THE EFFECTS OF GOVERNMENT DEBT AND FISCAL POLICY COMMUNICATION ON HOUSEHOLD SPENDING*

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Abstract

Utilizing an information randomized controlled trial (RCT) on a new transaction-level consumption panel of Korean households, we examine how news about public debt, fiscal deficits, and future fiscal policy affects household expectations and spending. We find that while fiscal news affects households' belief about future fiscal conditions, it does not affect their beliefs about other macroeconomic conditions, e.g., inflation and real GDP growth. However, an exogenous increase in beliefs about future public debt to GDP ratio increases current consumption spending. Further analysis suggests that anticipation of cuts in discretionary expenditure, including cash transfers and vouchers, can lead to a decrease in household spending.

Keywords: Information RCT, Government debt, Fiscal policy, Expectations, Transaction-level data

JEL Classification: E21, E3, E62

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"*Government overspending causes inflation. End of story. That is why prices at the store keep rising. Stop government overspending to end inflation!*" Elon Musk[1]

I. INTRODUCTION

The sharp increase in public debt across many countries during the COVID-19 crisis has reignited discussions on the role of public debt and fiscal policy. A recurring theme in policy and academic debates is whether, and how soon, these debts will accelerate inflation and slow economic growth. Indeed, the global surge in inflation from 2021 to 2023 is often partially attributed to massive fiscal expansion (e.g., Barro and Bianchi, 2024).

Economists have long studied the real effects of public debt, with theoretical channels ranging from conventional demand-side overheating to the monetization of public debt and the fiscal theory of the price level.[2] Given the contentious nature of the issue, it is crucial to empirically establish how households respond to changes in current and expected future public debt, as well as related policy actions. Unsurprisingly, this is challenging because households' information sets and beliefs about public debt are neither directly observable nor independent of other economic conditions. Similarly, it is difficult for econometricians to disentangle anticipated from unanticipated changes in fiscal policy, especially with time-series data.[3] This often leads to making strong assumptions about the timing of shocks, or the information set and expectation formation of economic agents.

In this paper, we analyze the effect of news about public debt and fiscal policy on household spending through a randomized controlled trial (RCT) that treats participants with different information on fiscal variables. Our laboratory is a new wave of online surveys that uses a large panel (~11,000) of Korean households matched with administrative-type data on consumer spending. This panel is constructed and maintained by Macromill Embrain (henceforth Embrain), a major marketing research company in Korea. Embrain uses a smartphone app that tracks consumer spending of its panel participants at transaction level and conducts online surveys on them by commission. We conduct two waves of surveys and collect information on respondents'

[1] The Musk quote is from his posting on X (formerly twitter), on September 12th, 2024.

[2] Cochrane (2023), and other FTPL citations

[3] For a thorough treatment of this identification issue, see Ramey (2011) for government spending shocks and Mertens and Ravn (2012) for tax policy shocks. For an overview of empirical strategies and findings on this topic, see Chapter 4 of Ramey (2016).

demographics, balance sheets, and beliefs about macroeconomic and fiscal variables, linking this data to their actual spending outcomes.

Notably, we introduce an RCT into the first wave, where some respondents receive different treatments regarding publicly available information on Korean public finances, while the control group (Group 1) receives no information. The goal is to generate exogenous news/shocks about public debt, fiscal deficits, and the future trajectory of fiscal policy and trace the subsequent *causal* effects on consumers' expectations and their spending at micro level. The treatments include: (1) information about the current level of government debt (Group 2); (2) information about the current fiscal deficit (Group 3); and (3) information about the current fiscal deficit *along with* planned government policy measures to address it. The latter treatment is further divided based on the type of planned government response: (a) without specifying a policy instrument (Group 4); (b) reducing discretionary government expenditure, such as cash transfers and vouchers, (Group 5); and (c) increasing taxes (Group 6). The statistics in these information interventions are reported as a percentage of GDP as well as in Korean won per person to enhance comprehension for the general public.

Our large consumer panel, combined with a wide range of information treatments, allows us to explore two main research questions: How do households respond to news about the current level of public debt and fiscal deficits? How can fiscal policy authorities communicate their policies effectively to shape household expectations and decisions?

To answer the first question, we compare the control group with the first two treatment groups (Group 2 and 3) to assess how households revise the expected levels of public debt and fiscal deficits, the growth rates of government expenditure and tax revenue, inflation, nominal interest rates, and output growth in response to news about the current fiscal status. The unit of news for each participant is measured as the gap between their prior perception of the current fiscal status that we elicited before treatment intervention and the actual value in the news. Furthermore, using high-frequency spending data from both the control group and Groups 2 and 3, collected before and after the survey intervention, we assess how fiscal news causally affects actual household spending.

Our first main finding is that while fiscal news substantially affects households' expectations over future fiscal variables, they have virtually no impact on their expectations over macroeconomic variables. For example, to a 10%p surprise in the current debt-to-GDP ratio, respondents on average significantly revise their expectations of fiscal balance-to-GDP ratio and fiscal debt-to-GDP ratio by 0.45%p and 5.8%p, respectively. On the contrary, they on

average revise their expectations of 10-year-average real GDP growth and inflation only by 0.18%p and 0.04%p, with no statistical significance. Similarly, a 1%p surprise in the current fiscal balance leads to revisions in 10-year-average real GDP growth and inflation expectations of 0.02%p and 0.02%p, and confidence intervals are tight around zero. We find very similar patterns for mortgage rates and unemployment expectations. Thus, respondents in our sample on average do not think there is a clear link between current fiscal status and future macroeconomic conditions.

However, this does not preclude the possibility that fiscal news affects household consumption through other channels, such as changes in expectations regarding government transfers, taxation, or short-run macroeconomic conditions that do not operate through long-run GDP and inflation expectations. Exploiting variations in survey dates across participants and using difference-in-differences method that is robust to heterogenous treatment effects (Borusyak et al., 2024), we find that information treatment for Group 2 on average *decreases* household spending for the first four weeks after the intervention. Since Korean households in our survey, on average, perceive the debt-to-GDP ratio to be higher (63.5%) than its actual level (49.6%) and are thus negatively surprised by the information, this suggests that a *positive* surprise in current public debt leads to an *increase* in household spending.

For a quantitative, causal interpretation between public debt beliefs and spending, we run an instrumental-variable (IV) regression using treatment dummies and interactions with prior beliefs as instruments for posterior beliefs. In line with our reduced form results, we find that a 10 %p increase in posterior debt-to-GDP beliefs *increases* spending by 5% for the first four weeks after the intervention. Therefore, our results point to a *positive causal link* from public debt beliefs to household spending. However, we do not find similar effects of fiscal balance beliefs on household spending.

The spending results are surprising, as they not only contradict benchmark predictions, such as Ricardian equivalence, but also seem to be driven by belief channels distinct from long-term GDP growth or inflation expectations. It is therefore crucial to further investigate the underlying forces behind the combined effects of other beliefs that households associate with high public debt, e.g., higher growth rates of government spending and revenue. This also relates to our second question on effective fiscal policy communication. Messages aimed at reducing public debt, with varying emphases on different policy instruments, may have different effects on household expectations and behavior.

To this end, we leverage the additive, multi-layered treatment design of Groups 3, 4, 5, and 6. Specifically, we conduct pairwise comparisons between Group 3 and Group 4, Group 4 and Group 5, and Group 4 and Group 6. For example, since participants in both Group 3 and Group 4 receive common information about the current fiscal deficit level, any differences in beliefs and spending between these groups can be attributed to additional news about deficit reduction plans. Each comparison thus isolates the news effects of generic deficit reduction plans, cuts in discretionary government spending, and tax increases.

Across all three comparisons, we again find limited pass-through to long-run macroeconomic beliefs, even when households adjust their fiscal beliefs. This reaffirms that they do not associate changes in fiscal conditions with broader macroeconomic trends. However, while news about deficit reduction plans or tax increases do not significantly impact spending, news about discretionary spending cuts leads to a reduction in household spending. This suggests that discretionary spending, such as cash transfers or vouchers that can directly influence households, can be particularly influential in shaping household consumption behavior.

How long do effects on expectations and spending last? In the second wave, conducted three months after the information treatment, we find that the effects on household expectations largely persist. For spending behavior, we find that while the effect of public debt beliefs on spending mildly persists over more than 6 weeks after the intervention, the effect of news about discretionary spending cuts is short-lived and concentrated on the first two weeks after the intervention.

Our work contributes to several strands of research. First, we are the first to analyze the extent to which expectation update is materialized as a change in consumption by utilizing connected survey-consumption data. While Coibion, Gorodnichenko, and Weber (2021), Roth et al. (2022), and more recently, Grigoli and Sandri (2024) and Andrade et al. (2025) have utilized information RCTs and/or surveys to analyze the effects of public debt and fiscal balance on consumer beliefs, none of these studies directly examine how actual consumption changes when information about fiscal variables is updated, due to the unavailability of data. We overcome this limitation by using the data that directly connects survey and consumption spending. We note that our finding is inconsistent with the previous literature in several dimensions, particularly in the non-significant response of inflation expectations to fiscal news in South Korea. This appears to be due to South Korea's much lower debt-to-GDP ratio and inflation rate compared to the countries previously analyzed (the US, UK, and Brazil), making

consumers less sensitive to the link between fiscal variables and other macroeconomic factors. Further research in different macroeconomic environments is needed to better understand the source of this difference.

Second, we contribute to the literature on studies on fiscal policy. Since the onset of the COVID-19 crisis and the financial crisis, lots of effort has been put to study the effectiveness of fiscal policies (see Ramey (2016) for a nice summary and discussion), especially due to lack of monetary policy tools as nominal interest rate hits zero lower bound in both episodes. We add to this literature by explicitly studying how individual consumers form or update their expectations on aggregate conditions, which have not yet been fully understood. Moreover, we provide causal evidence on how such expectations affect downstream consumption behavior, which is crucial for understanding the real effects of fiscal policy. We believe that our finding on micro behavior complements the previous literature that mainly utilizes aggregate variables to study the effects of fiscal policies on the aggregate economy.

Finally, our work contributes to the previous body of work on the effects and limitations of unconventional stabilization policies aimed at managing expectations—an area of growing interest among economists and policymakers. While the literature on how central banks communicate their policies to shape expectations—particularly inflation expectations—and influence household decisions has been growing (Coibion et al., 2022), research on fiscal policy communication remains especially scarce.

The paper is organized as follows. Section II describes the data and survey design. Section III presents result on how the information treatments affect expectations of survey respondents and then Section IV provides our main findings on the extent to which the changes in fiscal belief can affect consumption. Section V concludes the paper.

II. DATA AND SURVEY DESIGN

This section presents descriptive statistics of our sample and outlines the survey design used to elicit household expectations regarding fiscal and macroeconomic variables, as well as various treatments. We first describe the Embrain Panel Big Data, on which we conduct the survey, and then provide further details on the survey structure and treatment design.

A. Embrain Panel Big Data

Embrain Panel Big Data (henceforth EPBD) is a panel of approximately 200,000 households maintained by Embrain that collects the dynamic characteristics of their purchases. The consumer participating in the panel are asked to download a smartphone app that tracks consumer spending made by their cards: When either a credit or debit card is used for purchases, text messages that include information on transaction, such as date, time, outlet, amount for transactions, and categories (food/online shopping, etc.), are sent to the cell phone. Then the app sends the information to Embrain for recording. In turn, any transaction by the participants paid by the card that sends messages to the consumer is in our data. The data generated by the app mimics the structure of transaction-level data from credit card companies and banks (Baker and Kueng, 2022). According to the Global Findex Database 2021 constructed by the World Bank, South Korea is one of the countries with the highest credit card ownership (68%) in the world, which further validates the usage of credit and debit card data as household consumption.

We use the spending data in section IV to study how fiscal news and exogenous variations in fiscal expectations move individuals' spending behavior. The average monthly expenditure of the control group during the sample period (January to December 2023) was approximately 1,250,000 KRW (about 860 USD), which is around 70% of the average per-person consumption expenditure in Korea, estimated at 1,730,000 KRW (about 1,200 USD). The substantial magnitude of the expenditure covered in this data thus presents a unique opportunity for research. We also plot the time series of data against the official household expenditure data from the Bank of Korea in Figure 1. The correlation coefficient between the two variables is approximately 0.72, providing reassurance that our consumption data captures the key dynamic properties of average household consumption in Korea.

B. Survey Design

We fielded two waves of online surveys on the randomly selected sample of 11,262 EPBD participants in July and November of 2023. Embrain attempts to ensure the national representativeness of the sample based on age, gender, and region. Participants are at least 19 years old and receive points for answering surveys that can be converted into cash.

In the first wave of the survey, we first gathered information on participants' demographic characteristics, perceptions and expectations, and introduced five different information treatments as well as one control group. Table 1 provides the summary statistics of key demographic variables across different groups, along with the national averages in the

last column. For example, the average age of respondents is 43.8, around 75 percent of respondents aged 15 to 64 are employed, and the median of monthly labor income (self-reported, after-tax) is KRW 2,700,000 per year (about 1,870 USD). While our sample is quite representative in various dimensions compared to the national averages, it is on average more educated, more employed, and has more children. Importantly, the table also shows that the sample is well balanced across different groups.

Before and after the treatment, we asked questions that measure various perceptions and expectations of fiscal and macroeconomic variables, which are described in the next subsection. In the second wave of the survey, we re-asked the questions about their expectations that we asked in the first wave after the treatment intervention. The main purpose of this wave is to measure individuals' expectations over time. Demographic characteristics are assumed to be time invariant. 7,200 out of 11,262 respondents participated in the second wave of the survey.

C. Measurement

The key survey questions for our analysis are those measuring perceptions and expectations of participants. Questions about their perception about the *current* public debt and fiscal balance of the Korean economy are important because our information treatments include numerical information on the current level of public debt and fiscal deficits. In section III, we leverage the differences between participants' prior perceptions and the actual level and quantify how they revise their expectations of other macroeconomic variables.

To measure their perceptions with less measurement error, we give them background information that explains what they are asked of. Specifically, we ask the following question about fiscal balance perception:

> *Households earn income and spend from it. Similarly, the government generates revenue (including taxes, duties, etc.) and allocates it toward expenditures (such as national projects, defense spending, and social welfare programs). The fiscal balance is equal to government revenue minus government expenditure. If the value is positive, it is a fiscal surplus, and if it is negative, it is a fiscal deficit. If government revenue and government expenditure are equal, it is said to be in fiscal balance.*

Think about the Korean government spending and government revenue in 2022. How do you think each was compared to the gross domestic product (GDP, which you can think of as a country's total income) of the Korean economy? For example, if government expenditure (or revenue) was n won and GDP was 100 won, government expenditure (or revenue) would be n% of GDP.

[Enter 0 or positive number]

Government spending in 2022 was ___% of GDP [0-100%]
Government revenue in 2022 was ___% of GDP [0-100%]

The fiscal balance in 2022 was __XXX__% of GDP (XXX is automatically calculated based on the response to income-expenditure)

[-100~100%]

, and the following question about public debt perception:

National debt refers to the debt of a country that the country has an obligation to repay in the future by borrowing money from the private sector, the central bank, or overseas for reasons such as fiscal deficit. This is the same as households taking out debt when their income is less than their consumption.

What do you think Korea's national debt level was compared to its national income (GDP) at the end of 2022?

In December 2022, the national debt was _____% of GDP.
[0~200%]

Descriptive statistics about the respondents' perceptions are summarized in Panel A, Table 2. Compared to the actual figure (49.6%), Korean households, on average, overestimate the level of public debt. This contrasts with findings by Grigoli and Sandri (2024) for households in the US, UK, and Brazil, which may be due to Korea having the lowest public debt-to-GDP ratio among these countries. However, perceptions of the fiscal balance-to-GDP ratio are, on average, close to the actual figure (-5.6%). That said, there is significant cross-sectional

variation in perceptions for both variables, suggesting that households will be exposed to news of different signs and magnitude as they learn about the actual figures through information treatments.

Importantly, we can see that the sample is well-balanced across different treatment groups: Within group average public debt-to-GDP ratio ranges from 61% to 65% with 63.5% as the whole sample average and fiscal balance is perceived to range from -5% to -7% within each group, with full-sample average -5.8%.

To measure their expectations about future fiscal variables, we ask them to provide the lowest and highest values they can think of for a given variable, along with their subjective probability that the actual value exceeds the average of these two estimates. For example, we pose the following questions regarding their beliefs about the fiscal balance in 10 years:

Q18. This question asks your thoughts on the fiscal balance of the Korean economy (= government revenue - government expenditure) in the next 10 years. Think about the range of what the fiscal balance will be as a percentage of GDP in 10 years.

Instructions: If you think the government's spending will be greater than its revenues (fiscal deficit), enter a negative number. If you think the government's revenues will be greater than its expenditures (fiscal surplus), enter a positive number. If you think government revenues and expenditure will be equal (fiscal balance), enter 0.

Q18-1. What is the lowest value you think is possible? _____% [-150~150%]
Q18-2. What is the lowest value you think is possible? _____% [-150~150%]

Q19. What do you think is the probability that the fiscal balance after 10 years will be higher than the average of the values you answered earlier ((Q18-1 + Q18-2)/2%, automatically calculated)?
_____%
Range: 0% to 100%

We use this information to calculate a split triangular distribution.[4] We repeat the same questions for public debt-to-GDP ratio, government spending and revenue growth rates, interest rate on government bonds, as well as macroeconomic variables including real GDP growth, inflation rate, mortgage rate, and unemployment rate. Descriptive statistics about the respondents' fiscal beliefs are summarized in Panel B in Table 2. Expectations are on average well-balanced across the control and treatment groups. Annualized government spending growth rate, for instance, ranges from 42% to 44% with whole sample average of 43%.[5]

Following the information treatments, respondents, including those in the control group who did not receive any information, were asked follow-up questions to measure the immediate effect of the treatments on their expectations. To minimize survey fatigue and avoid reusing the exact same questions, we collect only point estimates for their expectations in the year 2030, instead of 10 years ahead.

D. Treatments

After the pre-intervention phase of the survey, participants are randomly assigned into six different groups, with each group consisting of approximately 1,900 participants. Each group receives different information about Korea's fiscal status and the future trajectory of fiscal policy. The first group is the control group, which is not treated with any information. Groups 2 and 3 receive information on the current public debt to GDP ratio and fiscal balance, respectively. Group 2 receives the following information.

> "*The level of public debt in Korea was 49.6% of GDP in 2022. This debt was 20.68 million won ($16,000) per capita, the largest by historical standards. According to the IMF, between 2017 and 2022, Korea's national debt-to-GDP ratio grew more than 2.5 times faster than the average ratio of the world's 35 advanced economies.*"

[4] We code the implied mean as missing for respondents who submitted the same number for both the lowest and highest possible values. The results remain quantitatively similar when these respondents are included, with their implied means assigned to their respective lowest and highest values.

[5] While the growth rates are much higher than the actual figures, this does not affect the interpretation of our analysis, as a balanced perspective on the variables is required for our empirical study, rather than absolute accuracy.

Group 3 receives similar information about the level of managed fiscal balance[6]:

"*The managed fiscal balance of the Korean government was -5.4% of GDP in 2022. That is, the government had a fiscal deficit. This deficit was 2.27 million won ($1,700) per person, the largest by historical standards."*

The dynamics of expectations and consumption in Group 1 versus Groups 2 and 3, before and after the treatment, reflect households' responses to news about current fiscal status. Specifically, we will exploit the difference between the actual value of debt and deficits in the information and prior perception for each respondent to estimate how much do they update their beliefs and adjust their spending. As all the treatments are publicly available information, zero response to the treatments should occur if households form expectations in a full-information rational expectations (FIRE) manner.

To help households interpret the information, we provide a historical perspective by illustrating trends over time, comparing them to peer countries, and offering qualitative assessments (e.g., "the largest by historical standards"). The combination of quantitative and qualitative information was designed to provide a strong signal that households can incorporate into their posterior beliefs about future fiscal conditions. In Section IV, we will exploit exogenous variation in these posterior beliefs, induced by information treatments, and examine their impact on household spending behavior.

In Groups 4, 5, and 6, participants receive the same information as those in Group 3, along with additional details about the government's planned efforts to reduce fiscal deficits. Group 4 is informed that the government has a plan to reduce the deficit to 3% of GDP but is not provided with a specific policy instrument. In addition to this information, Group 5 further learns that the government plans to cut discretionary spending, while Group 6 is told that the government intends to increase taxes. Hence, Groups 4, 5, and 6 receive additional information about the intended fiscal policy actions beyond what is provided to Group 3:

"*The government plans to reduce the deficit to 3% of GDP, approximately 1.14 million won ($850) per person, in 2024.*" (Group 4)

[6] We also provided an explanation about the meaning of managed fiscal balance to the participants at the end of the paragraph.

"*The government plans to reduce the deficit to 3% of GDP, approximately 1.14 million won ($850) per person, in 2024. To this end, along with other measures, the government plans to reduce more than 10 percent of its discretionary spending, including plans to cut cash transfers and voucher programs. This spending measure takes about 50% of total government budget.*" (Group 5)

"*The government plans to reduce the deficit to 3% of GDP, approximately 1.14 million won ($850) per person, in 2024. To this end, along with other measures, the government plans to scrap gas tax cuts. The government is also considering scraping auto purchase tax cuts and restoring the fair market rate, which is used when calculating the comprehensive real estate tax, from 60% to 80%.*" (Group 6)

We compare Group 3 and 4, Group 4 and 5, and Group 4 and 6, respectively and explore the effects of different elements of fiscal policy on household expectations and spending. Therefore, our design ensures that each treatment effect on expectations and spending is identified effects of announcement of generic debt reduction plan, discretionary government spending cuts, and tax rate hikes.

III. TREATMENT EFFECTS ON HOUSEHOLD EXPECTATIONS

In this section, we present and discuss how different treatments affect individuals' expectations. We consider two different regression specifications, each for the effects of news about fiscal conditions and news about future fiscal policy actions, respectively.

A. Revisions to News about Fiscal Variables

In the first specification, we examine how respondents revies their beliefs to the news about public debt and fiscal deficits, induced by information treatments in Groups 2 and 3. To do so, we regress the change in respondents' expectations—from before to after the information treatment—on a dummy variable indicating their treatment group (equal to zero for the control group and one otherwise). Specifically, we estimate the following equation similar to Armona et al. (2019) and Beutel and Weber (2023):

$$E_i^{\text{post}} y - E_i^{\text{pre}} y = \delta_{0,j} + \text{ Treatment }_{i,j}\left[\delta_{1,j}\left(x - \tilde{x}_i^{\text{pre}}\right) + \delta_{2,j}\right] + Z_i\phi + \text{ Error }_i$$

where $E_i^{\text{pre}} y$ and $E_i^{\text{post}} y$ denote pre- and post-treatment expectation on the variable *y* of the respondent i. Treatment $_{i,j}$ is the indicator variable indicating that the respondent i is assigned to the treatment group $j \in \{1,2,3\}$. x and $\tilde{x}_i^{\text{pre}}$ are the actual level of fiscal variable *x* (public debt to GDP ratio, fiscal deficit) that we provide in the information treatment and the respondent's prior perception about it, respectively. Thus, the difference between the two defines the news about the fiscal variable for the respondent i.

The coefficient of interest is $\delta_{1,j}$, which measures how respondents, on average, revise their expectations per unit of surprise in the treatment *j*. $\delta_{0,j}$ controls for any potential revisions in expectations in the control group due to variations in question formats before and after the provision of information. $\delta_{2,j}$ controls for any potential effects of the treatments that do not operate through perception gaps. Z_i is a control vector of socio-demographic characteristics. As respondents are randomly assigned into different treatment groups, inclusion of $Z_i\phi$ should not affect the estimates of $\delta_{1,j}$. Error $_i$ captures measurement noise in survey beliefs. We use Huber robust regression to deal with the outliers.

We estimate the equation for nine different variables for *y*: fiscal deficit, public debt, interest on government bond, growth rate of government spending, growth rate of government revenue, real GDP growth, inflation, mortgage rate, and unemployment rate. For convenience, we divide $\left(x - \tilde{x}_i^{\text{pre}}\right)$ by 10 for the public debt to GDP ratio, so that one unit of surprise in the current level of public debt is 10%p of the GDP. Therefore, this approach provides an informative testbed for various elements of the fiscal theory of price level, Ricardian equivalence, and related concepts. For example, the fiscal theory of price level predicts that inflation expectations should jump up (holding everything else constant) when households learn that public debt is higher than they thought.

Estimation results for $\delta_{1,j}$ are reported in Panel A, Table 3, with first and second row correspond to the estimates of $\delta_{1,j=2}$ and $\delta_{1,j=3}$, respectively. News about the current level of public debt and fiscal deficits have a statistically and economically significant impact on the households' expectations about future fiscal conditions. For example, a surprise of 10%p in current public debt-to-GDP ratio on average increases household expectations about public debt-to-GDP ratio in 10 years by 5.8%p. It also increases both the expected growth rate of

government spending and revenue in 10 years. A surprise of 1%p in current fiscal balance increases the expected fiscal balance in 10 years by 0.14%p.

Interestingly, however, neither of them has significant impact on macroeconomic beliefs. To a surprise of 10%p in the current public debt-to-GDP ratio, respondents on average revise their expectations of 10-year-average real GDP growth and inflation only by 0.18%p and 0.04%p, with no statistical significance. Similarly, a 1 %p surprise in the current fiscal balance leads to revisions in 10-year-average real GDP growth and inflation expectations of 0.02%p and 0.02%p, and confidence intervals are tight around zero.

These findings contrast with those of Grigoli and Sandri (2024), who find that households increase their inflation expectations when informed that public debt is higher than they had thought. This difference could arise for various reasons, such as (i) Korean households may not understand how changes in fiscal variables translate into other macroeconomic variables (lack of knowledge) or (ii) they may believe that aggregate variables are determined independently of fiscal conditions (a perceived dichotomy between the fiscal and real sectors). While it is not the focus of this paper to identify or disentangle the driving factors, an important question for future research is whether households in different fiscal environments exhibit varying belief responses to news about fiscal conditions. For example, Weber et al. (2023) shows that economic agents in different inflation environments across different countries respond differently to exogenously provided information about inflation and monetary policy.

The same equation with $E_i^{\text{post}} y$ measured in the follow-up survey is estimated in Panel B, Table 3. We find that the news effects on various outcomes are almost the same, suggesting that belief responses to fiscal news are at least mildly persistent. This is similar to the findings by Coibion et al. (2022) about the belief responses to news about inflation / monetary policy, where US households had mildly persistent beliefs up to 3 months to 6 months after information treatments.

B. Revisions to News about Fiscal Policy

In the second specification, we examine how households revise their beliefs to the news about fiscal policy. The difference from the previous specification is that we do not have perception gaps, as all respondents in Group 3 to 6 are informed about the actual fiscal balance to GDP ratio. Rather, the variation comes from different types of policy instruments to reduce fiscal deficits. We regress the change in agents' expectations—from before to after the

information treatment—on a dummy variable indicating their treatment group (equal to zero for the control group and one otherwise).

$$E_i^{\text{post}} y - E_i^{\text{pre}} y = \beta_{0,j} + \beta_{1,j} \text{ Treatment }_{i,j} + Z_i \phi + \text{ Error }_i$$

The coefficient of interest is $\beta_{1,j}$, which measures how respondents, on average, revise their expectations in response to news about future fiscal policy actions in treatment j. We again use Huber regression to deal with outliers. Estimation results for $\beta_{1,j}$ are reported in Panel A, Table 4, with each row corresponding to the estimates of $\beta_{1,j=4}$, $\beta_{1,j=5}$ and $\beta_{1,j=6}$, respectively. The same equation with $E_i^{\text{post}} y$ measured in the follow-up survey is estimated in Panel B, Table 4.

News about fiscal policy actions have overall modest effects on household expectations. News about the deficit reduction plan (Group 4) leads to an upward revision in fiscal balance beliefs and a downward revision in public debt beliefs, with these effects persisting for up to three months after the intervention. This suggests that communication about the future path of fiscal policy can influence household expectations in the intended direction. However, additional information about the policy instrument, including discretionary spending cuts and tax rate hikes, does not have additional effects on fiscal beliefs. Notably, macroeconomic beliefs do not respond to news about future fiscal policy either.

IV. FISCAL BELIEFS, NEWS, AND SPENDING DECISIONS

In this section, we present and discuss how exogenous variation in beliefs and fiscal policy news affect household spending decisions.

A. Hypothetical responses

Before analyzing the effects on actual household spending, we discuss households' hypothetical responses to changes in future government spending and revenue. In the first wave of the survey before giving them any information treatment, we asked questions about how their current expenditure, income, and working hours would change in response to a hypothetical reduction in government spending or increase in tax revenue. Specifically, they were asked the following:

Suppose the government decides to reduce the level of the national debt (the government's spending is greater than its revenue, so it owes more domestically and internationally). To do this, the government reduces annual government spending by [1%, 2%, or 5%; randomized] of GDP and maintains that low level for the next 10 years. Taxes remain unchanged. How do you expect this policy to affect your current expenditure (e.g., on consumption), income, and working hours? For each item, please answer by the percentage change relative to the current level. If you are not sure, please give your best guess.

Your expenditure will increase/decrease relative to your current spending [by ___%] [no change]
Your income will increase/decrease relative to your current income [by ___%] [no change]
Your working hours will increase/decrease relative to your current working hours [by ___%] [no change]

Let's continue assuming that the government has decided to reduce the national debt. However, this time, it raises taxes to collect an additional [1%, 2%, 5%; randomized] of GDP and maintains this higher tax level for the next 10 years. Government spending does not change. How do you expect this policy to affect your current expenditure (e.g., on consumption), income, and working hours? For each item, please answer by the percentage change from your current level. If you are not sure, please give your best guess.

Your expenditure will increase/decrease relative to your current spending [by ___%] [no change]
Your income will increase/decrease relative to your current income [by ___%] [no change]
Your working hours will increase/decrease relative to your current working hours [by ___%] [no change]

These hypothetical questions have been successfully applied in recent economic research, for example, to measure economic agents' subjective models of the macroeconomy (Andre et al., 2022). They are similarly useful for our research setup because they provide insight into the magnitude of household responses to changes and reveal what households perceive as the

active margins of adjustment. To minimize numerical anchoring, we randomize the magnitude of changes in government spending and taxation (1%, 2%, and 5% of GDP) and normalize the responses by dividing them accordingly.

Figure 2 displays the distribution of hypothetical responses for different outcomes.[7] Several observations stand out: First, the most common response from households is that changes in fiscal policy to reduce public debt would not affect their current expenditure, income, and working hours. For example, at least 25% of households responded that changes in government spending or tax rate have no effect on their current spending. However, a substantial portion of households chose to submit non-zero figures instead of selecting "no change.", especially for their expenditure response. The average changes of current expenditure, income, and working hours to a decrease of government spending by 1% of GDP are 3.07%, -0.39%, and 1.1%, respectively, while average changes of the same variables to an increase of taxation by 1% of GDP are 1.52%, -1.33%, and 1.17%, respectively.

Therefore, on average, households expect that policy changes aimed at reducing national debt will lead them to spend more, earn less, and work more, with spending being the most active margin. Additionally, their negative income responses suggest that their increased expenditure is not driven by an improvement in real living conditions but is more likely a response to a higher price level. Such interpretation is in line with households associating high inflation with a bad state of the economy (Kamdar 2018, Candia et al. 2020, Stantcheva 2024) and believing that more inflation results in more (nominal) consumer spending just to maintain a given consumption basket.

Overall, hypothetical responses suggest that an average household expects welfare losses following debt reduction plans, due to decrease in purchasing power and less time spent on leisure. However, as hypothetical responses have limited power in providing direct evidence, we need more analysis on how households adjust their behavior to actual changes in fiscal beliefs.

B. The effects of fiscal beliefs

[7] We trimmed extreme responses at each 1% tail.

How do actual changes in fiscal beliefs, induced by the information RCT, translate into consumption dynamics? The key to answering this question lies in identifying exogenous variation in fiscal beliefs and the corresponding consumption data.

As discussed in Section III, information about the level of public debt and fiscal deficits has significant effects on their beliefs about future fiscal conditions. In this section, we leverage these treatments as powerful instruments to help us identify how/whether fiscal beliefs affect household spending. Specifically, we consider the following specification where we regress ex post daily spending of households on their beliefs, using the linked survey-spending data for respondents assigned in Group 1, 2, and 3:

$$log(Spending)_{i,t+h} * 100 \; = \; Post_{i,t}^{balance} + Post_{i,t}^{debt} + \; Controls_{\;i,t} + \; Error_{\;i,t+h}$$

where the dependent variable is the log of total daily spending for respondent i at date $t+h$, multiplied by 100, and t is calendar survey date and h denote the number of days after the survey date. Given the high-frequency nature of transaction-level spending data, we use a 7-day backward-looking moving average to reduce high-frequency noise. $Post_{i,t}^{balance}$ and $Post_{i,t}^{debt}$ are posterior beliefs of respondent i for the future fiscal balance and public debt to GDP ratio that we elicited immediately after treatment, respectively. We also include a vector of household-level controls, which consist of: (i) prior beliefs about fiscal balance and public debt to GDP ratio (measured before the information treatments); (ii) demographic variables including gender, age and age squared, presence and number of children, education, log household income, and household size; and (iii) self-reported average monthly expenditure over the last 3 months, expenditure on durable goods over the last 6 months, and planned expenditure on durable goods over the next 12 months.

We instrument for each set of posterior beliefs using the treatments as follows:

$$\text{Post}_{i,t}^{\text{balance}} = a_0 + \sum_{j=1}^{3} a_j \times I\{i \in \text{ Group } j\} + \sum_{j=1}^{3} b_j \times I\{i \in \text{ Group } j\} \times \text{ Prior}_{i,t}^{\text{balance}} + \sum_{j=1}^{3} c_j \times I\{i \in \text{ Group } j\} \times \text{ Prior}_{i,t}^{\text{debt}} + \text{ Controls}_{i,t} + \text{ Error}_{i,t}$$

$$\text{Post}_{i,t}^{\text{debt}} = \tilde{a}_0 + \sum_{j=1}^{3} \tilde{a}_j \times I\{i \in \text{ Group } j\} + \sum_{j=1}^{3} \tilde{b}_j \times I\{i \in \text{ Group } j\} \times \text{ Prior}_{i,t}^{\text{balance}} + \sum_{i=1}^{3} \tilde{c}_j \times I\{i \in \text{ Group }\} \times \text{ Prior}_{i,t}^{\text{debt}} + \text{ Controls}_{i,t} + \text{ Error}_{i,t}.$$

This first-stage specification consists of regressing posteriors on priors along with an interaction of priors with treatment group indicators, effectively reproducing the visual evidence presented in Figure 4. Our identification relies on the fact that people with high fiscal expectations tend to lower their beliefs when they receive treatment, while those with low expectations do the reverse. Following Coibion et al. (2022) and Coibion et al. (2023), the first stage is estimated by Huber regression, and a jackknife approach is used in the second stage to control for outliers in both stages.

The information treatments generate a strong source of exogenous variation in beliefs about future fiscal balance and public debt to GDP ratios in the first stage: the first-stage F-statistic for fiscal balance to GDP ratio is around 30, while the first-stage F-statistic for public debt to GDP ratio is around 180.

The main IV results are presented in Figure 5. In Panel A, we plot the estimated coefficients for the posterior belief about public debt to GDP ratio at horizon $t+h$., with 90% confidence intervals. The coefficients are positive, statistically significant, and persistent up to 56 days after the survey date. In Panel B, we plot the estimated coefficients for the posterior belief about fiscal balance to GDP ratio at horizon $t+h$. The coefficients are mostly not statistically significant from zero.

C. The effects of fiscal policy communication

We move onto the effects of fiscal policy communication on spending behavior. Here we exploit the temporal variation in survey dates across different respondents, as well as exposures to different news. Specifically, we consider a standard event-study and estimate with the imputation method developed by Borusyak et al. (2024). A key advantage of this method is

that it provides an efficient, unbiased estimate of the treatment effect that is robust to heterogeneous treatment effects across units and over time. The identification assumption here is the parallel trend assumption across different groups, which is strongly supported by both the randomization of the treatment group as well as parallel pre-trends between different groups in the actual spending data.

The results are presented in Figure 6. The treatment effects of additional information in Group 4 compared to Group 3 (which received information on the government's efforts to reduce the budget deficit) and in Group 6 compared to Group 4 (which received information that the government will increase taxes) have a limited and statistically insignificant impact on spending (Panels A and C, respectively). However, the additional information provided to Group 5 compared to Group 4 (which received information that the government plans to cut its spending) has a significant, albeit short-lived, impact on spending (Panel B). Households reduce their spending as they learn that the government is planning to cut discretionary spending, including cash transfers and vouchers. We note that this finding does not provide decisive support for either the Keynesian or the neoclassical model. If consumers in Group 5 interpret the information as a contemporaneous shock, the result aligns with the Keynesian model, where a decline in government spending leads to lower consumption spending. However, if they treat the information as a news shock, as intended, the expectation of lower future government spending leads to reduced current consumption, consistent with the neoclassical framework.[8]

V. CONCLUSION

This paper utilizes an information randomized controlled trial (RCT) implemented on a new transaction-level consumption panel of Korean households to examine how news about public debt, fiscal deficits, and future fiscal policy affects household expectations and spending. We first show that while fiscal news influences households' beliefs about future fiscal conditions, it does not significantly affect their expectations regarding other macroeconomic variables, such as inflation and real GDP growth. Since this finding contrasts with previous literature based on surveys and RCTs conducted on consumers in the US and other countries, it highlights

[8] See Ramey (2009) for details.

the importance of heterogeneous belief formation, potentially driven by differences in macroeconomic environments.

Importantly, we further demonstrate that an exogenous increase in beliefs about the future public debt-to-GDP ratio leads to higher current consumption spending— a novel finding in this literature. Finally, we report that the anticipation of cuts in discretionary expenditures, including cash transfers and vouchers, can decrease household spending, whereas anticipated government deficit reduction or tax hikes do not have significant effects on consumption.

Our findings contribute to the growing literature on the interplay between fiscal policy information and household behavior by providing novel evidence from a unique consumption panel in Korea. Future research could explore the underlying mechanisms driving these heterogeneous responses and examine whether similar patterns are held in other countries with distinct fiscal structures and policy frameworks.

References

Armona, L., Fuster, A., & Zafar, B. (2019). Home price expectations and behaviour: Evidence from a randomized information experiment. *The Review of Economic Studies*, *86*(4), 1371-1410.

Andre, P., Pizzinelli, C., Roth, C., & Wohlfart, J. (2022). Subjective models of the macroeconomy: Evidence from experts and representative samples. *The Review of Economic Studies*, *89*(6), 2958-2991.

Bachmann, R., Born, B., Goldfayn-Frank, O., Kocharkov, G., Luetticke, R., & Weber, M. (2021). *A temporary vat cut as unconventional fiscal policy* (No. w29442). National Bureau of Economic Research.

Baker, S. R., & Kueng, L. (2022). Household financial transaction data. *Annual Review of Economics*, *14*(1), 47-67.

Barro, R. J., & Bianchi, F. (2024). Fiscal Influences on Inflation in OECD Countries, 2020-2023. *NBER Working Paper*.

Beutel, J., & Weber, M. (2023). Beliefs and portfolios: Causal evidence. *Chicago Booth Research Paper*, (22-08).

Borusyak, K., Jaravel, X., & Spiess, J. (2024). Revisiting event-study designs: robust and efficient estimation. Review of Economic Studies, rdae007.

Candia, B., Coibion, O., & Gorodnichenko, Y. (2020). *Communication and the beliefs of economic agents* (No. w27800). National Bureau of Economic Research.

Cochrane, J. (2023). The fiscal theory of the price level.

Coibion, O., Gorodnichenko, Y., & Weber, M. (2021). *Fiscal policy and households' inflation expectations: Evidence from a randomized control trial* (No. w28485). National Bureau of Economic Research.

Coibion, O., Gorodnichenko, Y., & Weber, M. (2022). Monetary policy communications and their effects on household inflation expectations. *Journal of Political Economy*, *130*(6), 1537-1584.

Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, and Maarten van Rooij. 2023. "How Does Consumption Respond to News About Inflation? Field Evidence from a Randomized Control Trial." *AEJ Macroeconomics* 15 (3): 109–52.

Grigoli, F., & Sandri, D. (2024). Public debt and household inflation expectations. *Journal of International Economics*, *152*, 104003.

Kamdar, R. (2018). The inattentive consumer: Sentiment and expectations.

Kueng, L. (2018). Tax news shocks and consumption. *Swiss Finance Institute Research Paper*, (20-30).

Leeper, E. M., Richter, A. W., & Walker, T. B. (2012). Quantitative effects of fiscal foresight. *American Economic Journal: Economic Policy*, *4*(2), 115-144.

Leeper, E. M., Walker, T. B., & Yang, S. C. S. (2013). Fiscal foresight and information flows. *Econometrica*, *81*(3), 1115-1145.

Mertens, K., & Ravn, M. O. (2012). Empirical evidence on the aggregate effects of anticipated and unanticipated US tax policy shocks. *American Economic Journal: Economic Policy*, *4*(2), 145-181.

Stantcheva, S. (2024). *Why do we dislike inflation?* (No. w32300). National Bureau of Economic Research.

Ramey, V. A. (2009). Identifying government expenditure shocks: It's all in the timing (No. w15464). National Bureau of Economic Research.

Ramey, V. A. (2011). Identifying government expenditure shocks: It's all in the timing. *The Quarterly Journal of Economics*, *126*(1), 1-50.

Ramey, V. A. (2016). Macroeconomic shocks and their propagation. *Handbook of macroeconomics*, *2*, 71-162.

Roth, C., Settele, S., & Wohlfart, J. (2022). Beliefs about public debt and the demand for government spending. *Journal of Econometrics*, *231*(1), 165-187.

Weber, M., Candia, B., Afrouzi, H., Ropele, T., Lluberas, R., Frache, S., ... & Ponce, J. (2023). *Tell me something I don't already know: Learning in low and high-inflation settings* (No. w31485). National Bureau of Economic Research.

[Table 1] Descriptive statistics: Demographics and Spending.

	Control (T1)	T2	T3	T4	T5	T6	Full sample	Natl. avg.
Female	0.54	0.56	0.52	0.54	0.54	0.53	0.54	0.50
Liquidity constrained	0.35	0.37	0.35	0.34	0.35	0.34	0.35	-
Age	43.74	43.55	44.00	43.83	43.70	43.96	43.79	43.85
	(9.92)	(9.84)	(10.16)	(10.17)	(10.18)	(10.03)	(10.05)	
Education (years)	15.13	15.17	15.11	15.10	15.15	15.17	15.14	12.5
	(2.00)	(2.04)	(1.94)	(1.91)	(1.94)	(1.96)	(1.97)	
Lab inc. (KRW 1,000)	2800	2700	2600	2800	2700	2800	2700	2670
Employed (age 15-64)	0.76	0.76	0.76	0.74	0.74	0.74	0.75	0.69
Household size	2.52	2.53	2.60	2.55	2.61	2.57	2.56	2.2
	(0.84)	(0.84)	(0.84)	(0.87)	(0.81)	(0.85)	(0.84)	
Number of children	0.56	0.56	0.59	0.61	0.58	0.59	0.58	1.57
	(0.73)	(0.71)	(0.74)	(0.77)	(0.71)	(0.72)	(0.73)	
Obs. (participants)	1,923	1,908	1,873	1,909	1,853	1,796	11,262	-

Note: Labor income is self-reported, after-tax monthly income at the individual level and trimmed at 1% tails. The statistics for labor income is median, while all others are mean in standard deviation (in parentheses).

[Table 2] Descriptive statistics: Perceptions and Expectations of fiscal variables.

	Control (T1)	T2	T3	T4	T5	T6	Full sample
Panel A. Perceptions (as of year 2022)							
Public debt to GDP ratio	64.57	61.78	63.32	63.84	64.80	62.95	63.54
	(53.76)	(52.40)	(52.95)	(52.90)	(53.35)	(53.61)	(53.16)
Fiscal balance	-6.05	-5.45	-5.62	-5.94	-5.78	-6.17	-5.83
	(14.98)	(14.01)	(14.16)	(14.48)	(14.77)	(14.44)	(14.48)
Panel B. Expectations (in 10 years)							
Public debt to GDP ratio	70.25	66.98	69.12	69.88	69.45	66.74	68.76
	(49.50)	(47.94)	(49.15)	(48.60)	(48.26)	(48.26)	(48.63)
Fiscal balance	13.55	12.80	15.04	13.50	12.66	13.24	13.46
	(29.01)	(28.04)	(28.24)	(28.87)	(27.58)	(27.89)	(28.28)
Gov. spending growth	43.56	42.51	43.83	42.55	42.11	43.43	42.99
(annualized)	(43.04)	(41.29)	(41.67)	(41.68)	(41.75)	(42.07)	(41.92)
Gov. revenue growth	29.23	27.20	29.89	30.30	28.44	29.33	29.06
(annualized)	(38.56)	(37.74)	(39.88)	(39.62)	(39.09)	(38.77)	(38.95)

Note:

[Table 3] Treatment Effects of News about Fiscal Variables.

	Fiscal expectations					*Macro expectations*			
	Fiscal bal.	Debt ratio	Gov bond r	G growth	T growth	Real GDP	Inflation	Mortg. rate	Unemp rate
				A. Immediate revisions					
Public debt to GDP	0.452***	5.800***	0.096**	1.630***	0.558***	0.175	0.044	0.001	-0.025
	(0.155)	(0.200)	(0.046)	(0.207)	(0.176)	(0.111)	(0.080)	(0.006)	(0.037)
Fiscal balance	0.141***	-0.112	-0.007	-0.013	0.157**	0.022	0.016	0.004*	0.001
	(0.052)	(0.078)	(0.016)	(0.074)	(0.062)	(0.040)	(0.029)	(0.002)	(0.013)
				B. 3 months later					
Public debt to GDP	0.595***	2.898***	0.164	1.959***	1.100***	0.079	0.091	0.021*	0.099
	(0.214)	(0.390)	(0.100)	(0.271)	(0.253)	(0.149)	(0.125)	(0.013)	(0.083)
Fiscal balance	0.185**	0.010	0.019	0.002	0.258***	0.077	0.003	0.006	0.029
	(0.077)	(0.145)	(0.040)	(0.101)	(0.093)	(0.054)	(0.045)	(0.005)	(0.031)

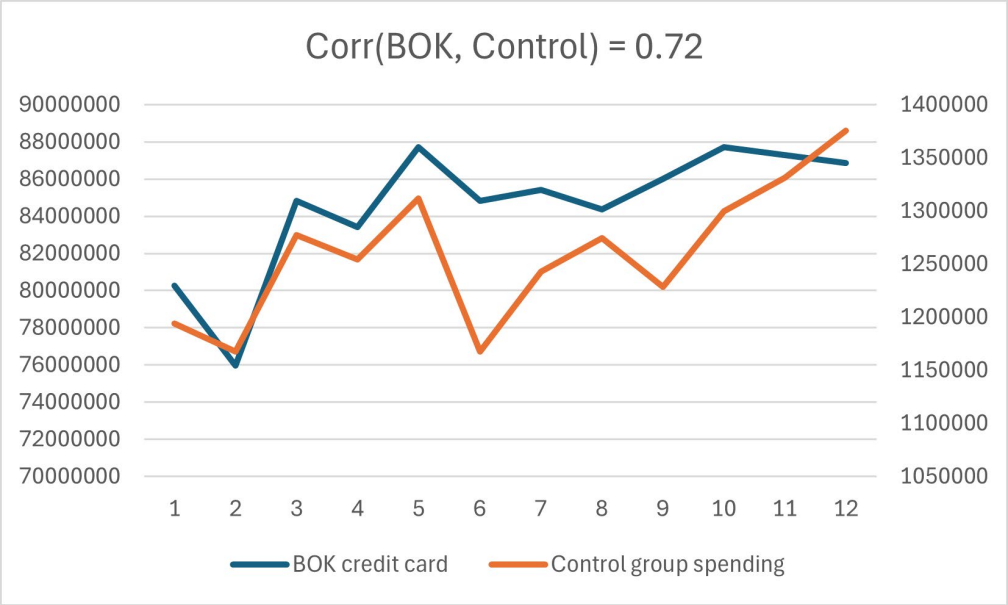
Note:

[Table 4] Treatment Effects of News about Fiscal Policy.

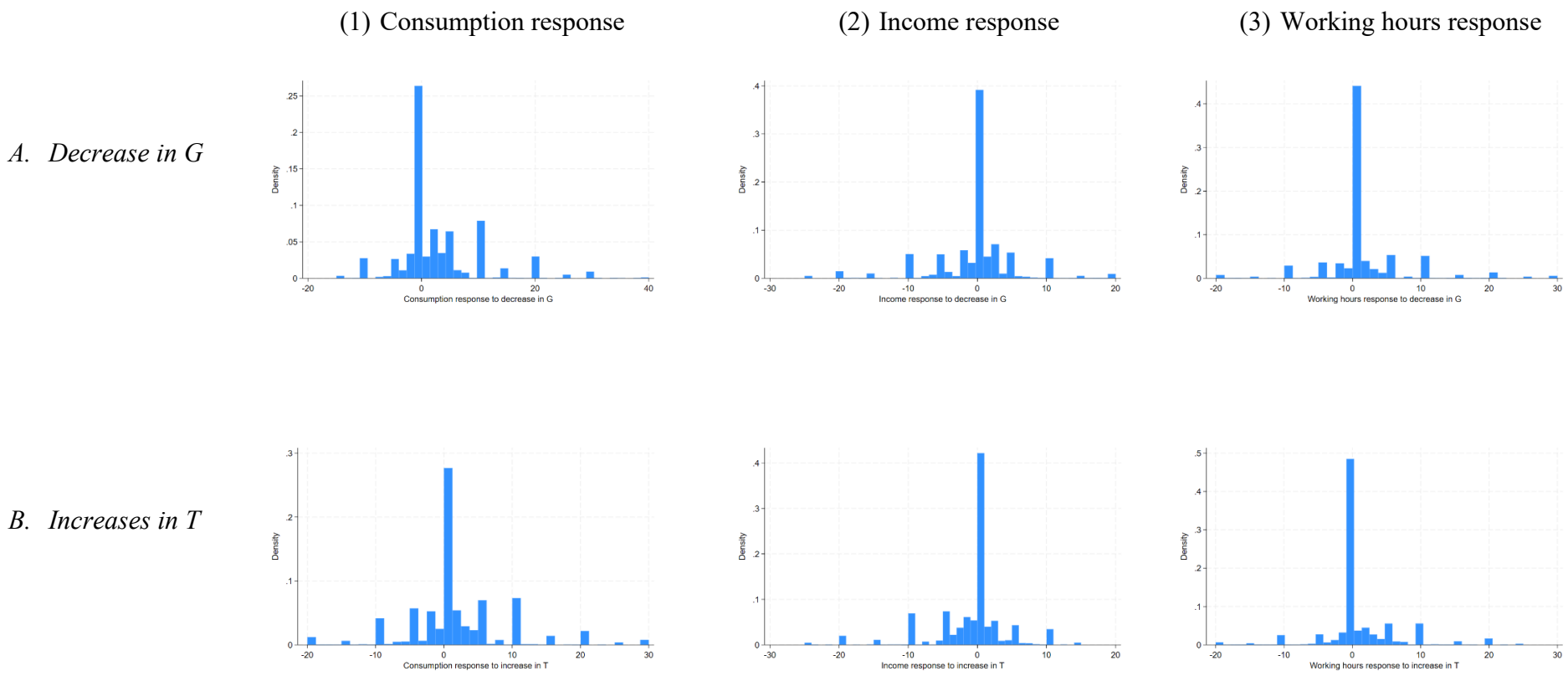
	Fiscal expectations					*Macro expectations*			
	Fiscal bal.	Debt ratio	Gov bond r	G growth	T growth	Real GDP	Inflation	Mortg. rate	Unemp rate
				A. Immediate revisions					
Group 4	2.126*	-2.875*	-0.468	-0.272	-0.685	0.324	0.396	0.024	0.309
	(1.085)	(1.710)	(0.347)	(1.514)	(1.337)	(0.822)	(0.590)	(0.046)	(0.269)
Group 5	-0.087	0.575	0.812**	-0.752	1.205	-0.287	-0.729	-0.078*	-0.092
	(1.054)	(1.636)	(0.336)	(1.516)	(1.320)	(0.834)	(0.626)	(0.046)	(0.280)
Group 6	-0.281	2.999*	0.700**	0.234	2.321*	0.137	-0.690	-0.017	0.180
	(1.090)	(1.632)	(0.319)	(1.533)	(1.314)	(0.780)	(0.570)	(0.046)	(0.279)
				B. 3 months later					
Group 4	2.313	-6.028**	-0.178	1.901	0.655	1.288	0.414	0.019	0.126
	(1.540)	(2.912)	(0.735)	(1.960)	(1.926)	(1.059)	(0.867)	(0.089)	(0.573)
Group 5	0.448	-1.659	0.290	-0.856	0.664	-0.852	0.457	-0.119	-0.312
	(1.444)	(2.942)	(0.656)	(1.985)	(1.827)	(1.068)	(0.865)	(0.093)	(0.610)
Group 6	-1.680	2.721	1.497**	-2.698	-1.307	-0.267	0.598	-0.035	-0.055
	(1.552)	(2.923)	(0.719)	(2.028)	(1.881)	(1.095)	(0.876)	(0.090)	(0.588)

Note:

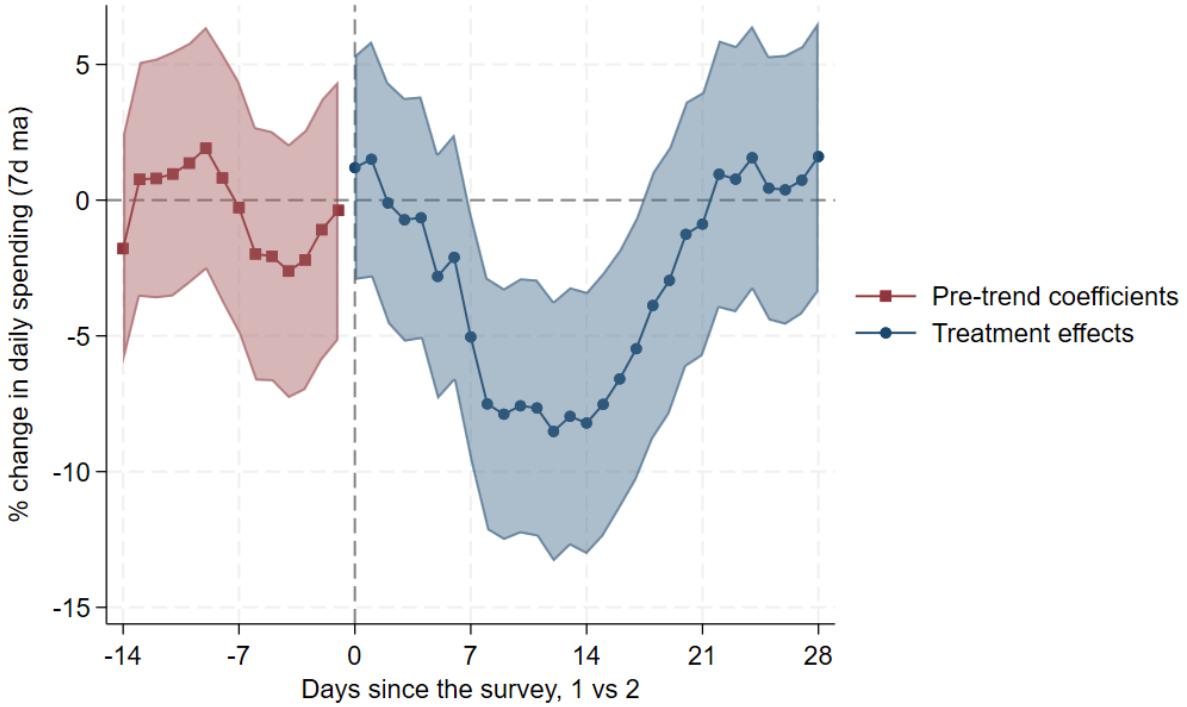
[Figure 1] Embrain Panel Big Data and the Bank of Korea data



[Figure 2] Hypothetical responses to changes in government spending or taxation

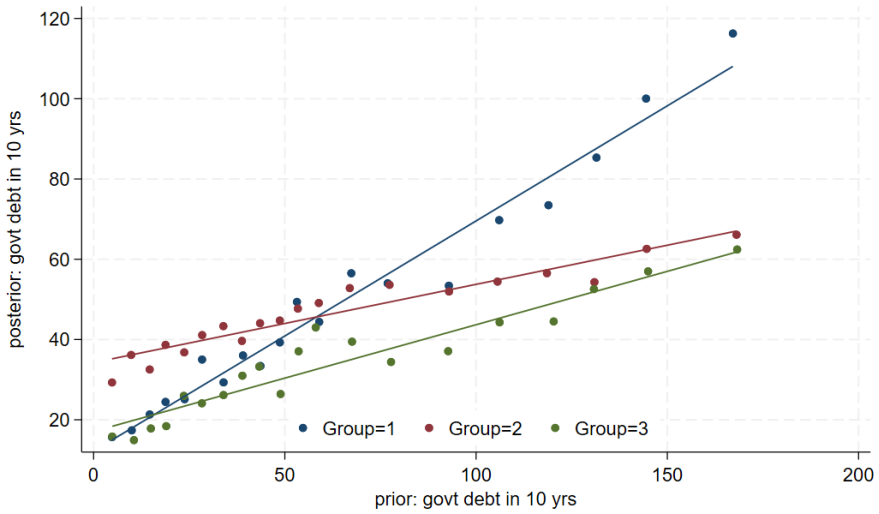


[Figure 3] Treatment Effects on Household Spending

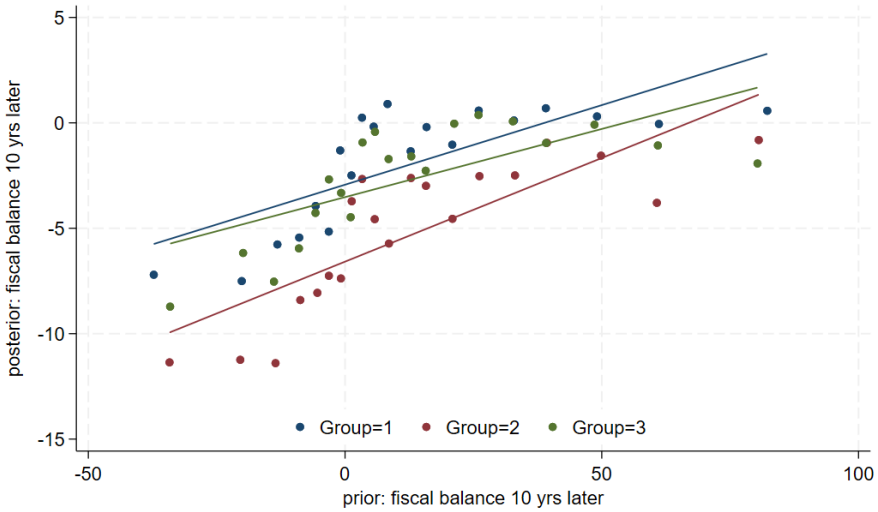


[Figure 4] Treatment Effects on Fiscal Beliefs.

Panel A. Public debt to GDP ratio

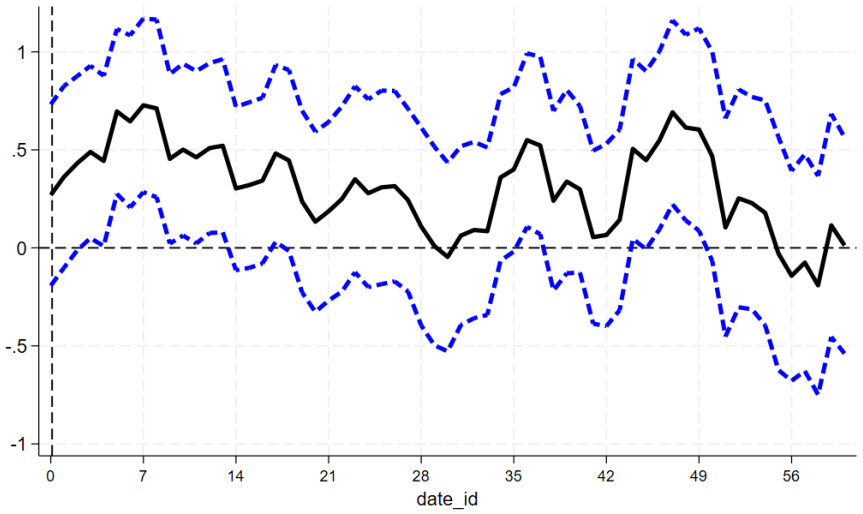


Panel B. Fiscal balance

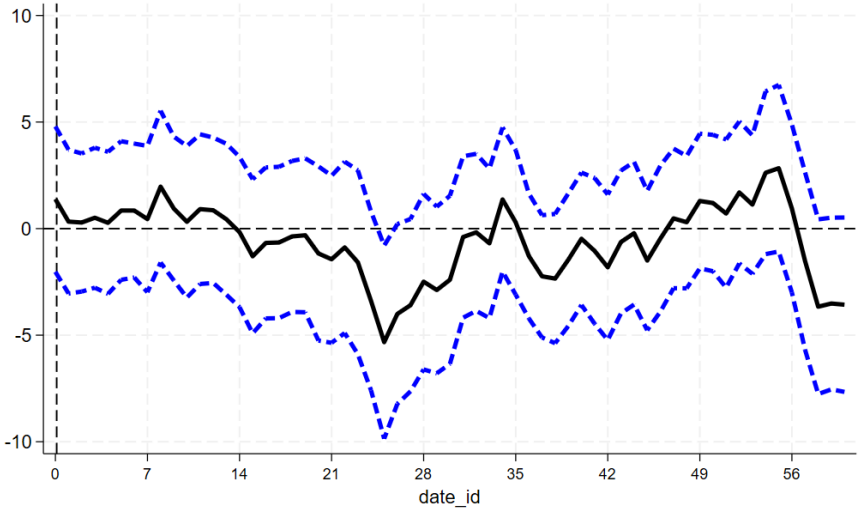


[Figure 5] IV Results on Daily Spending

Panel A. Public debt to GDP ratio

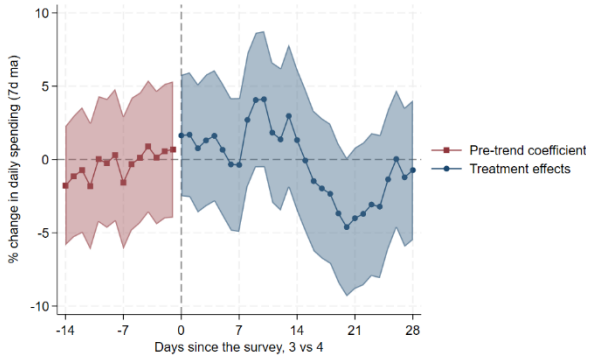


Panel B. Fiscal balance

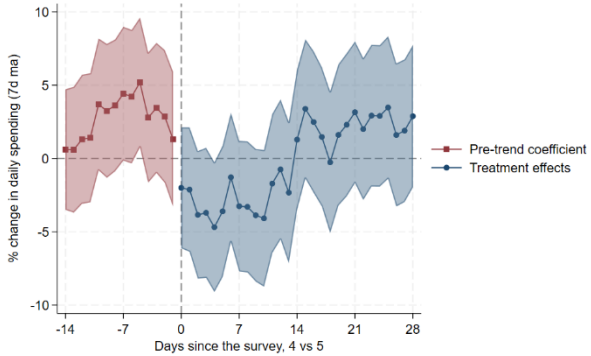


[Figure 6] Treatment Effects of Fiscal Policy on Spending

Panel A. Deficit reduction plan



Panel B. Discretionary spending cuts



Panel C. Tax rates hike

