2011) also confirm that the FED bond purchases led to "economically meaningful and long-lasting reductions in longer-term interest rates on a range of securities". Joyce et al. (2011) come to the same conclusion that the Bank of England (BOE) asset purchases negatively affected medium to long term bond yields. Using VAR models and an identification through heteroscedasticity and high-frequency event-study analysis on US data Wright (2012) finds that after the initial fall yields tend to return back to higher levels in a few months after the policy implementation.

Next to examining the effects of unconventional measures on financial markets few studies try to make a further step and estimate the influence of such a policies on macroeconomic variables such as inflation and output. Using three different types of VAR models on United Kingdom data Kapetanios et al. (2012) provide evidence that the quantitative easing had a positive influence on real GDP and inflation amounting to 1.5 p.p. and 1.25 p.p., respectively. Using a BVAR methodology and the counterfactual analysis approach on Eurozone data Lenza et al. (2010) find a positive effect of non-standard measures on inflation and production after a delay of several months while initially the effect is negative. Baumeister and Benati (2012) also aim to estimate the further effect of the long-term yield changes on the main macroeconomic variables using US and UK data. They conclude that "compressions in the long-term yield spread exert a powerful effect on both output

growth and inflation”.

In addition to the literature on monetary policies in crisis periods, many studies have been conducted on the effectiveness of a fiscal stimulus (i.e. tax rebates and increased government spending) on various economic outcomes. Shapiro and Slemrod (2003) find that in the US 21.8% of households would mostly use the money of the 2001 tax rebate for spending, while in Shapiro and Slemrod (2009) the percentage was found to be 20% for the rebate in 2008. Misra and Surico (2014) find identical results for the 2008 rebate. Looking at the comparisons between good and bad times DeLong and Summers (2012) argue that at the zero lower bound the effectiveness of expansive fiscal policy increases significantly when compared to non-binding periods. Using a multiple regime framework Arina et al. (2015) provide evidence of larger spending multipliers during periods of low economic activity, however, the magnitude of the effects of fiscal shocks on consumption and investment is shown to be very small. Candelon and Lieb (2013) argue that active spending policies have a stronger impact in recession periods, with multipliers exceeding unity. Auerbach and Gorodnichenko (2012) support the thesis that fiscal policy is “considerably” more effective in recessions than in expansions. That the problem is not so simple and that the results can differ for different countries is shown by Owyang et al. (2013) who find no bigger multipliers during times of slack in the US while for Canada the multipliers prove to be significantly higher during such a periods.

Though many studies exist on the topics of conventional and unconventional monetary and fiscal policies, there is hardly any empirical contribution elaborating monetary-fiscal cooperation and monetary finance or, more specifically, the likely consequences of helicopter money. The reason for this is rather clear: throughout the history, controlled and well managed monetary-fiscal cooperations conducted with the goal of a gradual increase in nominal demand hardly ever happened. Either the monetary financing was a result of unsustainable fiscal expansions leading to the loss of central bank independence and high levels of inflation, or it was prohibited by law in order to help central banks to maintain low inflation goals.⁴ Thus many questions related to this important topic are still unanswered. This is where we want to add to the existing literature. We designed a survey where people were

⁴For a short historical perspective on monetary finance see Saravelos et al. (2016), pages 5-7.

confronted with different versions of money financed fiscal stimuli and answered questions on how they would spend the transfers and how the policies would change their expectations about the economy and future government behavior.

3 Survey methodology and data

We use data from the GESIS panel for our analysis. The GESIS panel is a probability-based mixed mode access panel which provides the social science community an opportunity to collect survey data from a representative sample of the German population aged between 18 and 70 years at the time of recruitment and residing permanently in Germany. In February 2014, when the panel was started it contained about 4900 panelists. The survey takes place bi-monthly consisting of questions that can be answered in about 20 minutes. About 65% of the panelists participate online via web-based surveys and about 35% participate offline by mail. Each survey consists of two major parts. About five minutes of the interviewing time of each survey is reserved for a longitudinal core study which touches on topics developed by the GESIS itself. The rest of the time is reserved for submitted studies from external researchers. We applied for a such a study which successfully underwent a peer-reviewing process so that our questions were fielded in spring 2016. Besides drawing on the answers to the questions that we could place in one of the waves by ourselves, a large set of accompanying information is available mostly from the longitudinal studies conducted by the GESIS. We can draw on those variables which allows us to add a rich set of socio-demographic characteristics of the panelists to our study. Another intriguing feature of the GESIS online panel is that panelists can be randomly divided into up to four sub-sets. We made use of this possibility by constructing four different (policy) treatments on unconventional monetary and fiscal policies with which the panelists were confronted.⁵

⁵In the Online Appendix we show evidence that randomization is actually achieved.

4 Treatments

The treatments were framed to mimic the policy debate on how to actually design and implement helicopter money in practice, see, e.g., Reichlin et al. (2013). A major issue in the policy related debate has been whether the monetary authority should directly inject the money into the economy by giving checks to households or whether it should equip the fiscal authorities who then spend the money. Furthermore, if the role of the central bank would be to finance the fiscal policies of the government should it do so by buying government bonds declaring that it will not undo the money creation, or should the central bank simply transfer newly created money to the government.

The economic effects of the policies could actually differ depending on the public's perception of the role of the monetary and fiscal authorities. Helicopter money that is distributed via the fiscal authorities may result in lower propensities to consume by the households than helicopter money distributed by the central bank. If the fiscal stimulus of the financial authority is financed by the central bank buying government bonds, the public may actually believe that the government will have to increase taxes in the future so that the transfer is not considered as net-wealth by the households. If the monetary authority distributes the money by itself policymakers should actually not be concerned that Ricardian equivalence diminishes the effectiveness of the policy.

The public, however, may still have doubts about the expansionary effect of the central bank policy. Households may conjecture that the central bank uses other (un)conventional policy measures to sterilize the expansionary effect of the helicopter drop. It is also conceivable that the public expects a tighter government budget in the future even as a result of a helicopter drop if such a policy reduces the central bank's surplus that otherwise would have gone to the government, or if the helicopter drop requires a re-capitalization of the central bank by the government.

We tried to shed light on these issues by randomly splitting the panelists into four equally representative groups. Each sub-group was confronted with a different (policy) scenario. In particular the four different treatments read:

T1: Lottery

T2: Money financed fiscal stimulus

T3: Helicopter money one-time payment

T4: Helicopter money multiple payments

In all four treatments households were confronted with a situation in which they would hypothetically receive a certain amount of money (1200 Euro), and had to decide whether they would spend the money, save it, or use it for repaying debts during the next twelve months.⁶

In treatment T1 participants were confronted with a scenario where they won 1200 Euros in a lottery. Since there is no macroeconomic policy involved in this treatment, people should consider this windfall fully as net wealth. Thus it serves us as a baseline treatment for comparisons with our policy treatments. In particular, participants were asked (in German) what they would do in the following situation:

(T1) *“Imagine you just won 1200 Euro in a lottery. Given your current financial situation how much of the 1200 Euro would you spend, save up/invest or use to pay off debt in the next 12 months?”*

With regard to this treatment, as to the other three treatments, respondents had to fill in the amounts, respectively:

“I would spend ___ Euro.”

“I would save up/invest ___ Euro.”

“I would use ___ Euro to pay off debt.”

Treatment T2 is a policy treatment where the government would provide a fiscal stimulus which is financed by the central bank lending the money to the

⁶The chosen amount is a compromise between what has been paid out in the past. It is larger than the typical tax rebates of the US government following the 2001 and 2008 crisis but also significantly lower than the per-capita amount of the QE program of the European Central Bank. With monthly purchases of about 80 billion Euros for two years and a population of 340 million in the Eurozone the ECB will have purchased assets equivalent to about 5600 Euro per citizen.

government. In particular, participants had to decide what they would do with the additional money given the following situation:

(T2) *“During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The government of each Eurozone member state should give money directly to its citizens. The money for this endeavor governments should borrow from the European Central Bank. Imagine such a policy was actually approved and you along with every other citizen in the Eurozone received a onetime payment of 1200 Euro from the government.”*

“Given your current financial situation how much of the 1200 Euro would you spend, save up/invest or use to pay off debt in the next 12 months?”

Helicopter money was distributed in treatment T3. In this scenario households were told that they would receive a transfer directly from the central bank. In particular, participants had to decide what they would do with the additional money given the following situation:

(T3) *“During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The European Central Bank should give money directly to the citizens of the Eurozone. The money for this endeavor should be printed by the European Central Bank. Imagine such a policy was actually approved and you along with every other citizen in the Eurozone received a onetime payment of 1200 Euro from the European Central Bank.”*

“Given your current financial situation how much of the 1200 Euro would you spend, save up/invest or use to pay off debt in the next 12 months?”

Contrary to treatment T2 the role of the central bank is now to distribute the money by itself rather than lending it to the fiscal authority thus financing a fiscal stimulus. By contrasting T3 with T2 we wanted to elaborate if the arguments in

favour of pure helicopter money in relation to the role of Ricardian equivalence have any ground.

Finally, in T4 we presented to the forth sub-group a variant of the helicopter money policy in which citizens would receive a stream of payments over the upcoming 12 months instead of a one time payment as in T3. The motivation for this treatment was twofold. First, looking at the QE practice, policy makers may prefer a gradual increase of money supply to one time payments. Second, one may conjecture that the effectiveness of the policy can be improved by not paying out total transfer at once. This is, at least, what mental accounting theory would suggest, see Thaler (1985; 1990) and Shefrin and Thaler (2004). Slightly altering the scenario, participants had to decide what they would do with the additional money given the following situation:

(T4) *“During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The European Central Bank should give money directly to the citizens of the Eurozone. The money for this endeavor should be printed by the European Central Bank. Imagine such a policy was actually approved and you along with every other citizen in the Eurozone will receive 100 Euro per month from the European Central Bank for the next 12 months.”*

“Given your current financial situation how much of the monthly 100 Euro would you spend, save up/invest or use to pay off debt during the next 12 months?”

Where possible the wording of our questions mimicked earlier studies on intended consumption following government policies. In the Online Appendix we provide for a table summarizing comparable survey approaches and main results that may be compared to our findings with respect to consumption shares.

For all four treatments we filed accompanying questions on what respondents' expected in terms of price changes, development of the economic situation in Germany, government obligations and taxes in the upcoming years, and a question on whether and how households keep track of their expenditures. The exact wording

of these questions is given in the Online Appendix. Again we phrased the questions as in other studies where possible. These accompanying questions will help us to analyze more closely the effects of the respective policies, and test additional consumption theories.

5 Results

5.1 Spending decisions

In Figure 1 we summarize the findings on what the money would be used for in each of the treatments. On average subjects indicated that they would spend 468 Euros of the 1200 Euros of the lottery win (T1), 449 Euros when the treasury transfers money to the households financed by borrowing money from the central bank (T2), 451 Euros when the central bank makes a one-time drop of the helicopter money (T3), and 429 Euros if the helicopter money is distributed in smaller amounts over the upcoming 12 months (T4). In all four treatments, the largest share of the awarded money, more than 500 Euros, would be saved while the rest would be used for repaying debts. As t-tests, see Table 1, indicate there is no statistically significant difference in the marginal propensities to consume, neither when comparing single policies with the lottery win nor among the policy treatments. This is also mostly true for the announced behavior in relation to saving and repaying debt.

What may come as a bit of a surprise is that money given away to our subjects in any of the three policy treatments does not affect consumption behavior differently compared to the lottery treatment. In fact, in any of the three policy treatments subjects knew that every citizen of the Eurozone would receive the transfers from the fiscal authority (T2) or the central bank (T3, T4). Thus, if the programs succeeded in convincing people that the policies are going to turn around the economy, the transfers could have been regarded as not only transitory but having a permanent effect on people's incomes. If so, we should have seen that the marginal propensities to consume in treatments T2 to T4 are larger than in T1 as suggested by the permanent income hypothesis (Friedman, 1957) and the life-cycle hypothesis (Modigliani, 1986). That the policies did not, suggests that

Table 1: Differences in how transfers are allocated to consumption, saving, and debt repayment comparing two treatments

	Obs.	Spending	p-val	Saving	p-val	Repaying	p-val
T1 vs T2	1564	-19 (22.4)	0.404	-3 (23.2)	0.889	0 (21.5)	0.986
T1 vs T3	1569	-17 (22.6)	0.447	25 (23.6)	0.284	-32 (21.1)	0.134
T1 vs T4	1533	-39 (22.5)	0.082	47 (23.7)	0.049	-38 (20.8)	0.067
T2 vs T3	1593	2 (21.9)	0.945	28 (22.9)	0.215	-32 (20.4)	0.116
T2 vs T4	1557	-20 (21.8)	0.349	50 (23.0)	0.030	-38 (20.1)	0.055
T3 vs T4	1562	-22 (22.0)	0.319	22 (23.4)	0.359	-6 (19.6)	0.743

Notes: For each combination of treatments (row) the columns “Spending”, “Saving” and “Repaying” represent differences in the means (in Euro) between two respective treatments (i.e. T2 minus T1 in the first row). Standard errors are given in parentheses. These are followed by the “p-val” columns that represent the p-value of a t-test for a difference in the means. Number of observations is just given for the “Spending” variables of the two treatments compared but is almost the same when we compare the treatments for “Saving” or “Repaying”.

either expectations were not positively affected by the policy treatments or that people are not perfectly forward looking.

Moreover, the largely identical marginal propensities to consume between treatment T2 on the one hand and treatments T3 and T4 on the other hand, cast doubt on the relevance of Ricardian equivalence. Given that policy treatment T2 is financed by the treasury by borrowing money from the central bank rather than the central bank printing the money and distributing it, respondents in T2 should have taken into account future tax increases which should have dampened their spending. But this is not what we can take away from Table 1.

Finally, we do not observe any difference in spending behavior comparing the treatments T3 and T4. According to theories of mental accounting, see Thaler

(1985; 1990) and Shefrin and Thaler (2004), one should have observed larger shares being spent in treatment T4 than in treatment T3. According to the mental accounting framework respondents receiving larger amounts are more likely to activate the so-called mental wealth account, and thus should spend less than the respondents confronted with a series of smaller payments. We will turn to a more elaborate analysis of the consumer behavior with mental accounting later in Section 5.3.

5.2 Expectation formation

An explaining factor of the consumption and saving behavior of the subjects across the various treatments could be that the policies lead to particular expectations on how economic conditions, future government policies, or inflation would change. Thus, choices following an economy wide program may not be that different from what we observe in the case of a windfall received by an individual only. We turn attention to those issues now.

Economic conditions

We asked subjects in each treatment if they expected that the policy would have an effect on the economy. They could choose between the three possible answers that the policy would improve, impair, or not change the economic situation. The shares of subjects choosing either of the three options in any of the three policy treatments are shown in Figure 2.

Irrespective of the policy treatment a bit more than one third of the respondents opted for a worsening of the economic conditions, about one half expressed the opinion that the policies would not have an effect on the economy, and the remaining and smallest share of respondents believed that the policies would actually improve the economic situation. The observation that more than 8 out of ten respondents expect either no change or a worsening of economic conditions complies with our findings that there is no difference in the marginal propensity to consume between the (individual) lottery treatment (T1), and the economy wide policies T2 to T4. It seems that for the subjects the payments were more like a windfall profit than convincing them that incomes would improve permanently

due to a better economic outlook.

In order to statistically compare the policies we ran a multi-nominal logit model for all combinations of treatments, with the three answers as the dependent variable and the treatment dummy as the only regressor. In Table 2, the columns “Worsen”, “No change”, and “Improve” give the differences in percentage points between two treatments, i.e. in T3 the share of people who answered that the policy would worsen the economic conditions is 2.9 percentage points smaller than the share of people in T2 who believe that the economic situation would become worse. The last column shows the p-values of a Wald test which is testing for the joint significance of the treatment dummy for all possible baseline outcomes of the dependent variable.

Table 2: Differences in expectations about economic conditions across policies

	Obs.	Worsen	No change	Improve	Wald test
T2 vs T3	1704	-2.9	3.0	-0.1	0.396
T2 vs T4	1703	0.1	-1.5	1.5	0.682
T3 vs T4	1711	2.8	-4.5	1.7	0.176

Notes: For each combination of treatments (row) the “Worsen”, “No change” and “Improve” columns represent the differences in shares of people choosing that particular answer between two respective treatments (i.e. T3 minus T2 in the first row). Differences are expressed in percentage points. Last column represents the p-value of a Wald test for a significance of treatment variable in respective multi-nominal logit model.

From a statistical point of view the answers do not differ across the treatments T2 to T4. Policies seem to have similar effects and they are all not able to induce a great deal of optimism. That there are no differences in terms of expected economic changes between the policies speaks again for an interpretation that the subjects do not distinguish between a helicopter type financed transfer, and one where the fiscal authorities run a debt-financed policy.

Expectations on taxes and future government obligations

We now turn to the analysis of the economic policies on peoples’ expectations in relation to the future government behaviour. We are interested in whether the

policies make respondents expect future tax increases, or equivalently make them believe that future government obligations will be larger if any of the transfer programs was implemented. Figure 3 summarizes the findings, again using bar charts that give the shares of the three possible answers comparing the policies T2 to T4. In the left panel (a) expected changes with respect to taxes are given, and in the right panel (b) expected changes in relation to future government obligations are reported.

Considering the policy influence on tax expectations, for all policies a negligible share of people answered that taxes would actually fall. 24% of the respondents believed that fiscal transfers would not change future taxes (T2), while 30% and 28.9% believed that taxes would not change in treatments T3 and T4, respectively. An increase of future taxes was expected by 74% of the respondents following a debt financed fiscal policy, but only 67% or 68% of the respondents expected an increase in future taxes after a helicopter drop of money by the central bank. Again, we ran a multi-nominal logit model to check for the statistical significance of these results, see Table 3. The p-values of the Wald tests (0.022 and 0.058) suggest that the differences between T2 and T3, and T2 and T4 are statistically significant. This may be interpreted as evidence that the respondents have some understanding of the differences between these two policies regarding the government's inter-temporal budget constraint. This interpretation is supported by an insignificance t-statistic when T3 is compared with T4.

Turning to the policy effect on government obligations, as before, the share of people believing that government obligations would decrease is negligible, see panel (b) of the Figure 3. Again the largest fractions can be observed for those who believe that there will be an increase in government obligations irrespective of what policy treatment we look into. Actually, about 70% of the respondents would expect an increase of outlays of the government in the years following a T2 policy. A significantly smaller fraction of the subjects chose this option when the transfers were distributed by the central bank (59% in T3 and 62% in T4). Looking at the Wald tests in part (b) of Table 3, it can be seen that these differences are statistically significant (p-values 0.000 and 0.006), again.

Overall it seems that households expect that any transfer policy aiming to strengthen aggregate demand would have an effect on future governments' actions,

Table 3: Differences in policy effects on expectations about taxes and government obligations

	Obs.	Decrease	No change	Increase	Wald
T2 vs T3	1703	0.5	5.7	-6.1	0.022
T2 vs T4	1699	0.7	4.5	-5.2	0.058
T3 vs T4	1706	0.2	-1.2	0.9	0.842

a) Taxes

	Obs.	Decrease	No change	Increase	Wald
T2 vs T3	1701	1.0	9.7	-10.6	0.000
T2 vs T4	1698	1.0	6.4	-7.4	0.006
T3 vs T4	1707	0.0	-3.2	3.1	0.372

b) Government obligations

Notes: In Panel (a) for each combination of treatments (row) the “Decrease”, “No change” and “Increase” columns represent the differences in shares of people choosing that particular answer between the two respective treatments (i.e. T3 minus T2 in the first row). Differences are expressed in percentage points. The last column gives the p-value of a Wald test on the significance of the treatment variable in the multi-nominal logit model. Panel (b) is constructed similarly for the expectations on government obligations.

mostly in the direction of increasing government obligations and future taxes. While there are statistically significant differences regarding expectations on future taxes and government spending when comparing the different policies, those seem to be rather small, often less than 10 percentage points. This finding thus complies with more or less equally large marginal propensities to consume across all the policy treatments that we elicited earlier on.

Inflation expectations

A major goal of central banks around the world following unconventional monetary policies has been to ultimately increase inflation expectations. To this end, it might be interesting to evaluate how the policy treatments of our survey changed inflation expectations of the subjects. In all treatments (T1 to T4) subjects were asked about their inflation expectations. Given that survey participants were confronted with unconventional monetary and fiscal policies in treatments T2, T3

and T4, they were explicitly reminded to take into account those policies in the expectation formation. Figure 4 shows answers on what inflation rates our subjects expected.

On average, we get inflation expectations of 2.8%, 2.3%, 2.6% and 3.8% for treatments T1 to T4, respectively. Given the rather large variation in answers, the differences in the means between T1 and the policy treatments (T2 to T4) turn out to not being statistically different at the 5% significance level, see Table 4. Looking more closely into the standard deviation of the answers as a measure of the spread we see that the policy treatments significantly increase the variation of answers, with the helicopter money treatments inducing greater uncertainty than debt financed policy. The p-values of a test for a difference in standard deviations prove to be always smaller than 0.001 providing evidence that the differences in uncertainty are statistically significant across the policies.

Table 4: Differences in inflation expectations and t-tests

	Obs.	Mean	p-val	St. dev. ratio	p-val
T1 vs T2	1620	-0.4 (0.33)	0.198	1.13	0.001
T1 vs T3	1618	-0.2 (0.37)	0.662	1.35	0.000
T1 vs T4	1628	1.0 (0.54)	0.065	2.24	0.000
T2 vs T3	1604	0.3 (0.39)	0.495	1.19	0.000
T2 vs T4	1614	1.4 (0.56)	0.010	1.99	0.000
T3 vs T4	1612	1.2 (0.58)	0.045	1.66	0.000

Notes: For each combination of treatments (row) the “Mean” column shows the difference in the mean expected inflation between the two respective treatments. Standard errors are given in parentheses. The difference is expressed in percentage points. The “St. dev. ratio” column gives the ratio of standard deviations of inflation expectations for the two respective treatments, e.g. σ_{T2}/σ_{T1} in the first row. These two columns are each followed by a column on p-values (“p-val”) that reports the result of a test on statistical difference of the means or standard deviations, respectively.

The finding that the policies are not able to boost inflation expectations might come as a surprise as we would expect new money creation to significantly increase inflation expectations, especially in treatments T3 and T4. Combining this finding with the one on the significant increase in the standard deviation of inflation expectations leads to the conclusion that policies financed by a central bank printing money might not be that effective. We now turn to a deeper analysis of participants' answers on inflation expectations to shed more light on the potential causes of this result.

Heterogeneity of policy effects on inflation expectations

There is a small but growing literature that tries to explain the origins and heterogeneity of inflation expectations with microdata. Bryan and Venkatu (2001) report on gender-differences in inflation expectations but other socio-demographic characteristics have been analyzed as well. Malmendier and Nagel (2016) show that inflation expectations stem from a learning process that differs across age groups. We can contribute to this literature by using the policy treatments as a source of exogenous variation in order to evaluate if the implied changes in inflation expectations differ across socio-demographic groups.

As in T1 (lottery) there is no economic policy involved we take it to be our baseline treatment for comparisons. In order to see if the treatment effect differs across different socio-demographic groups we ran for each policy treatment (T2, T3 and T4) the following regression:

$$inflation_exp_i = \alpha_1 + \alpha_2 treat_i + \beta X'_i + \gamma[treat_i \# X'_i] + \epsilon_i \quad (1)$$

in which the dependent variable is the inflation expectation of a respondent i , $treat_i$ is an indicator for the treatment dummy being 0 for T1 and 1 for the policy treatment, β is a row vector of coefficients on socio-demographic variables, X'_i is a column vector of socio-demographic variables for individual i , γ is a row vector of coefficients on the interaction terms, $[treat_i \# X'_i]$ is a column vector of interactions of the socio-demographic variables with the treatment dummy. The parameters of most interest to us are the coefficients on the interaction terms γ_j . A significant coefficient γ_j implies heterogeneity of the treatment effect for a

given socio-demographic variable when controlling for all other factors in X . In our specification X consists of a rich set of socio-demographic variables including income, household size, marital status, gender, an indicator variable for three age groups $\text{young} < 40 \leq \text{middle} \leq 60 < \text{older}$, an indicator for being born in Germany, distance to the next city, an indicator for living in West Germany, house ownership, a variable for the change in the financial situation of the respondent, trust in the German government, and an indicator variable on whether the person is interested in economic issues. In Table 5 we report results for age, gender, and for the one additional variable for which the interaction term was statistically significant in all three models. Coefficients on other (insignificant) variables are not reported.

Table 5: Heterogeneity of treatment effects on inflation expectations

	T1 vs T2	T1 vs T3	T1 vs T4	T1 vs Pooled
Male#treatment	0.39 (0.73)	0.34 (0.91)	-0.82 (1.23)	-0.19 (0.81)
Age_3g#treatment				
middle_age#1	-3.72*** (0.90)	-0.54 (1.11)	-5.11*** (1.54)	-2.90*** (1.12)
older#1	-3.44*** (1.10)	-0.57 (1.33)	-4.88*** (1.87)	-2.70** (1.36)
Non_economist#treat.	-1.58* (0.83)	-2.29** (1.04)	-2.52* (1.45)	-2.11** (1.06)
Obs.	1261	1243	1267	2545

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The four columns show the γ coefficients of Equation 1 for four separate regressions where the treatments are T2, T3, T4, and one where answers for treatments T2 to T4 were pooled. Insignificant coefficients for all additionally included socio-demographic variables are not reported. Standard errors are given in parentheses.

In contrast to Bryan and Venkatu (2001) our results suggest that gender is not correlated with the formation of inflation expectations. Regarding age, we find that the treatment effect differs across age groups. If we pool the answers to all policy treatments, inflation expectations of the middle aged and older respondents are about three percentage points lower when compared to the youngest age group.

The last variable that proved to be significant in examining the heterogeneity of treatment effects on inflation expectations is the dummy on participants' interest in economic topics. The dummy is coded 0 for respondents who claim to have a medium and high interest in economic issues, and coded 1 of those who answered to have a small interest in economic issues. The treatment effect for the not economically interested respondents proved to be two percentage points smaller. The result suggests that agents' interest in economic issues is of crucial importance for the efficacy of these kind of policies in relation to altering inflation expectations. Since we have seen that, on average, there was hardly any effect of the policies on mean expected inflation rate, we conclude that the positive effects of the policies on the inflation expectation of the economically more interested respondents would largely be offset by the negative effects on the inflation expectations of the less economically interested people.

5.3 More on individual spending choices

Yet another way to analyze our data is to look into the spending choices of our households for each of the treatments as a function of the various variables related to their expectations, socio-demographic characteristics, and variables which indicate whether households use budgeting rules. With budgeting rules we mean whether households follow in the consumption and saving behavior a self-imposed target that a certain amount of the household income should only be consumed or has to be saved.

Research drawing on microdata in order to elicit the relationship between inflation expectations, in particular, and consumption decisions has been active in recent years (see, e.g. Burke and Ozdagli, 2013; Bachmann et al., 2015; Ichiue and Nishiguchi, 2015; Crump et al., 2015). Microdata as we use it could be helpful to shed light on this relationship because it looks at the actual decision maker (rather than aggregates). In addition to people's inflation expectations we are able to look into the role of the respondents' expectations regarding the development of the economy and future government behavior for their spending decisions. Finally, we will provide evidence on whether the decisions on how the use of the transfers can be explained by the mental accounting theory on consumption behavior.

We assembled the results related to those questions in Tables 6, 7, 8, and 9. In Models (1) to (8) of Table 6 we regress the amount of the lottery win consumed on a varying set of variables. In the Tobit models shown in Table 7 we jointly include all of the control variables, and we estimate this model also for dependent variables being the amounts saved and used for repaying debts, respectively. Then, Table 8 and Table 9 summarize the regression results for the full model for treatments T2 to T4 for all three spending choices, i.e. consumption, saving, and repaying debt. Compared to the models for T1 we include two more variables that take account of the respondents' expectations on the policy effects on future government behaviour. We turn to the discussion of the findings now.

Inflation expectations

We analyze for each of the treatments in how far inflation expectations are important for the decisions to actually spend the additional resources on consumption. Theory predicts (see, e.g., Eggertsson et al., 2003; Krugman, 1998; Romer, 2011) that higher inflation expectations should induce households to increase consumption at the zero lower bound, a macroeconomic situation that was given at the time of the survey. At zero nominal interest rates higher inflation expectations should bring down real borrowing costs spurring consumption on durables, in particular.

In all of our specifications for treatment T1 individual inflation expectations are not correlated with the spending decision as theory would predict. This is also true for treatments T2 to T4. By and large parameter estimates are not statistically significantly different from zero, indicating that households who expect prices to increase more do not spend differently from those who expect prices to increase less.

How do our results contrast to the small but growing literature on this topic? Actually, similar analyses based on other microdata have come up with rather inconclusive results. For Japan, Ichiue and Nishiguchi (2015) find that households that expect higher inflation plan to decrease future consumption. Using data from the Michigan Survey of Consumers and the New York Fed Survey on Consumer Expectations, Bachmann et al. (2015) finds small and often statistically insignificant effects of inflation expectations on the intentions to purchase durables

outside of the zero-lower-bound, and a negative association for the times where the economy hit the zero lower bound. Similarly, Burke and Ozdagli (2013) find only weak evidence for the relationship between the two variables, whereas Crump et al. (2015) report a large positive association for a similar data set. Recurring to an announced value added tax increase in Germany, D’Acunto et al. (2016) argue using consumer survey data from the GfK (Gesellschaft für Konsumforschung) that it first raised inflation expectations and, subsequently, intended purchases of durables.

Our estimates rather suggest that inflation expectations do not drive households’ spending choice. While one could argue that the individual non-response in terms of spending the money may be due to the uncertainty about future inflation rates that we found earlier on, the fact that there is also no response for the T1 treatment where we do not have this potential uneasiness with the policies speaks against such an interpretation.

Expectations on economic development

Regarding expected economic conditions we observe in treatment T1 that those respondents who expect a worsening tend to consume less of the additional income. This result, however, proves to be insignificant when the full set of regressors is included. The formulation of this question for policy treatments T2, T3 and T4 is slightly different. The question about future economic conditions for treatments T2 to T4 was phrased to ask for the influence of the policy on the economic conditions, and not for the economic conditions itself as in treatment T1. Thus, the answers have to be interpreted as the households’ spending decisions as a consequence of their evaluation of the policies’ success. Again, results rather suggest no strong correlation.

Table 6: Tobit regressions for treatment T1 - smaller models

	Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
income	17.1* (9.1)	16.0 (10.5)	15.2* (9.1)	17.3* (9.5)	16.5* (9.5)	15.4* (9.1)	12.6 (9.6)	21.0** (9.0)
econ. cond. worsen	-164.8** (79.9)	-164.3** (81.7)	-165.3** (79.8)	-148.8* (82.0)	-161.7** (81.5)	-103.4 (81.4)	-148.4* (81.5)	-154.9** (78.7)
improve	-138.1 (130.4)	-139.8 (133.6)	-139.7 (130.3)	-116.9 (135.6)	-116.1 (132.5)	-133.8 (129.7)	-113.3 (132.2)	-164.4 (128.2)
inflation	1.6 (7.1)	2.7 (7.4)	2.0 (7.1)	1.6 (7.2)	-1.9 (8.0)	1.9 (7.0)	1.8 (7.4)	0.8 (7.0)
chg. finance. sit. worsen	-151.8 (101.0)	-161.3 (104.8)	-145.2 (100.9)	-134.0 (104.8)	-159.1 (102.6)	-139.2 (101.4)	-140.9 (102.3)	-102.8 (100.5)
improve	-28.7 (82.3)	-23.7 (85.3)	-25.0 (82.0)	-1.5 (84.6)	-27.0 (84.0)	-19.7 (82.1)	-12.9 (84.2)	17.6 (81.6)
hh. size		-24.5 (38.9)						
age		-21.6 (20.0)						
age ²		0.2 (0.20)						
gender		65.1 (82.3)						
married		58.4 (93.5)						
born in Germ. EU			-240.6 (159.4)					
non EU			-443.1 (284.1)					
distance to city				-43.8* (24.0)				
west				-105.5 (96.7)				
house own					-60.4 (76.2)			
trust in Ger gov.						50.0* (26.2)		
interest in econ.							19.1 (45.0)	
budgeting spend target								-148.3* (87.8)
save target								-261.2** (106.0)
repay target								-552.5*** (147.7)
const	391.4*** (101.7)	877.1* (448.7)	424.8*** (102.8)	601.6*** (158.5)	444.7*** (109.4)	163.1 (146.3)	362.2** (155.8)	502.7*** (113.8)
σ	869.6*** (40.8)	878.2*** (41.8)	866.5*** (40.6)	873.9*** (42.0)	871.4*** (41.5)	853.1*** (40.4)	869.3*** (41.4)	851.2*** (39.8)
Obs.	657	646	657	630	635	632	634	654
Pseudo R ²	0.0019	0.0024	0.0027	0.0024	0.0020	0.0024	0.0015	0.0049

Standard errors in parentheses, * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; endogenous variable is money spent in treatment T1;

Table 7: Tobit regressions for treatment T1 - full models

	Spending	Saving	Repaying
income	12.6 (11.5)	-24.1* (12.5)	5.6 (25.2)
econ. cond. worsen	-104.9 (86.8)	114.0 (94.7)	1.6 (195.7)
improve	-135.5 (138.9)	-112.4 (155.1)	524.6* (298.8)
inflation	0.3 (9.0)	5.5 (9.6)	-16.6 (19.8)
chg. finance. sit. worsen	-77.4 (112.1)	-82.2 (120.5)	412.4* (236.1)
improve	62.7 (89.4)	-126.3 (97.8)	148.1 (199.7)
hh. size	-26.3 (41.1)	-9.5 (46.1)	64.7 (87.9)
age	-16.0 (20.6)	-11.9 (22.8)	72.7 (47.7)
age ²	0.1 (0.21)	0.1 (0.23)	-0.7 (0.49)
gender	76.9 (90.2)	-102.0 (98.3)	292.4 (200.1)
married	123.4 (101.3)	-124.2 (111.7)	-43.1 (227.9)
born in Germ. EU	-306.0* (184.5)	115.6 (191.5)	483.8 (392.7)
non EU	-248.7 (334.1)	306.6 (328.3)	-49.3 (609.9)
distance to city	-38.2 (25.6)	1.7 (28.1)	48.4 (57.9)
west	-66.4 (99.8)	-20.4 (107.8)	230.7 (228.2)
house own	-19.3 (92.6)	40.8 (100.8)	-49.6 (201.9)
trust in Ger gov.	35.7 (28.3)	20.4 (31.2)	-146.8** (63.8)
interest in econ.	-7.7 (49.4)	45.9 (53.7)	-165.1 (110.5)
budgeting spend target	-157.8* (95.2)	29.5 (105.0)	427.0** (217.1)
save target	-298.3*** (114.1)	491.0*** (124.8)	-479.2* (284.6)
repay target	-557.2*** (161.0)	-441.9** (180.7)	1723.7*** (330.2)
const	991.5* (514.0)	613.7 (565.6)	-2.4e+03** (1168)
σ	850.1*** (42.8)	920.0*** (48.4)	1542.5*** (133.3)
Obs.	566	570	555
Pseudo R ²	0.0068	0.0115	0.0340

Standard errors in parentheses, * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; endogenous variable is money spent, saved, or used for repaying debts, respectively, in treatment T1.

Table 8: Tobit regression for treatments T2, T3 and T4 – spending

	Spending			
	T2	T3	T4	Pooled
income	0.7 (9.35)	-22.0** (11)	-22.0** (11.1)	-13.5** (5.96)
econ. cond.				
worsen	-109.8 (76.4)	54.6 (87.5)	-77.5 (87.8)	-53.9 (48.2)
improve	151.3* (89.1)	160.2 (103)	92.7 (97.7)	131.1** (55.2)
gov. oblig. incr.	-195.8*** (74.3)	-70.7 (85.8)	-23.5 (87.7)	-80.0* (46.8)
tax increase	-25.8 (78.3)	-45.7 (86.8)	-101.5 (88.6)	-58.2 (48.4)
inflation	6.7 (4.91)	-0.2 (5.19)	-3.1 (3.75)	-0.1 (2.53)
budgeting				
spend target	52.6 (76.9)	77.4 (91.7)	-16.4 (90.5)	37.0 (49.5)
save target	-80.2 (95.7)	-28.6 (104)	-234.9** (108)	-116.4** (58.6)
repay target	-245.7** (117)	-17.8 (159)	-422.0*** (153)	-262.0*** (80.7)
chg. financ. sit.				
worsen	-55.2 (92.4)	-195.7* (108)	-214.6** (108)	-153.9*** (59)
improve	124.0* (72.9)	-30.1 (81.5)	96.9 (82.7)	69.0 (45.4)
hh. size	14.1 (35.5)	-17.6 (39.5)	-14.2 (38.4)	-6.4 (21.6)
age	-14.9 (16.7)	-6.3 (19.2)	-7.5 (20)	-13.6 (10.6)
age ²	0.2 (0.17)	0.0 (0.2)	0.0 (0.203)	0.1 (0.109)
gender	78.8 (72.9)	154.5* (83.4)	224.5*** (83.6)	153.3*** (45.7)
married	-158.0* (81.9)	-41.1 (98.1)	-48.0 (96.2)	-69.3 (52.3)
born in Germ.				
EU	-36.9 (137)	-22.2 (139)	0.1 (145)	-17.4 (79.9)
non EU	-165.5 (239)	-144.1 (322)	-2.8 (247)	-64.1 (151)
distance to city	5.4 (20.8)	-0.0 (23.7)	-0.1 (23.4)	-0.7 (13)
west	15.1 (78.6)	202.0** (96.6)	-52.5 (94.8)	34.7 (51.4)
house own.	-103.3 (73.2)	-51.8 (87)	44.3 (82.4)	-38.6 (46.1)
trust in Ger gov.	6.0 (22.2)	-7.3 (25.2)	-15.3 (26.6)	-3.7 (14)
interest in econ.	12.1 (42.5)	75.5* (42.7)	39.6 (47.2)	40.3 (25.3)
const	628.8 (414)	440.7 (457)	765.9 (519)	717.9*** (264)
σ	718.9*** (32.5)	800.6*** (38.5)	800.3*** (39.8)	780.0*** (21.4)
Obs.	610	596	593	1799
Pseudo R^2	0.01	0.006	0.009	0.006

Standard errors in parentheses, * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; endogenous variable is money spent in treatments T2, T3, and T4; for the regression of the last column respondents' answers for treatments T2, T3, and T4 are pooled

Table 9: Tobit regression for treatments T2, T3 and T4 – saving and repaying debt

	Saving			Repaying		
	T2	T3	T4	T2	T3	T4
income	-6.5 (10.1)	14.3 (11.5)	5.6 (11.4)	-11.0 (19.3)	6.6 (23.2)	19.9 (17.2)
econ. cond. worsen	46.8 (81.4)	-132.2 (93)	51.4 (91)	126.6 (150)	244.6 (184)	100.8 (134)
improve	-11.5 (97.2)	-141.1 (110)	-84.6 (102)	-262.9 (190)	-12.9 (224)	14.3 (155)
gov. oblig. incr.	140.2* (80.4)	14.8 (91.5)	-26.9 (91.1)	217.9 (154)	146.7 (184)	128.6 (137)
tax increase	56.9 (85.5)	117.9 (92.9)	113.8 (92)	-30.8 (162)	-293.3 (187)	-149.8 (138)
inflation	-1.0 (5.76)	4.0 (5.61)	-0.8 (3.92)	-4.1 (10.8)	-5.6 (9.67)	6.8 (5.74)
budgeting spend target	-91.4 (82.4)	12.7 (97.1)	-32.1 (95.1)	278.4* (161)	-253.8 (190)	236.1 (146)
save target	118.3 (101)	224.7** (109)	326.7*** (112)	5.3 (203)	-605.9*** (231)	-52.9 (172)
repay target	-531.1*** (127)	-750.3*** (182)	-403.5** (156)	1406.7*** (226)	959.6*** (294)	1274.2*** (219)
chg. financ. sit. worsen	-240.1** (99.4)	-192.8* (113)	-149.7 (110)	478.2*** (179)	894.7*** (221)	668.7*** (159)
improve	-177.4** (78.1)	-74.7 (86.7)	-81.0 (85.8)	129.7 (149)	248.8 (175)	58.4 (130)
hh. size	10.6 (37.9)	31.2 (42.3)	2.3 (40)	-24.1 (69.5)	5.7 (81.7)	15.1 (58.6)
age	-15.5 (17.9)	-21.9 (20.2)	-20.8 (20.7)	90.0** (36.4)	99.7** (43.5)	49.3 (31.7)
age ²	0.1 (0.18)	0.2 (0.21)	0.2 (0.21)	-1.0*** (0.37)	-1.0** (0.45)	-0.6* (0.33)
gender	-158.9** (77.7)	-177.0** (88.2)	-232.0*** (86.9)	228.5 (151)	65.6 (182)	77.2 (128)
married	-53.2 (86.7)	-64.3 (105)	97.2 (100)	414.2** (168)	208.7 (207)	-22.8 (147)
born in Germ. EU	24.5 (143)	-177.7 (153)	142.9 (153)	133.0 (262)	510.1* (287)	-322.9 (248)
non EU	228.5 (268)	337.3 (338)	133.9 (266)	80.1 (469)	-136.9 (653)	-365.4 (437)
distance to city	-1.6 (22.2)	-6.4 (25.3)	-34.9 (24.3)	-11.0 (42.3)	15.8 (50.3)	33.8 (35.7)
west	9.5 (84.3)	121.2 (102)	111.1 (98.6)	-1.4 (160)	-69.9 (205)	-156.8 (145)
house own.	-46.4 (77.7)	13.4 (92.5)	-45.7 (85.7)	169.0 (148)	105.4 (185)	72.6 (127)
trust in Ger gov.	18.6 (23.8)	30.4 (26.6)	53.4* (27.8)	-43.8 (44.7)	-64.7 (52.3)	-44.9 (41.7)
interest in econ.	41.1 (45.2)	-84.5* (46.1)	-53.1 (49)	-121.0 (85.6)	-20.3 (90.2)	15.4 (72.8)
const	778.7* (447)	1073.5** (485)	917.5* (540)	-2.4e+03*** (910)	-2.9e+03*** (1035)	-1.8e+03*** (821)
σ	768.6*** (35.5)	847.4*** (41.8)	836.8*** (41.3)	1214.7*** (91)	1401.2*** (116)	1047.5*** (77.6)
Obs.	611	597	591	605	594	593
Pseudo R^2	0.010	0.013	0.011	0.043	0.031	0.036

Standard errors in parentheses, * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; endogenous variables are money saved or used for repaying debts in treatments T2, T3, and T4;

Ricardian equivalence

According to Ricardian equivalence, see, e.g., Barro (1974) or for a review Seater (1993), forward looking consumers internalize the government's budget constraint. As a consequence debt financed policies should not be able to stimulate demand as households are expecting higher taxes in the future to finance increased future government obligations. Rather than using the additional current income for consumption it would be saved to pay the future bill.

Our data gives us the possibility to evaluate at the household level whether individuals actually foresee that the transfers will have to be paid back by the government eventually, and whether households act accordingly. In the previous section we already elaborated on whether the households expected that government obligations or taxes will change as a consequence of the policies with which the subjects were confronted. There, we showed that T2 and T3 policies are similar with around 70% of the people in T2 and 60% of people in T3 expecting a fiscal tightening in the future. Thus, people seemed to differentiate between these two policies and to some extent internalize the government budget constraint. However, if Ricardian equivalence holds, one should also be able to observe a correlation between these expectations and the individual spending behaviour. Households who expect higher future taxes as a consequence of the policy should consume less.

In the Tobit regressions shown in Table (8) we used the individual answers on expected government behavior and correlated them with the spending decisions of the households controlling for a large set of variables. The Ricardian equivalence proves to be weak. Looking into the spending regressions there is some evidence that people who expect future government obligations to increase consume less in T2, while coefficients are insignificant in T3 and T4. Expected tax increases have no effect on consumption behavior in any policy treatment.

It is often hypothesized that Ricardian equivalence performs so poorly empirically because one of the major assumptions, i.e. a perfect capital market on which households can borrow against future incomes is hard to be upheld (see, e.g., Heller and Starr, 1979; Hubbard et al., 1986). The inclusion of the variable on the households' recent change in the financial situation and its indication that

those households who have been experiencing a deterioration of their situation would be using the additional income for repaying debts, may actually be interpreted as an indication that some households are credit constrained. Given that we control for being credit constrained with that variable we should have paved the way for Ricardian equivalence to show up. But it hardly did. Thus, overall Ricardian equivalence does not help us a great deal in explaining the variation in the responses of the surveyed households. That Ricardian equivalence is not strongly supported by our data together with the previous finding that inflation expectations and expectations about future economic conditions are hardly correlated with the marginal propensity to consume paints a consistent picture that agents might be imperfectly forward looking. Perhaps, behavioral consumption theories are a better way to explain the survey participants' answers. We turn to such a model now.

Mental accounting

In a set of very influential papers Thaler (1985; 1990) and Shefrin and Thaler (2004) argue that so called mental accounts are important for properly understanding consumer choices. The central idea of the mental accounting framework is that people use different accounts in their minds, e.g. current income or assets accounts, for the same resource (money) and that the account to which it is booked may depend on the size of the windfall. Consequently, marginal propensities to consume out of an additional income differ according to which account the individual booked it, which itself is a function of the size of the amount. In particular, as small gains relative to income would be coded as current income more of it would be spent, whereas larger transfers would enter the assets account out of which the marginal propensity to consume would be lower.

It proved inherently difficult to design questions that properly address mental accounting and its implications for the spending behavior. Probably, not much could have been learned from asking the panelists if they have mental accounts and if so, into which they would put the transfer. Rather, we recurred to questions already proposed in an earlier study on tax rebates by Shapiro and Slemrod (2003). As in their questionnaire we asked whether the household is following a

budgetary rule, and if so, whether it is following a spending, saving, or debt repayment target. The exact phrasing of the questions is documented in the Online Appendix. Besides asking question trying to crystallize mental accounts we varied the helicopter treatment, as explained earlier on, such that in T4 lower monthly amounts are paid that, however, in total equal the one-time payment in T3.

We confront our data with the idea of mental accounting in two ways. First of all, what we should observe is that those individuals who self-report to apply budgeting rules, our proxy for mental accounts, should actually behave differently in terms of spending than those without mental accounts. A second possibility to tease out a mental accounting interpretation from the spending behavior is to compare the marginal propensities to consume between treatments T3 and T4. As subjects were randomly allocated to the two groups they do not differ in terms of their socio-demographic characteristics including incomes. As theory suggests that mental wealth accounts are more likely to be activated with higher transfers and current income accounts with lower transfers (c.f. Shefrin and Thaler, 2004, p. 404), we should observe that the respondents who claim to follow some budgetary rule spent larger amounts in treatment T4 if compared to subjects in T3 where transfers were higher.

Regarding the first proposition, there is evidence that those with mental accounts spend the transfers differently than those who do not. Almost throughout all of our regressions the indicator variables on budgeting turn out to be significantly different from zero. But do the signs on the indicator variables of having a spending, saving, or repaying debt account comply to a mental accounting interpretation? Following the interpretation by Shapiro and Slemrod (2003, p. 383) for mental accounting to hold, we should observe that respondents with a spending target are more likely to save the additional income while those with saving or debt repayment targets rather spend it (and therefore have a higher marginal propensity to consume). The data however does not comply with that prediction. Households who report to have a saving budget save a significantly larger amount of the transfer, and those who report to follow a repaying debt budget use a significantly larger amount of the transfer to ease their debt burden instead of spending it. While these results contradict what one would have predicted from a mental accounting framework, they actually comply with the findings in Shapiro and

Slemrod (2003) who asked the same questions. An interpretation of our results could be that households have self-imposed saving or repaying debt targets that at the time of the survey have not yet been reached, and the additional income thus would be used to achieve either of the aims earlier than otherwise.

There is also no support for the second proposition of the mental accounting framework coming from our survey data. In Table 10 we report the results of a difference-in-difference (DiD) analysis where we take advantage of the random allocation of respondents to treatments T3 and T4 and compare the amounts spent out of the transfer for those who report to use budgetary rules and those who report to not use budgetary rules. As noted before, what we should observe is that those respondents who use budgetary rules (or have mental accounts) should spend more in treatment T4 than in treatment T3 as the smaller transfer in T4 should more likely activate the mental account related to consumption. Our respondents, however, would spend less in T4 on average when compared to T3. Comparing the difference to the control group of respondents without a mental account gives us a statistically not significant difference of 56 Euros. Replicating the DiD for those subjects who report to use spending, saving, or debt repaying targets reveals statistically not significant differences in behavior, either.

Controls

Finally, looking into the controls that were included in the previous analyses, we find that individual characteristics such as age, marital status, and household size hardly play any role for the spending choices. There is also no clear pattern to be observed with respect to a potential effect of the regional controls, wealth, or citizenship. Similarly, the influence of income on the marginal propensity to consume out of the transfer is ambiguous and depends on the source of the transfer. One variable that becomes important in explaining the spending behaviour in policy treatments T2, T3 and T4 proves to be gender, in a way that male respondents tend to spend about 150 Euro more - a result which is statistically significant in the pooled model at a 1% level.

Table 10: Difference-in-differences (DiD) analysis of mental accounting theory

	T3 mean	T4 mean	Difference (T4-T3)	p-val	DiD	p-val	Obs.
No mental account	473	491	18 (46.6)	0.703			
Mental account	445	407	-38 (25.0)	0.125	-56 (51.1)	0.271	1551
- Spending target	476	459	-17 (33.6)	0.602	-35 (56.7)	0.535	1072
- Saving target	421	367	-54 (42.3)	0.204	-71 (63.4)	0.259	741
- Debt repaying target	337	248	-89 (73.9)	0.229	-107 (92.0)	0.246	514

Notes: The first two cells in the first row show the means in spending (in Euros) of those respondents who do not use budgetary rules for treatments T3 and T4, respectively (“No mental account”). How much those respondents who use budgetary rules would spent is reported in the following rows. The “DiD” column reports the differences in the means between the two treatments T3 and T4 when we compare the answers of the respondents who use a budgetary rule with those who do not. The p-values stem from a t-test on the means of the differences. Standard errors are given in parentheses.

6 Conclusions

In the aftermath of the financial crisis a set of unconventional monetary policies have been implemented by major central banks around the world. As they have resulted in partly disappointing outcomes, in particular with respect to steering inflation expectations back to the levels envisaged by central banks, calls have been made to extent the toolbox to distributing helicopter money. Due to a lack of historical precedences little to nothing is known about the likely consequences of a policy where the monetary authorities print money and give it to the people. Our survey among a representative sample of the German population which allowed us to randomly assign subjects to various policy treatments yielded some interesting insights.

Our results support the theoretical assertions that helicopter money could be

used to increase nominal demand as 38% of a transfer would be used for spending (451 Euro). The 19% of a transfer (223 Euro) that would go into debt repayments could also provide additional positive effects on a macro level by improving the financial position of the households. While not extremely big, amounts are non-trivial and similar to results of tax rebates research.

Some important conclusions can be drawn from the finding that economy wide transfers via the policies lead to the same spending decisions if compared to individual lottery wins. First, households seem not be very concerned that the government will take the money back as Ricardian equivalence would suggest. Second, the unconventional monetary policies with which our subjects were confronted are not able to induce an increase in expected permanent income. It seems that their influence on economic conditions is rather negatively perceived so that spending amounts in T1 and policy treatments do not differ. Third, the fact that there was no difference in spending behavior between the money financed fiscal policy and the helicopter money questions whether people are actually able to differentiate between these two policies in terms of the sources of how they are financed. While one has certainly to be cautious when interpreting this result, it at least casts some doubt on whether Ricardian equivalence can be used to argue for helicopter money as the more effective policy instrument. Overall, we find these result plausible as there is no consensus on the eventual effects of these policies even among economists.

Another finding is that the policies are on average not capable of increasing inflation expectations. This result is mainly driven by a negative effect of the policies on middle aged and older people, and also on people with weak interest in economic issues. One should perhaps not go as far as to argue that these policies are completely incapable of increasing inflation expectations, but rather acknowledge that their influence is very much dependent on how they would be communicated. There is also evidence that the policies inject a great deal of uncertainty into the economy as the variance of inflation expectations increases with the policy treatments. Our findings on the policies' strong influence on inflation uncertainty and the importance of agents' interest in economic issues for the effectiveness in steering inflation expectations should help policymakers in designing the optimal policy and avoiding potential pitfalls.

In terms of correlates for individual consumption decisions we can confirm some earlier results. In particular, households' inflation expectations do not coincide with consumer behavior suggesting that no inter-temporal choices are taking place. Moreover, we tested for alternative explanations of consumption behavior addressing implications from mental accounting theories. However, our data does not lend support to those theories.

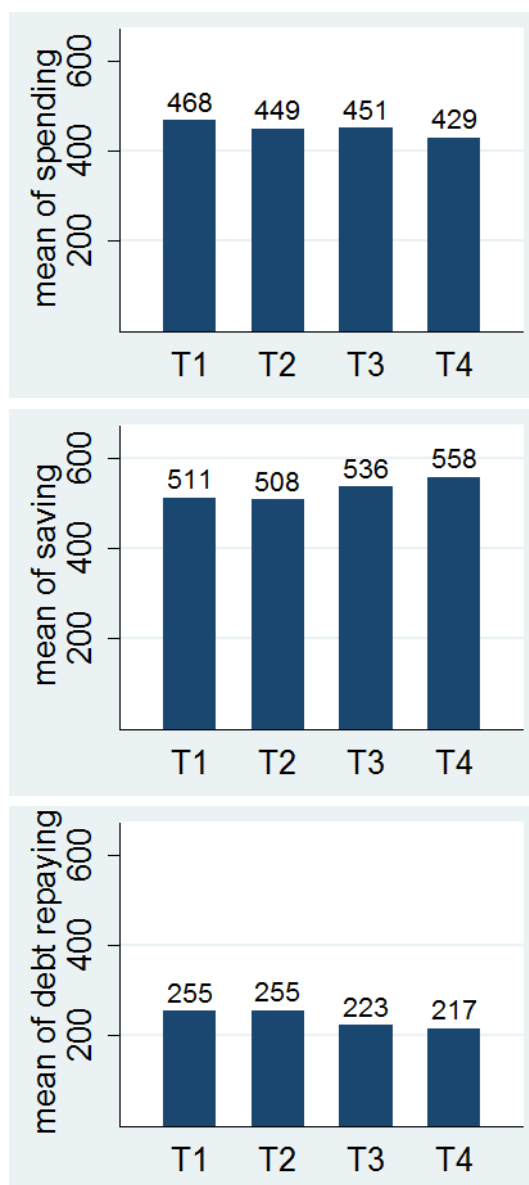
We are aware that our results should be taken with a grain of salt for various reasons. First of all, as economists we typically have some doubts about drawing conclusions from what people say rather than what people do. However, it has been argued that this view is too limited with respect to what one can actually achieve with survey data (Shapiro and Slemrod, 1995) and, indeed, more recent evidence suggests that intended consumption behavior highly correlates with actual consumption (see, e.g., Bachmann et al., 2015). Second, one could imagine that the most unconventional among the unconventional monetary policies if actually implemented would get a lot of media attention. It is difficult to predict how the public would be influenced and what that would imply for individual decisions on how to spend the money transferred. Finally, it is not so obvious to us whether our results could be extended to other countries. In the context of the European Monetary Union countries fare differently in economic terms. It could be the case that households in the periphery react differently to a helicopter treatment than German households. Having these difficulties in mind, we do, however, consider our results to be important in adding to a very scarce literature on the practical implications of helicopter money.

Acknowledgments

Data collection was supported by the German Ministry of Education and Research (BMBF) and provided by GESIS Leibniz Institute for the Social Sciences, GESIS Panel (<http://www.gesis-panel.org>).

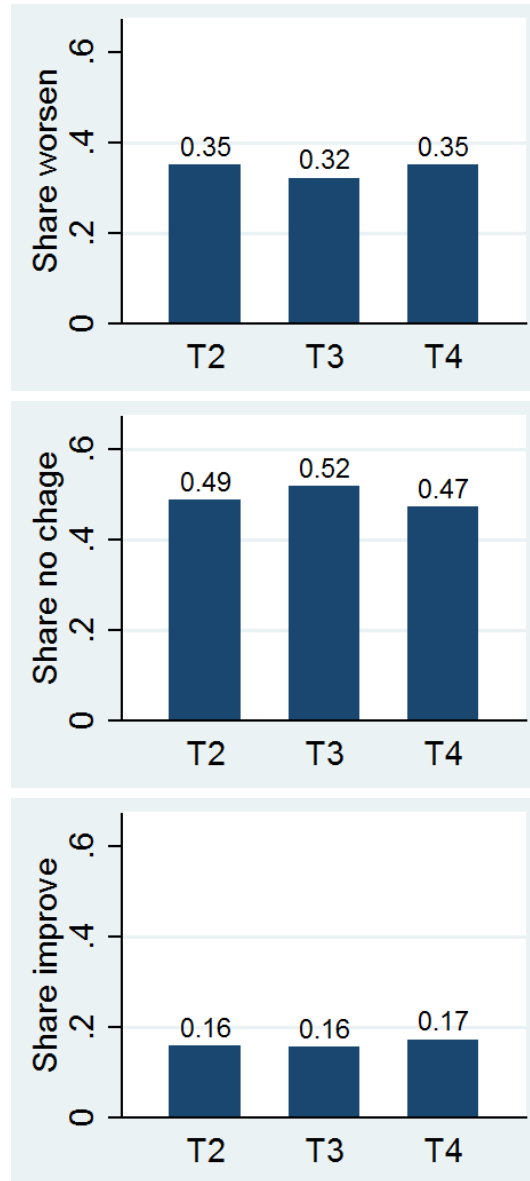
Figures

Figure 1: Spending, saving and debt repayings



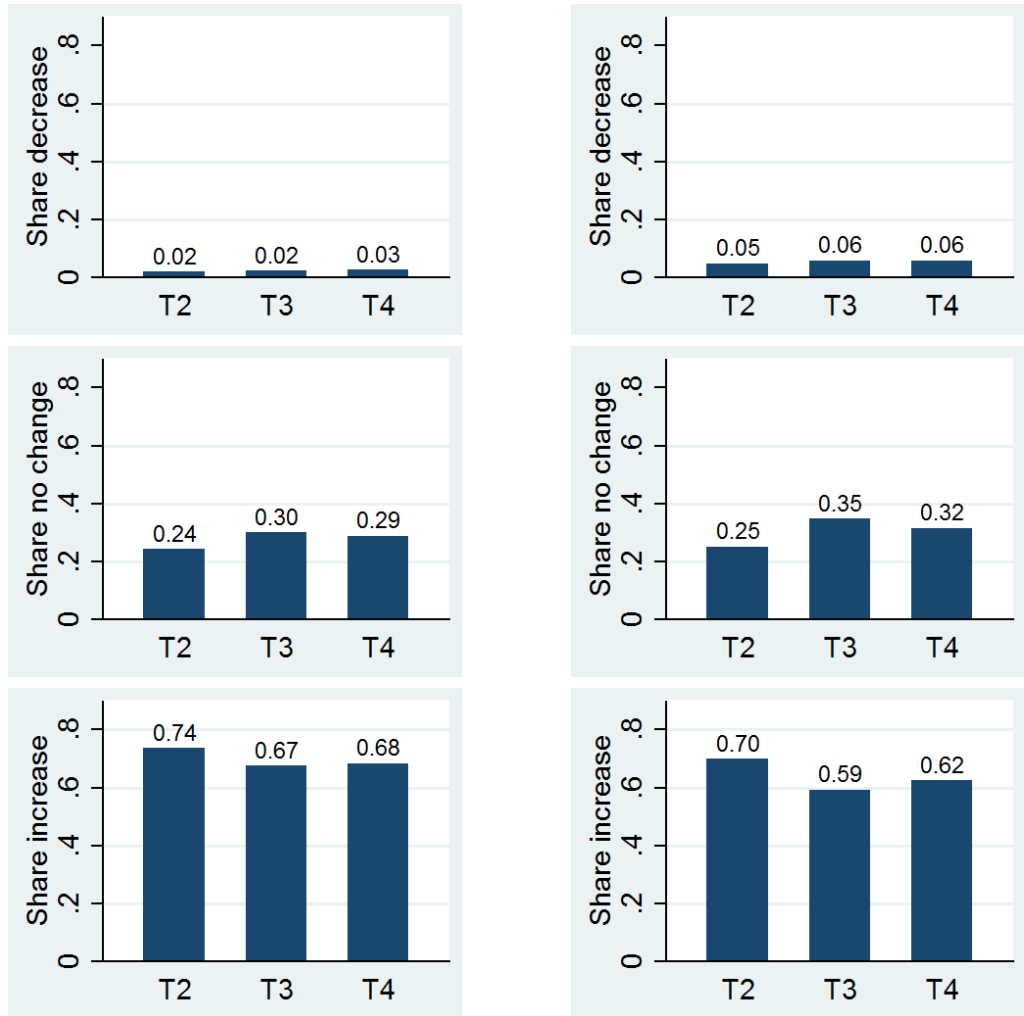
Notes: The three bar graphs display the average amounts that respondents would use for spending, saving and debt repayments for all four treatments in Euros.

Figure 2: Expectations on economic conditions



Notes: The first graph shows the percentage of people who expect policies T2 to T4 to lead to a *worsening* of economic conditions. The second and the third graph show the shares for the three treatments T2 to T4 for those who expect *no change* or an *improvement* of economic conditions, respectively.

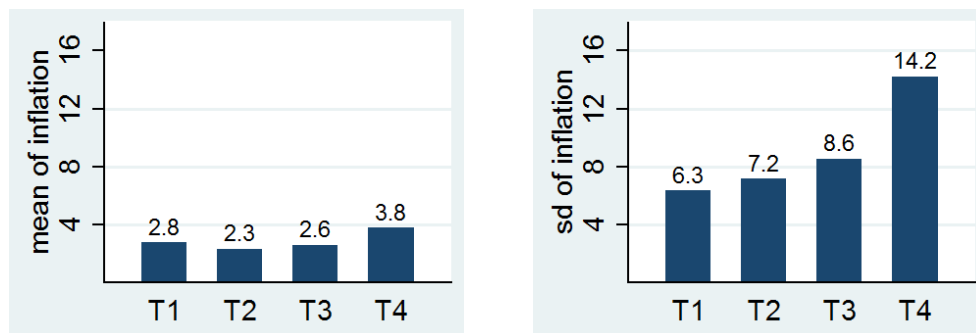
Figure 3: Expectations on taxes and government obligations across policies



(a) Change in future tax burden (b) Change in future government obligations

Notes: In Panel (a) the first graph shows the percentage of people who expect the policy to lead to a *decrease* in the future tax burden. The second and the third graph show the shares for *no change* and an *increase* of the tax burden. Panel (b) is constructed similarly for expectations on government obligations.

Figure 4: Inflation expectations in % (left) and standard deviation of inflation expectations



Notes: The left graph presents the mean expected inflation rate for each treatment in %. The right graph presents the standard deviations of inflation expectations for each treatment.

References

- ARINA, K. P., F. KORAYC, AND N. SPAGNOLOB (2015): “Fiscal multipliers in good times and bad times,” *Journal of Macroeconomics*, 44, 303–311.
- AUERBACH, A. J. AND Y. GORODNICHENKO (2012): “Measuring the output responses to fiscal policy,” *American Economic Journal: Economic Policy*, 4, 1–27.
- BACHMANN, R., T. O. BERG, AND E. R. SIMS (2015): “Inflation expectations and readiness to spend: cross-sectional evidence,” *American Economic Journal: Economic Policy*, 7, 1–35.
- BARRO, R. J. (1974): “Are government bonds net wealth?” *Journal of Political Economy*, 82, 1095–1117.
- BAUMEISTER, C. AND L. BENATI (2012): “Unconventional monetary policy and the great recession: estimating the macroeconomic effects of a spread compression at the zero lower bound,” *Bank of Canada*.
- BRYAN, M. AND G. VENKATU (2001): “The curiously different inflation perspectives of men and women,” Federal Reserve Bank of Cleveland, Economic Commentary issue November.
- BUITER, W. H. (2014): “The simple analytics of helicopter money: Why it works-always,” *Economics*, 8.
- BURKE, M. A. AND A. OZDAGLI (2013): “Household inflation expectations and consumer spending: evidence from panel data,” Federal Reserve Bank of Boston, Working Paper No. 13-25.
- CAMPBELL, J. R., C. L. EVANS, J. D. FISHER, AND A. JUSTINIANO (2012): “Macroeconomic effects of Federal Reserve forward guidance,” *Brookings Papers on Economic Activity*, 1, 1–80.
- CANDELON, B. AND L. LIEB (2013): “Fiscal policy in good and bad times,” *Journal of Economic Dynamics and Control*, 37 (12), 2679 – 2694.

- CHRISTENSEN, J. H. AND G. D. RUDEBUSCH (2012): “The response of interest rates to US and UK quantitative easing,” *The Economic Journal*, 122, F385–F414.
- CRUMP, R. K., S. EUSEPI, A. TAMBALOTTI, AND G. TOPA (2015): “Subjective intertemporal substitution,” FRB of New York Staff Report 734.
- D’ACUNTO, F., D. HOANG, AND M. WEBER (2016): “The effect of unconventional fiscal policy on consumption expenditure,” NBER Working Paper 22563.
- DELONG, J. B. AND L. H. SUMMERS (2012): “Fiscal policy in a depressed economy,” *Brookings Papers on Economic Activity*, 1, 233–297.
- EGGERTSSON, G. B. ET AL. (2003): “Zero bound on interest rates and optimal monetary policy,” *Brookings Papers on Economic Activity*, 139–233.
- FRIEDMAN, M. (1957): *A theory of the consumption function*, Princeton: Princeton University Press.
- (1969): *The optimum quantity of money and other essays*, Chicago: Adline Publishing Company.
- GAGNON, J., M. RASKIN, J. REMACHE, AND B. SACK (2011): “The financial market effects of the Federal Reserve’s large-scale asset purchases,” *International Journal of Central Banking*, 7, 3–43.
- GALÍ, J. (2014): “The effects of a money-financed fiscal stimulus,” CEPR Discussion Paper No. DP10165.
- GIIRKAYNAK, R., B. SACK, AND E. SWANSON (2005): “Do actions speak louder than words? The response of asset prices to monetary policy actions and statements,” *International Journal of Central Banking*, 1, 55–94.
- HELLER, W. P. AND R. M. STARR (1979): “Capital market imperfection, the consumption function, and the effectiveness of fiscal policy,” *The Quarterly Journal of Economics*, 93, 455–463.

- HUBBARD, R. G., K. L. JUDD, R. E. HALL, AND L. SUMMERS (1986): “Liquidity constraints, fiscal policy, and consumption,” *Brookings Papers on Economic Activity*, 1–59.
- ICHIUE, H. AND S. NISHIGUCHI (2015): “Inflation expectations and consumer spending at the zero bound: micro evidence,” *Economic Inquiry*, 53, 1086–1107.
- JOYCE, M., A. LASAOSA, I. STEVENS, AND M. TONG. (2011): “The financial market impact of quantitative easing in the United Kingdom,” *International Journal of Central Banking*, 7, 113–161.
- KAPETANIOS, G., M. HAROON, S. IBRAHIM, AND T. KONSTANTINOS (2012): “Assessing the economy-wide effects of quantitative easing,” *The Economic Journal*, 122, F316–F347.
- KOO, R. C. (2009): *The holy grail of macroeconomics: lessons from Japans great recession*, John Wiley & Sons.
- KRISHNAMURTHY, A. AND A. VISSING-JORGENSEN (2011): “The effects of quantitative easing on interest rates: channels and implications for policy,” NBER Working Paper No. 17555.
- KRUGMAN, P. R. (1998): “It’s baaack: Japan’s slump and the return of the liquidity trap,” *Brookings Papers on Economic Activity*, 137–205.
- LENZA, M., H. PILL, AND L. REICHLIN (2010): “Monetary policy in exceptional times,” *Economic Policy*, 62, 295–339.
- MALMENDIER, U. AND S. NAGEL (2016): “Learning from inflation experiences,” *The Quarterly Journal of Economics*, 131, 53–87.
- MCCULLEY, P. AND Z. POZSAR (2013): “Helicopter money: or how I stopped worrying and love fiscal-monetary cooperation,” *Global Society of Fellows*, 7.
- MISRA, K. AND P. SURICO (2014): “Consumption, income changes, and heterogeneity: evidence from two fiscal stimulus programs,” *American Economic Journal: Macroeconomics*, 6, 84–106.

- MODIGLIANI, F. (1986): “Life cycle, individual thrift, and the wealth of nations,” *The American Economic Review*, 76, 297–313.
- OLKEN, B. A. (2007): “Monitoring corruption: evidence from a field experiment in Indonesia,” *Journal of Political Economy*, 115, 200–249.
- OWYANG, M. T., V. A. RAMEY, AND S. ZUBAIRY (2013): “Are government spending multipliers greater during periods of slack? Evidence from twentieth-century historical data,” *The American Economic Review*, 103, 129–34.
- REICHLIN, L., A. TURNER, AND M. WOODFORD (2013): “Helicopter money as a policy option,” VoxEU.org, May 20.
- ROMER, C. D. (2011): “Dear Ben: it’s time for your Volcker moment,” *New York Times*, October 29.
- SAHM, C. R., M. D. SHAPIRO, AND J. SLEMROD (2010): “Household response to the 2008 tax rebate: survey evidence and aggregate implications,” *Tax Policy and the Economy*, 24, 69–110.
- SARAVELLOS, G., D. BERTON, AND R. WINKLER (2016): “Helicopters 101: your guide to monetary financing,” Deutsche Bank Research, 14 April 2016.
- SEATER, J. J. (1993): “Ricardian equivalence,” *Journal of Economic Literature*, 31, 142–190.
- SHAPIRO, M. D. AND J. SLEMROD (1995): “Consumer response to the timing of income: evidence from a change in tax withholding,” *The American Economic Review*, 85, 274–283.
- (2003): “Consumer response to tax rebates,” *The American Economic Review*, 93, 381–396.
- (2009): “Did the 2008 tax rebates stimulate spending?” *The American Economic Review*, 99, 374–379.
- SHEFRIN, H. M. AND R. H. THALER (2004): “Mental accounting, saving, and self-control,” in *Advances in behavioral economics*, ed. by G. L. C. F. Camerer and M. Rabin, Princeton: Princeton University Press, 395–428.

- THALER, R. (1985): “Mental accounting and consumer choice,” *Marketing Science*, 4, 199–214.
- THALER, R. H. (1990): “Anomalies: saving, fungibility, and mental accounts,” *The Journal of Economic Perspectives*, 4, 193–205.
- TURNER, A. (2015): “The case for monetary finance - an essentially political issue,” IMF Jacques Polak Research Conference, 5th November 2015.
- WRIGHT, J. H. (2012): “What does monetary policy do to long-term interest rates at the zero lower bound?” *The Economic Journal*, 122, F447–F466.

Online Appendix

Appendix A - Random treatments

In Table 11 we summarize the socio-demographic variables of the respondents.

Table 11: Summary of the socio-demographic variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age	3492	49.74	14.15	21	73
Gender	3493	0.47	0.49	0	1
Married	3285	0.63	0.48	0	1
Income	3116	7.61	4.01	0	15
House ownership	3351	0.54	0.49	0	1
Born in Germany	3490	1.11	0.39	1	3
Household size	3299	2.50	1.13	1	5
Distance to city	3317	3.53	1.59	1	6
West Germany	3488	0.80	0.39	0	1

Notes: Income is coded in fifteen groups, with 15 being 5000 Euro and more. The “Born in Germany” variable is coded as 1 - German, 2 - Europe, 3 - other. The “Distance to city” variable is coded in six groups with 6 being 60 km and more away from the city.

We check for the goodness of randomization by applying a procedure proposed in Olken (2007). Table 12 reports the results of a Probit model regressing a treatment dummy on the socio-demographic characteristics of the survey participants. We run this model on all combinations of treatments and report marginal effects of all variables. In all cases, the regressors are individually and jointly not significant, which implies that they cannot explain why subjects ended up in one rather than the alternative treatment supporting random allocation into treatments.

Table 12: Relationship between treatments and socio-demographic characteristics

Variable	T1 T2	T1 T3	T1 T4	T2 T3	T2 T4	T3 T4
Age	0.00	0.00	0.00	-0.00	0.00	0.00
Gender	0.01	0.01	0.01	0.00	0.00	0.01
Married	-0.01	0.02	0.03	0.03	0.04	0.01
Income	-0.01	-0.00	-0.00	0.00	0.01	-0.00
House ownership	0.02	0.01	0.01	-0.01	-0.00	0.01
Born in Germany						
Europe	0.07	0.08	0.05	0.00	-0.01	-0.02
Other	-0.02	-0.11	0.05	-0.09	0.08	0.16
Household size	0.01	0.01	-0.00	-0.00	-0.01	-0.01
Distance to city	-0.01	-0.00	-0.00	0.01	0.00	-0.00
West Germany	-0.04	-0.00	0.02	0.04	0.06	0.02
Joint p-value	0.6028	0.8978	0.6867	0.9058	0.5553	0.7418
Observations	1415	1404	1429	1437	1462	1451

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Notes: The top row presents the pairs of treatments being used to construct a dummy variable for the Probit analysis. For each dummy a Probit model is ran on a set of regressors whose marginal effects are reported in columns together with the test of joint significance.

Appendix B - Overview of questions

Lottery treatment - T1

1. We would like to ask you about your assessment of price development in Germany.
How do you expect average prices to develop in 12 months?
Please choose just one answer and write a value.

- I expect the prices in 12 months to be on average ___% higher than today.
- I expect the prices in 12 months to be on average ___% lower than today.
- I expect the prices in 12 months on average to stay the same as today.

2. Please imagine you just won 1200 Euro in a lottery. Given your current financial situation, how much of the 1200 Euro would you spend, save/invest or use to pay off debt in the next 12 months?

Please enter the respective amount in Euro.

- I would spend ___ Euro.
- I would save/invest ___ Euro.

- I would use ___ Euro to pay off debt.
3. Do you think the overall economic situation in Germany will improve, worsen or stay the same in the upcoming year?
Please choose one answer.
- I think that the overall economic conditions will improve.
 - I think that the overall economic conditions will worsen.
 - I think that the overall economic conditions will not change.
4. We would like to know whether you (and your family) keep track of household expenses via a book or account for them through similar but different means. If you keep track of household expenses, what is usually the goal of this task: keeping expenses in predefined limits, saving a regular amount of money, or repaying a regular amount of debt?
Please choose one answer.
- My family and I mostly try to keep our expenses in certain predefined limits.
 - My family and I mostly try to regularly save certain amount.
 - My family and I mostly try to regularly repay certain amount of debt.
 - My family and I do not keep track of expenses using a book or other means.

Debt-financed policy treatment - T2

Please read the following text carefully. The questions following afterwards are related to it.

During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The government of each Eurozone member state should give money directly to its citizens. The money for this endeavor governments should borrow from the European Central Bank.

Imagine such a policy was actually approved and you along with every other citizen in the Eurozone received a onetime payment of 1200 Euro from the government.

1. Given your current financial situation, how much of the 1200 Euro would you spend, save/invest or use to pay off debt in the next 12 months?
Please enter the respective amount in Euro.
 - Answers as in question 2 in T1
2. If the above mentioned policy were approved, how would you expect average prices in Germany to develop in 12 months?
Please choose one answer and enter a value.

- I would expect the prices in 12 months to be on average ___% higher than today.
 - I would expect the prices in 12 months to be on average ___% lower than today.
 - I would expect the prices in 12 months on average to stay the same as today.
3. Do you think the above mentioned policy would improve, worsen or have no impact on the overall economic situation in Germany during the upcoming year?
Please choose one answer.
- I think this policy would improve economic situation.
 - I think this policy would impair economic situation.
 - I think this policy would not change economic situation.
4. Do you think the above mentioned policy would increase, decrease or have no impact on government obligations in Germany during the upcoming years?
Please choose one answer
- I think this policy would increase government obligations in following years.
 - I think this policy would decrease government obligations in following years.
 - I think this policy would not change government obligations in following years.
5. Do you think the above mentioned policy would increase, decrease or have no impact on your tax burden in the upcoming years?
Please choose one answer.
- I think this policy would increase my tax burden in following years.
 - I think this policy would decrease my tax burden in following years.
 - I think this policy would not change my tax burden in following years.
6. Same as question 4 in T1 (expenses tracking)

Helicopter money (1x1200 Euro) treatment - T3

Please read the following text carefully. The questions following afterwards are related to it.

During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The European Central Bank should give money directly to the citizens of the Eurozone. The money for this endeavor should be printed by the European Central Bank.

Imagine such a policy was actually approved and you along with every other citizen in the Eurozone received a onetime payment of 1200 Euro from the European Central Bank.

1. Same as question 1 in T2 (spend/save/repay amounts)
2. Same as question 2 in T2 (inflation expectations)
3. Same as question 3 in T2 (economic conditions)
4. Same as question 4 in T2 (government obligations)
5. Same as question 5 in T2 (tax burden)
6. Same as question 6 in T2 (expenses tracking)

Helicopter money (12x100 Euro) treatment - T4

Please read the following text carefully. The questions following afterwards are related to it.

During current economic and political discussions concerning best management of the European economic crisis the following position has come forth: The European Central Bank should give money directly to the citizens of the Eurozone. The money for this endeavor should be printed by the European Central Bank.

Imagine such a policy was actually approved and you along with every other citizen in the Eurozone will receive 100 Euro per month from the European Central Bank for the next 12 months.

1. Given your current financial situation how much of the monthly 100 Euro would you spend, save/invest or use to pay off debt during the next 12 months?
Please enter the respective amount in Euro.
 - I would monthly spend ___ Euro.
 - I would monthly save/invest ___ Euro.
 - I would monthly use ___ Euro to pay off debt.
2. Same as question 2 in T2 and T3 (inflation expectations)
3. Same as question 3 in T2 and T3 (economic conditions)
4. Same as question 4 in T2 and T3 (government obligations)
5. Same as question 5 in T2 and T3 (tax burden)
6. Same as question 6 in T2 and T3 (expenses tracking)

Additional questions

1. Has your life in your opinion worsened or improved in the following areas over the past 12 months?

Please rate the change from today's perspective.

- Financial situation

- Considerably worsened
- Slightly worsened
- Stayed the same
- Slightly improved
- Considerably improved
- Don't know

2. How much do you personally trust the following public institutions or groups?

- Federal government

- 1 - Don't trust at all
- 2
- 3
- 4
- 5
- 6
- 7 - Fully trust

3. How interested in economic affairs are you?

- Very strong
- Strong
- Moderately
- Little
- Not at all
- Don't know

We do not report questions on socio-demographic variables such as income, household size, age, gender, marital status, place of birth, region people live in and house ownership. The reader is referred to <http://www.gesis-panel.org> for the exact phrasing.

Appendix C - Questions and results from studies on US tax rebates

In order to make our results more comparable to the 2008 US tax rebate research we recoded our variables to get the percentages of people reporting they would use the money *mostly* for spending, saving or debt repayments. Results are reported in Table 13 as shares of total answers (3070 observations in total).

Table 13: Distribution of answers about spending choices in %

	Spend	Save	Repay	Spe/Sav	Spe/Rep	Sav/Rep	Sp/Sa/Re
T1	29.0	36.9	18.4	10.2	1.8	2.7	0.6
T2	28.2	35.5	18.6	10.4	2.0	2.8	2.2
T3	29.2	37.6	16.1	11.1	1.9	2.2	1.6
T4	29.5	33.0	14.6	16.9	2.3	3.4	0.0
Total	29.0	35.8	16.9	12.1	2.0	2.8	1.1

Notes: For each treatment (row), the column “Spend” refers to the percentage of people whose spending amount was bigger than both saving and debt repayment. Figures in columns “Save” and “Repay” are constructed analogously. Then there was a considerable number of answers where consumption, saving, or repaying debt amounts equaled. For example, in T1 10.2% of the respondents answered that they would spend the same amount as they would save, each of the amounts being larger than what they would use for repaying debts (column “Spe/Sav”). In “Sp/Sa/Re” the spend, save, and debt repayment amounts were identical.

Table (14) is taken from Sahm et al. (2010) who report on results from different surveys that measure the percentages of people who would use the transfers of the U.S. tax rebate in 2008 to mostly spend, save, or repay debts with it. Our results are mostly in line with the average findings of those studies. One difference to be noticed is that in our survey less people chose to mostly repay debts with the transfer. This seems, however, plausible given the different macroeconomic conditions in Germany in 2016 and the USA in 2008.

Table 14: Percentage of respondents who would spend US tax rebates

Pollster	Interview date	Question	Percentage of responses				
			Obs.	Spend	Save	Pay debt	Other
1. Fox news/Opinion Dynamics	Jan. 30-31	If you received a tax rebate in the next few months, what do you think you would do with the money - save it or spend it?	900	53	37	... ^a	10
2. Harris Interactive for CCH Complete Tax	Jan. 30-Feb. 1	If you were to get a tax rebate, which of the following would you be mostly likely to do with all or most of your money?	2020	21	32	47	...
3. <i>Washington Post</i> /ABC News ^b	Jan. 30-Feb. 1	If you get a federal rebate, what will you most likely do with it?	1249	24	36	35	4
4. Zogby International for TransUnion TrueCredit.com ^c	Jan. 30-Feb. 1	If you were to get a tax rebate, which of the following would you be most likely to do with all or most of the money?	3036	24	29	45	3
5. Pew Research Center	Jan. 30-Feb. 2	If you receive the cash rebate from the government, how are you most likely to use the money? Are you most likely to spend it, save it, pay off bills, or something else	1502	20	24	49	7

6. Bloomberg/ <i>L.A. Times</i>	Feb. 21-25	When you get your rebate check, will you spend it on purchases, or will you pay down some of your debt, or will you put it in your savings account?	1408	23	38	35	6
7. CNN/Opinion Research Corp.	March 14-16	If you receive a tax rebate, what will you do with the money - spend it, save it, pay off bills or donate it to charity?	1019	21	32	41	3
8. Harris Interactive ^d	April 7-15	How much money (in dollars) do you think you will use for the following?	2529	40	25	30	5
9. <i>Washington Post</i> /ABC News ^b	April 10-13	If you get a federal rebate, what will you most likely do with it?	1197	26	37	35	3
10. CBS News/ <i>New York Times</i>	April 25-27	What do you expect to do with the tax rebate money you receive-will you spend it, use it to pay bills, or save or invest it?	664	19	28	53	...
11. Zogby International ^e	May 6-8	How do you plan to spend the majority of your 2008 tax rebate?	7815	34	25	32	9
12. Harris Interactive ^d	Aug. 11-17	How much money (in dollars) did you use for the following?	2710	39	20	35	5
Sahm-Shapiro-Slemrod (2009)	Feb.-June, Nov.-Dec.	Did the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly pay off debt?	3417	20	28	52	...

...^a = not applicable.

^bOpen-ended answers aggregated by the authors.

^cThe 24% spend rate consists of 18% who would buy something necessary and 6% who would “splurge.”

^dMultiple answers in 0%, 1%-25%, 25%-50%, 51%-75%, and 75%-100% categories were categorized and recalculated by the authors to add to 100%.

^eThe 34% spend rate consists of 26% who spend only on everyday expenses and 8% who would “splurge.”