Impact of Private Sector Perceptions of Fiscal Burden on the Fiscal Policy Effects

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Abstract

Many studies have frequently utilized fiscal data like fiscal balances and public debt to measure changes in the private sector's perceived fiscal burden. However, these variables might overlook escalating anxieties over default risk, or growing uncertainties of the fiscal burden. Therefore, in this study, we created indices to represent the fiscal burden from newspaper articles, and verify whether the approach of previous research using fiscal data adequately captures the private sector's perception of the fiscal burden. We estimated SVEC model and conducted impulse response analysis, to analyze the impact of fiscal burden which cannot be fully captured by fiscal balances, on private demand such as consumption and GDP.

The analysis confirms that rising fiscal burden decreases consumption and GDP. This result holds true even when accounting for increase in fiscal burden due to economic downturns, or the decrease in private demand due to fiscal balances. These findings suggest that fiscal balance data alone may fall short in fully encapsulating the extent of the fiscal burden perceived by the private sector. Additionally, it can be said that newspaper articles predicting fiscal deterioration provide valuable supplementary information on the fluctuations in the private sector's perceived fiscal burden.

Key words and phrases: Fiscal Anxiety, Ricardian Equivalence Theorem, Non-Keynesian Effect

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none

1. Introduction

As many theoretical analyses have pointed out, the effectiveness of fiscal policy depends on the perception of the fiscal burden by the private sector. Therefore, empirical analyses of fiscal policy often attempt to understand the fiscal burden perceived by the private sector by utilizing fiscal data such as government expenditures, fiscal balances, and public debt levels. Such research includes studies on Ricardian equivalence theorem (Kochin, 1974; Feldstein, 1982; Aschauer, 1985; Chakraborty and Farah, 1996, etc.), non-Keynesian effects (Giavazzi and Pagano, 1990; Giavazzi and Pagano, 1996; Perotti, 1999; Hjelem, 2002, etc.), and studies on the state dependence of fiscal policy (Corsetti, 2012; Ilzetzki et al., 2013; Nickel and Tudyka, 2014; Auerbach and Gorodnichenko, 2017, Huidrom, 2020, etc.). However, it is challenging to fully capture changes in the private sector's perception of the fiscal burden using fiscal data alone.

There are two main problems with the approach of using fiscal data to capture the perception of the fiscal burden by the private sector. The first problem is that fiscal data cannot capture the private sector's expectations. The magnitude of the fiscal burden is also influenced by the private sector's expectations of future fiscal policy. Therefore, in empirical studies of Ricardian equivalence theorem like Aschauer (1985), researchers construct ad hoc models (e.g., simple autoregressive models) to estimate government expenditures expected for the current period. Similarly, empirical analyses of non-Keynesian effects, starting with Giavazzi and Pagano (1990), attempt to capture changes in the private sector's expectations of future policies through changes in government expenditures, fiscal balances, and public debt levels. However, even with the above approach, fiscal data cannot capture future policy expectations based on the information available to the private sector in real time at the time, since they represent ex post results of fiscal conditions.

The second problem is that fiscal data cannot capture private sector fiscal anxiety. A temporary increase in the fiscal anxiety could affect the private sector's perception of the fiscal burden and alter private demand; for one, there could be a case of increased fiscal policy uncertainty; Fernández-Villaverde et al. (2015) find that during periods of increased fiscal policy uncertainty, households are increase their precautionary savings and reduce consumption. However, fiscal data cannot capture such changes in fiscal policy uncertainty. Another example is the private sector's growing concern about default. Roldan (2022) point out that even if default does not actually occur, the private sector's perception of risk may lead it to increase its savings in preparation for future fiscal burdens, thereby decreasing consumption. However, fiscal data do not contain sufficient information on default risk. Orphanides (2018) points out that, using the European sovereign debt crisis as an example, even sovereigns with sound fundamentals may experience downgrades or defaults if investors anticipate central banks refusing to accept government bonds. However, information regarding investor confidence in government bonds and central banks' acceptance of these bonds is not included in fiscal data.

Therefore, in this study, we aim to verify whether the approach of previous research using fiscal data adequately captures the private sector's perception of the fiscal burden. Specifically, we create a new index representing the private sector's perception of the fiscal burden from

newspaper articles and analyze whether this new index can affect private sector demand even when controlling for fiscal data.

The reason for utilizing newspaper articles when creating an index representing the fiscal burden is that newspaper articles contain diverse information relevant to understanding the perception of the fiscal burden. First, newspaper articles include information such as fiscal planning, government announcements, and parliamentary debates. Since these pieces of information are available in real-time to the private sector, they are suitable for capturing the private sector's expectations of future policies at that time. Second, newspaper articles contain articles related to policy uncertainty and an increase in default risk. Therefore, newspaper articles contain information that can be useful for capturing fluctuations in private sector fiscal concerns. Hence, by utilizing newspaper articles, it is possible to create an index that supplements changes in the perception of the fiscal burden not captured by fiscal data.

The specific flow of the analysis is as follows. Firstly, in this study, we construct an index to measure the private sector's fiscal burden based on the fiscal sentiment index created by Kameda (2020) from newspaper articles, which Kameda used to analyze the impact of fiscal deterioration on interest rates. There are primarily two advantages to using this index as a basis. First, the newspaper articles used to create the fiscal sentiment index are suitable for capturing articles related to the private sector's fiscal burden. The fiscal sentiment index aggregates articles daily, classifying them into those containing information that financial markets react positively to and those containing information that financial markets react negatively to, and is based on the difference in the number of such articles. Therefore, articles classified as negative (positive) can be interpreted as containing information that increases (decreases) the fiscal burden. Second, this index is based on the Nikkei Shimbun, allowing it to be used for the analysis of Japan. The fiscal anxiety in Japan are likely to experience more significant fluctuations compared to other advanced economies due to its high government debt-to-GDP ratio. For these reasons, in this study, we reaggregate Kameda's (2020) index on a quarterly basis and refer to them as the "Fiscal Deterioration Expectation Index" and the "Fiscal Soundness Expectation Index," respectively, as new indices representing the private sector's fiscal burden.

Subsequently, we estimate impulse response functions to shocks in these indices using a six-variable SVEC model that includes variables representing demand (private consumption, GDP) and fiscal data (primary expenditures and revenues). If, even after controlling for fiscal data, these indices have a significant impact on aggregate demand, it can be concluded that fiscal data alone do not capture changes in the private sector's perception of the fiscal burden that affect private sector demand.

The results of the analysis can be summarized as follows: In the impulse response analysis, an increase in the Fiscal Deterioration Expectation Index was found to consistently reduce both real consumption and real GDP. This result indicates that fiscal data alone do not capture changes in the perception of the fiscal burden that affect private sector demand. On the other hand, an increase in the Fiscal Soundness Expectation Index did not have a significant impact on real consumption and real GDP. Additionally, these results remained robust even after considering

the simultaneity issue in the relationship between fluctuations in the indices and economic variables and conducting analyses that controlled for the influence of fiscal data on private sector demand.

The structure of this paper is as follows: In Section 2, we review previous studies that analyze the relationship between the private sector's perception of the fiscal burden and the effectiveness of fiscal policy. In Section 3, we provide an explanation of the analytical methodology and data used in this study. In Section 4, we present the results of our analysis, and in Section 5, we conclude.

2. Preceding Literature

In this section, we will first provide a review of theoretical analyses that explain the relationship between the size of fiscal burdens perceived by the private sector and the effects of fiscal policy on private demand. Traditional neoclassical theory often posits that the effects of fiscal policy are less potent than Keynesian economics would suggest. Barro (1974), for instance, demonstrated in an infinite-horizon model—where each generation considers the utility of its successors—that households view public debt as future tax obligations. Thus, tax cuts that don't modify the present discounted value of the tax burden may not influence household consumption. Moreover, Aschauer (1988) suggested that in cases where no substitutability between government spending and private consumption and no productivity of public spending exist, expanding government spending could heighten households' lifetime tax liability. This can cause a corresponding drop in consumption, potentially negating the effects of increased government spending. Even in Blanchard's (1985) finite-horizon model, which presupposes severed intergenerational ties, rising government spending decreases consumption by the future tax liability imposed on the current generation. But since not all the tax burden falls on the current generation, consumption doesn't drop by the full fiscal spending amount, resulting in a multiplier effect of less than one. Therefore, neoclassical theory highlights that the private sector's interpretation of debt-financing as a future tax obligation can curb consumption and lessen the multiplier effect.

Moreover, non-Keynesian theories indicate that the private sector's consumption may decrease more than the current bond issuance amount, and the effect of fiscal policy could be contrary to Keynesian theory. This occurs when the private sector recognizes not just the increasing tax burden from current fiscal policy, but also distortionary tax collection effects and the potential for unexpected tax burden. For instance, Bertla and Drazen (1993) suggested that if a government persists in fiscal expansion even when government spending hits a critical level, households might anticipate a lack of future spending cuts and potential large-scale tax hikes, leading to a sharp fall in consumption. Additionally, Perotti (1999) showed that if public debt resulting from current fiscal spending is collected via a distortionary tax, households could foresee a more significant reduction in permanent income from future taxes and distortions than the anticipated increase from the multiplier effect, thereby suppressing private consumption.

In the light of these theories, empirical research often utilizes fiscal data, such as fiscal

balances and public debt, to measure the perceived fiscal burden of the private sector. Next, we review these empirical analyses. The analyses can be mainly categorized into three strands: studies on the neutrality proposition, non-Keynesian effects, and the state-dependency of fiscal policies.

Research on the neutrality proposition has added fiscal data other than government spending to macro consumption functions to examine whether these added variables influence consumption (Kochin, 1974; Feldstein, 1982; Seater, 1993). Similarly, some studies have tested the neutrality proposition by adding fiscal data, which is not to be included in the Euler equation or consumption function derived from intertemporal optimization problems, into the model (Aschauer, 1985; Evans, 1988; Chakraborty and Farah, 1996; Graham and Himarious, 1996).

Non-Keynesian effects research captures changes in the private sector's perceived fiscal burden using variations in the fiscal balance and estimates the impact of fiscal policy changes on consumption (Giavazzi and Pagano, 1990; Giavazzi and Pagano,1996; Perotti, 1999; Giavazi et al., 2000; Giavazzi et al, 2005; Afonso, 2010).

Research on the state-dependency of fiscal policy uses public debt to capture the increasing fiscal burden perceived by the private sector and tests whether the effect of fiscal policy changes depending on the level of public debt (Perotti,1999; Kameda, 2012; Ilzetzki et al., 2013; Nickel et al., 2014; Auerbach and Gorodnichenko, 2017; Huidrom et al., 2020).

As noted above, many empirical analyses attempt to capture perceptions of fiscal burden from fiscal data with insufficient information on future policy expectations and fiscal anxiety, and the results of such analyses can be misleading.

3. Methodology

3.1 Method of Creating the Index

In our paper, we construct a new fiscal index based on the Fiscal sentiment index developed by Kameda (2023). His Fiscal sentiment index is daily data constructed by subtracting the number of articles related to fiscal deterioration from the number of articles related to fiscal consolidation. We re-aggregate each type of article on a quarterly basis and call them a "Fiscal Deterioration Expectation Index" and a "Fiscal Consolidation Expectation Index".

The specific classification method of articles by Kameda (2023) is as follows: first, the articles containing the term "zaisei" from the first quarter of 1986 to the first quarter of 2017 (117,986 in total) are downloaded from *Nikkei Telecon 21* database of *Nikkei* newspaper. the term "zaisei" is a very general word covering "fiscal," "public finance," or (government) budget." Second, 500 of these articles are randomly selected and categorized into three types: negative articles leading to expectations of fiscal deterioration, positive articles leading to fiscal consolidation expectations, and articles unrelated to fiscal expectations. For example, articles about fiscal expansion due to government bond issuance are categorized as negative, while articles about enacted tax increases, expected to lead to fiscal consolidation, are categorized as positive. Finally, the Naive Bayes method is used to categorize the remaining articles, using the selected 500 as training data.

In this analysis, it is posited that an increase in the number of negative articles corresponds with periods of heightened fiscal burden in the private sector, and an increase in those of positive articles corresponds with periods of eased fiscal burden. We then use the total number of negative and positive articles for each quarter as indices representing the private sector's perceived fiscal burden.

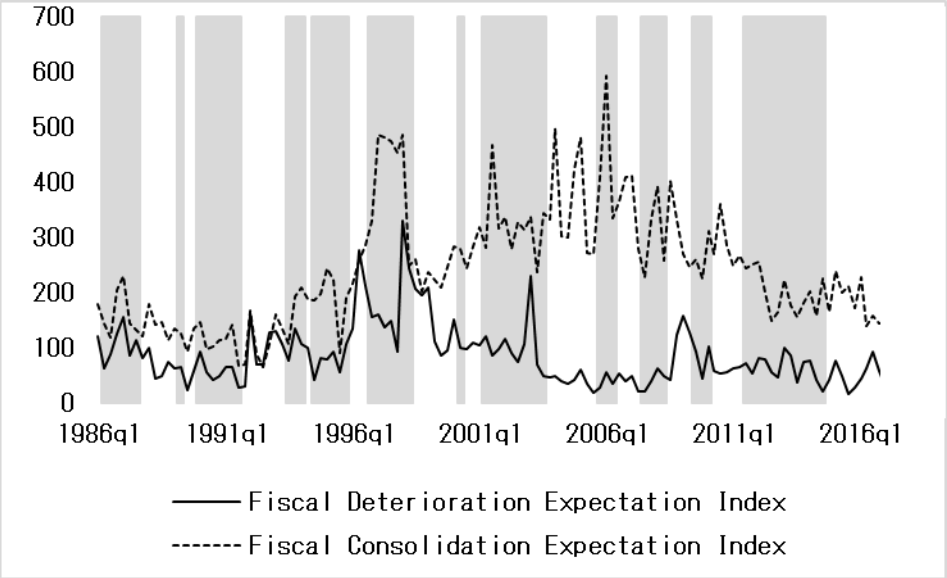
$$n_t = \Sigma_{i=1}^{\mathrm{N_t}} Negative_{it} \quad (\mathrm{Eq.}\ 1)$$
$$p_t = \Sigma_{i=1}^{\mathrm{K_t}} Positive_{it} \quad (\mathrm{Eq.}\ 2)$$

$Negative_{it}$ and $Positive_{it}$ represent the number of negative and positive articles on day i of quarter t, respectively, while N_t and K_t are the total number of negative and positive articles in quarter t. Thus, N_t represents the period when negative articles increased the sense of fiscal burden, while P_t serves as an indicator of the period when positive articles decreased the sense of fiscal burden. newspaper articles from the first quarter of 1986 to the first quarter of 2017 are used. As mentioned earlier, these indices are hereafter referred to as the fiscal deterioration expectations index and the Fiscal Consolidation Expectations Index.

Figure 1 shows the transition of the Fiscal Deterioration Expectation Index and the Fiscal Consolidation Expectation Index. The response of each index is the opposite in a period when the fluctuations in financial anxiety are considered to be significant. These indices show that during the second Hashimoto administration (1996Q4 – 1998Q2), when fiscal structural reforms such as raising the consumption tax rate and abolishing special tax cuts were implemented, the Fiscal Deterioration Expectation Index temporarily decreases, and the Fiscal Consolidation Expectation Index significantly increases. After that, towards the end of the Hashimoto administration when the fiscal policy shifted to expansion, the Fiscal Deterioration Expectation Index increased and the Fiscal Consolidation Expectation Index decreased.

Also, during the Koizumi administration (2001 Q2- 2006 Q3), when a primary balance surplus and a reduction in debt balance to GDP were aimed at, the Fiscal Deterioration Expectation Index once again declined, and the Fiscal Consolidation Expectation Index rose in accordance with the deliberation of the parliamentary budget. Therefore, these indices can be said to be moving in a way that is consistent with the policy direction of the government at the time.

Figure 1: Trend of the Indices



3.2 Data

Our VAR model include the following six variables: Fiscal Deterioration Expectation Index, Fiscal Consolidation Expectation Index, the logarithmic value of real GDP per capita, the logarithmic value of real private consumption per capita, the logarithmic value of primary revenue per capita, and the logarithmic value of primary expenditure per capita.

The reason for focusing on these six variables is our study focuses on the effects of the fiscal burden that may remain even after excluding the effects captured in fiscal data. If the shock to the indices has any effects on the private consumption even under controlling the fiscal variables constant, we can say that the fiscal burden has additional effect other than the fiscal variables.

In creating these four variables other than the indices, we use the "2009 System of National Accounts" for the period from 1986 to 1993, and the "2019 System of National Accounts" thereafter. To ensure consistency between the two series, we calculate the ratio of the post-series to the pre-series for each variable on the first quarter of 1994 and multiply it by the pre-series. Then, we convert these variables into per capita values by dividing them by the total population from the "Population Estimates." of Japanese Statistics Bureau. Lastly, we seasonally adjust these variables with X-12-ARIMA and convert them into logarithmic values. Note that we use the value of final consumption expenditure of the household sector as real consumption. Moreover, we follow the procedure used by Kameda (2012) to create primary expenditures and primary revenues: These variables are constructed by excluding revenues and expenditures of social security fund sector from those of the general government (for details, see Appendix of Kameda (2012)).

3.2 Estimation Model

The stationarity of the time series data is crucial when employing the time-series analysis. Phillips (1998) highlighted that if the variables in the model are non-stationary, impulse

responses derived using OLS estimates from the level VAR model lack consistency. Hence, if the variables possess a unit root, one should not derive impulse responses from the level VAR model.

Table 1 presents the results of the Augmented Dickey-Fuller test for the six variables. At the level value, except for real private consumption and real GDP, the null hypothesis of having a unit root is not rejected for all variables. However, depending on whether trend exits, the null hypothesis for real private consumption and real GDP is not rejected. Since the bias is more pronounced when non-stationary process is treated as stationary than stationary process is treated as non-stationary, we treat these two variables non-stationary. As in the third and the fourt columns in the table. the null hypothesis of a unit root is rejected for all variables when the first difference is taken, we interprete all variables as I(1) variables.

Next, to verify the presence of cointegration relationships among the variables, we construct following the Vector Error Correction (VEC) model (Eq.3) and conduct the Johansen test.

$$\Delta \boldsymbol{Y_t} = \boldsymbol{C_0} + \boldsymbol{\pi Y_{t-1}} + \boldsymbol{\Sigma_{i=1}^{7} C_{t-i} \Delta Y_{t-i}} + \boldsymbol{u_t} \qquad \text{(Eq.3)}$$

In this model, $\boldsymbol{Y_t} = [\, g_t,\ t_t, n_t, p_t, c_t, y_t]'$and $\boldsymbol{u_t}$ denote the error term. The lag length in the model is selected at 7 using the BIC for the level VAR model[1].

Table 2 presents the results of the Johansen trace test and the maximum eigenvalue test. Although the null hypothesis of zero cointegration relationships is rejected, the null hypothesis of one or fewer was not rejected, suggesting that a single cointegration relationship exists among the variables. Consequently, in this analysis, we estimate the VEC model (Eq.3) using OLS and perform impulse response analysis.

[1] We also use the modified Q statistic to ensure that the VAR model residuals follow a white noise process.

Table 1 ：Results of the Augmented Dickey-Fuller test

Variables	In Level		In 1st Difference	
	Constant	Trend	Constant	Trend
Primary expenditure	-2.9022 (2)	-2.7585 (2)	-9.8295***(2)	-9.9868***(2)
Primary revenue	-2.7592 (5)	-2.7586 (5)	-3.8466***(4)	-3.8293** (4)
Fiscal Deterioration Expectation Index	-2.4160 (4)	-2.6059 (4)	-9.8954***(3)	-9.8664***(3)
Fiscal Consolidation Expectation Index	-1.3948 (8)	-1.0227 (8)	-6.5708***(7)	-6.7112***(7)
Real private consumption	-3.1868 (4)	-4.1372***(4)	-4.5095***(3)	-4.7751***(3)
Real GDP	-4.2924***(5)	-3.9607 (5)	-5.3110***(3)	-6.2887***(4)

Note 1: The values in parentheses represent the lag length. After identifying the lag length using BIC, it was extended until the residuals became white noise as verified by the adjusted Q-statistics.

Note 2: *** and ** indicate that the null hypothesis of having a unit root is rejected at significance levels of 1% and 5%, respectively.

Table 2 ：Results of the Johansen Cointegration Test

Null Hypothesis	Alternative Hypothesis	Trace Statistics
rank= 0	rank > 0	124.66
rank ≤1	rank > 1	83.00***
Null Hypothesis	**Alternative Hypothesis**	**Maximum eigenvalue statistics**
rank=0	rank=1	41.65
rank=1	rank=2	32.33**

Note 1: *** and ** indicate that the null hypothesis of having a unit root is rejected at significance levels of 1% and 5%, respectively.

3.3 Identification of the Structural Shocks

To estimate the impact of the Fiscal Deterioration Expectation Index and Fiscal Consolidation Expectation Index on private demand, it is necessary to identify structural shocks. The relationship between reduced form shocks and structural form shocks in the above VEC model can be expressed as follows (Eq.4).

$$\begin{bmatrix} 1 & -b_{gt} & -a_{gn} & -a_{gp} & -a_{gc} & -a_{gy} \\ -b_{tg} & 1 & -a_{tn} & -a_{tp} & -a_{tc} & -a_{ty} \\ -\gamma_{ng} & -\gamma_{nt} & 1 & -b_{np} & -a_{nc} & -a_{ny} \\ -\gamma_{pg} & -\gamma_{pt} & -b_{pn} & 1 & -a_{pc} & -a_{py} \\ -\gamma_{cg} & -\gamma_{ct} & -\gamma_{cn} & -\gamma_{cp} & 1 & -a_{cy} \\ -\gamma_{yg} & -\gamma_{yt} & -\gamma_{yn} & -\gamma_{yp} & -\gamma_{yc} & 1 \end{bmatrix} \begin{bmatrix} u_t^g \\ u_t^t \\ u_t^n \\ u_t^p \\ u_t^c \\ u_t^y \end{bmatrix} = \begin{bmatrix} \varepsilon_t^g \\ \varepsilon_t^t \\ \varepsilon_t^n \\ \varepsilon_t^p \\ \varepsilon_t^c \\ \varepsilon_t^y \end{bmatrix} \quad \text{(Eq.4)}$$

To identify the structural shocks, it is necessary to impose coefficient constraints on 15 of the above parameters. Based on previous research, the following constraints are imposed on the parameters to the right of diagonal components of the coefficient matrix.

Firstly, following Blanchard and Perotti (2002), we assume that it takes at least one quarter lag for discretionary fiscal policy to be implemented and for primary expenditure and primary revenue to change, setting $a_{gn} = a_{gp} = a_{gc} = a_{gy} = a_{tn} = a_{tp} = 0$. Regarding a_{tc} and a_{ty}, we assume they represent changes in tax revenue through the automatic stabilization function of the economy. Similar to Blanchard and Perotti (2002), we conducted estimates using information on the tax system. As a result of the estimates, we set $a_{tc} = 0.33$ and $a_{ty} = 0.83$[2].

Next, concerning the coefficients for the Fiscal Deterioration Expectation Index and the Fiscal Consolidation Expectation Index, we assumed that changes in consumption or GDP do not affect the index at the same point, setting $a_{nc} = a_{ny} = a_{pc} = a_{py} = 0$. We also need to impose a constraint on either b_{np} or b_{pn}, but there is no valid assumption for determining the order of variables, so we estimate both cases where $b_{np} = 0$ and$b_{pn} = 0$.

Furthermore, we assume that the consumption elasticity value for temporary income equals the proportion of non-Ricardian households under liquidity constraints, setting a_{cy}=0.129 based on Hara et al. (2016).

Lastly, either b_{gt}or b_{tg} can be set to 0 to identify structural shocks. As a result of the analysis, no significant differences are confirmed regardless of which was set to 0, so this study presents results assuming $b_{gt} = 0$.

In this analysis, we carried out structural shock identification by sequentially estimating from the first line of (Eq.3) under the above 15 coefficient constraints. It should be noted that due to simultaneity issues, the OLS estimates of γ_{nt}, γ_{pt}, γ_{pn}, γ_{ct}, γ_{cn}, γ_{cp}, γ_{yt}, γ_{yn}, γ_{yp}, and γ_{yc} do not possess consistency. Therefore, for the estimation equations where simultaneity issues arise, we carry out estimates using two-stage least squares, with the estimated structural form

[2] See Appendix A for details on the estimation methodology for a_{tc} and a_{ty}.

shock values $\hat{\varepsilon}_t^t$, $\hat{\varepsilon}_t^n$, $\hat{\varepsilon}_t^p$, $\hat{\varepsilon}_t^c$, and $\hat{\varepsilon}_t^y$ as instrumental variables for each reduced form shock. For instance, when estimating the coefficient γ_{nt} for the third equation of u_t^t, the already estimated $\hat{\varepsilon}_t^t$ from the second equation is used as an instrumental variable.

4. Estimation Results

4.1 Benchmark case

Figure 2 displays the cumulative impulse responses to a one standard deviation shock in the Fiscal Deterioration Expectation Index. The first column represents the scenario where $\mathrm{b}_{\mathrm{np}} = 0$ while the second corresponds to $\mathrm{b}_{\mathrm{pn}} = 0$. We derived 90% confidence intervals from 1000 bootstrap samples.

The findings from Figure 2 show that an upsurge in the Fiscal Deterioration Expectation Index notably suppresses real private consumption and real GDP, even after controlling for primary expenditure and primary revenue. In total, real consumption and real GDP fell by 1.379% and 1.039%, respectively. These results indicate that the increase in the fiscal anxiety, which the primary balance cannot captures, affects private demand. Moreover, these results mean that newspaper articles leading to the prediction of the fiscal deterioration provide valuable information for identifying changes in private sector's perceived fiscal burdens.

Next, we pay attention the response of the fiscal data. In our analysis, we assumed that discretionary fiscal policy wouldn't be implemented at the same time as the shock. Consequently, the first-period impulse response of fiscal data merely exhibits a minor reaction due to automatic tax adjustment. From the second period onwards, the impulse response signifies an expansion in primary expenditures and a contraction in primary revenues. It is impossible to conclude whether these responses reflect the realization of the fiscal deterioration expected by the private sector at the time of the rise in the Fiscal Deterioration Expectations Index, or whether they reflect fiscal expansionary policies in response to the decline in private demand in the first period. The important point here is that neither real consumption nor real GDP has recovered despite the expansionary response of fiscal data. Consistent with previous studies on non-Keynesian effects, these results suggest potential attenuation of fiscal policy's impact due to an increase in the private sector's perceived fiscal burden. In addition, these results remain stable even when modifying the variable order of the Fiscal Deterioration Expectation Index and Fiscal Consolidation Expectation Index, as shown in the second column.

Figure 3 shows the cumulative impulse responses to a shock in the Fiscal Consolidation Expectation Index. As discerned from Figure 3, neither real consumption nor real GDP exhibits a significant reaction to the Fiscal Consolidation Expectation Index shock. This estimation result remains robust even when switching the variable order of the Fiscal Deterioration Expectation Index and Fiscal Consolidation Expectation Index.

Our findings imply that the surge in fiscal burden perceived by private sector, as captured by the Fiscal Deterioration Expectation Index, may not be accurately reflected by fiscal balances or public debt balances. Therefore, empirical analyses that utilize fiscal data as a proxy for the magnitude of the fiscal burden perceived by the private sector might misinterpret the estimation

results. The estimated outcomes supporting the neutrality proposition may not stem from intergenerational linkages but could result from an increase in private demand due to tax cuts being offset by suppressed private demand owing to fiscal anxieties. Furthermore, the ambiguous results regarding non-Keynesian effects and the state dependence of fiscal policy may stem from not fully considering the fiscal burden perceived by the private sector.

Figure 2: Cumulative Impulse Responses for a Shock of the Fiscal Deterioration Expectation Index

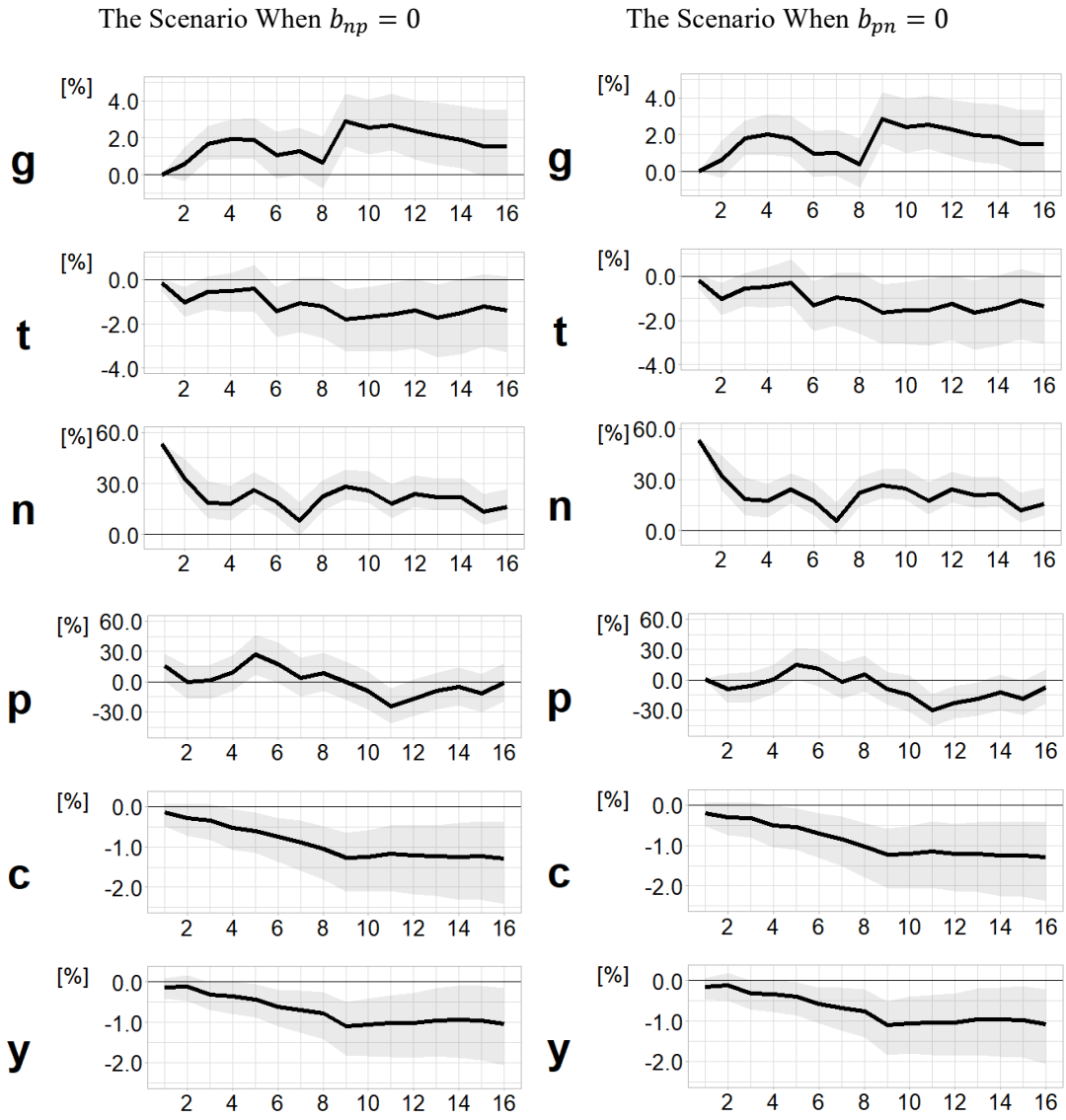
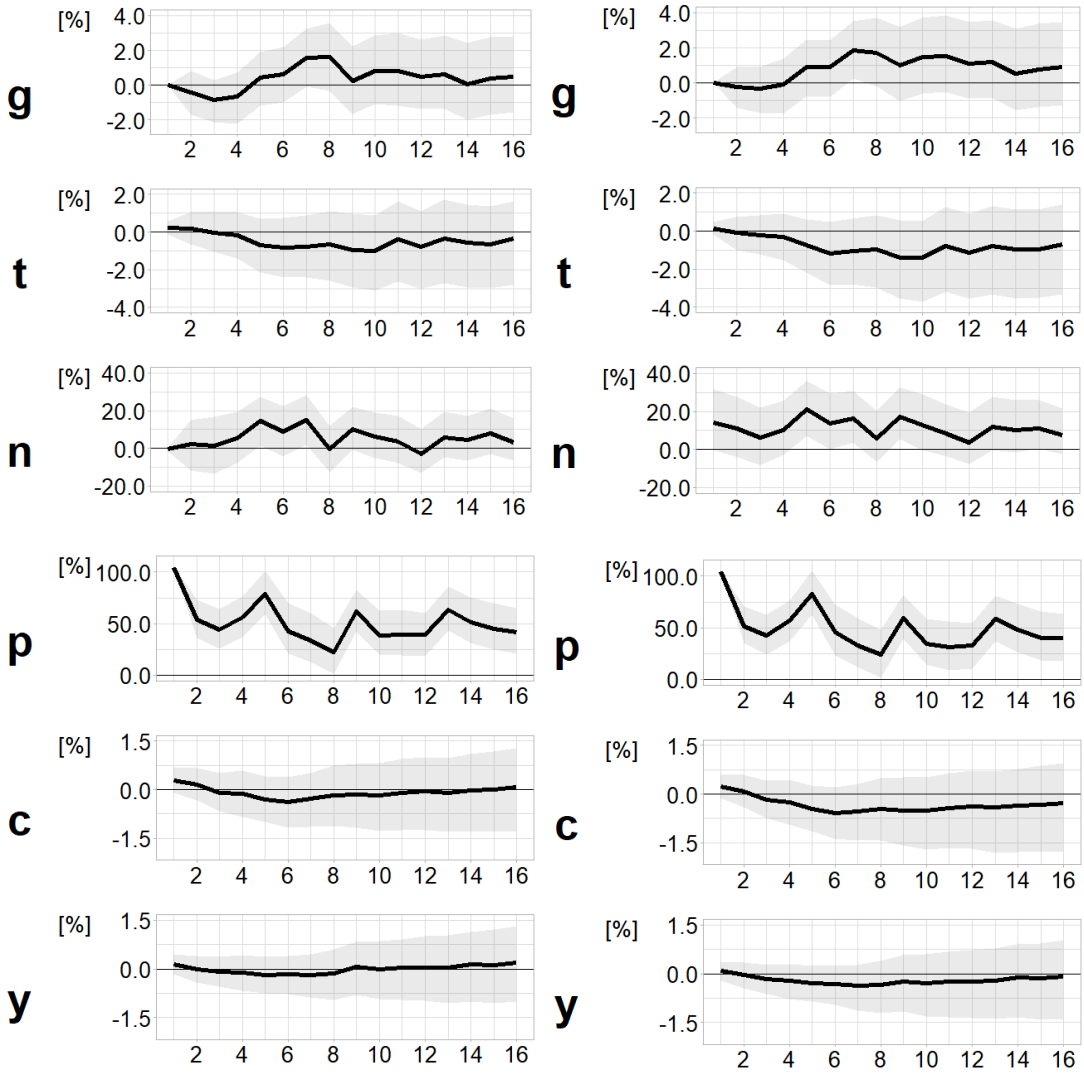


Figure 3: Cumulative Impulse Responses for a Shock of the Fiscal Consolidation Expectation Index

The Scenario When $b_{np} = 0$ | The Scenario When $b_{pn} = 0$



4.2 Robustness Check

In the benchmark case, we imposed the restrictions a_{ny}=a_{py}= 0 when identifying structural shocks. These constraints imply that business cycles do not affect fiscal unease contemporaneously. However, realistically, an economic downturn might elevate the Fiscal Deterioration Expectation Index (a_{ny}<0) and decrease the Fiscal Consolidation Expectation Index (a_{py} > 0) due to the anticipation of expansionary fiscal policy. If such a scenario is correct, there could be a negative bias in the benchmark case's estimate of a_{yn} and a positive bias in the estimate of a_{yp}. Thus, the impulse response of the benchmark case may overestimate the effect of the Fiscal Deterioration Expectations Index (Fiscal Consolidation Index) in suppressing (increasing) real GDP.

In Figure 4, we estimated a model with $a_{ny} = a_{py} = 0$ replacing $a_{yn} = a_{yp} = 0$. This identification constraint assumes that while the fiscal deterioration and fiscal consolidation expectations indices are affected by simultaneous GDP, changes in these indices do not affect contemporaneous GDP through channels other than consumption. The first column in Figure 4 shows the cumulative impulse responses to a shock in the Fiscal Deterioration Expectation Index. The results indicate little variation in any variable compared to the benchmark case, suggesting that the benchmark results are not reflecting an increase in the Fiscal Deterioration Expectation Index due to a decrease in GDP. The second column of Figure 4, representing the cumulative impulse responses to a Fiscal Consolidation Expectation Index shock, also revealed no substantial changes from the benchmark case.

Next, in the benchmark case, we note that fiscal data showed an expansionary response to shocks in the Fiscal Deterioration Expectation Index. Despite this expansionary reaction in fiscal data, private demand decreased, hinting at the occurrence of non-Keynesian effects. If such non-Keynesian effects are indeed happening as pointed out by prior research, the results of the impulse response may simply reflect the reduction in private sector demand due to fiscal deficit deterioration. In this case, it cannot be inferred that the Fiscal Deterioration Expectation Index contains specific information about the private sector's perception of fiscal burden.

Hence, in Figure 5, we conducted a cumulative impulse response analysis using a model that sets all coefficients of primary expenditures and primary revenues in the explanatory variables of the VEC model to zero. This impulse response demonstrates the effect of the indices on private demand in a counterfactual model where fiscal balances do not respond to shocks in the Fiscal Deterioration Expectation Index or Fiscal Consolidation Expectation Index. As can be observed from Figure 5, even in this counterfactual model, we found a reduction in real private consumption and real GDP. Real private consumption and real GDP decreased by 1.976% and 2.195%, respectively, which is a larger decrease in these variables than in the benchmark case. Therefore, the decline in private demand observed in the benchmark case is not due to the impact of the deteriorating fiscal balance but to an increase in the fiscal deterioration index. In addition, the results of the benchmark case, where fiscal data exhibit expansionary responses but private demand does not recover, can be interpreted as the suppressive effect on demand due to the perceived increase in fiscal burden by the private sector outweighing the demand-stimulating

effect of fiscal policy. Therefore, our findings suggest the occurrence of non-Keynesian effects.

From these estimations, we infer that changes in the private sector's perceived fiscal burden cannot solely be captured by fiscal balances. Especially during periods with a prevalence of newspaper articles inducing expectations of fiscal deterioration, an increase in fiscal burden, inadequately represented by the fiscal balances, may suppress private demand.

Figure 4: Cumulative Impulse Responses for a Shock of the Indices in Different Identify Constraint

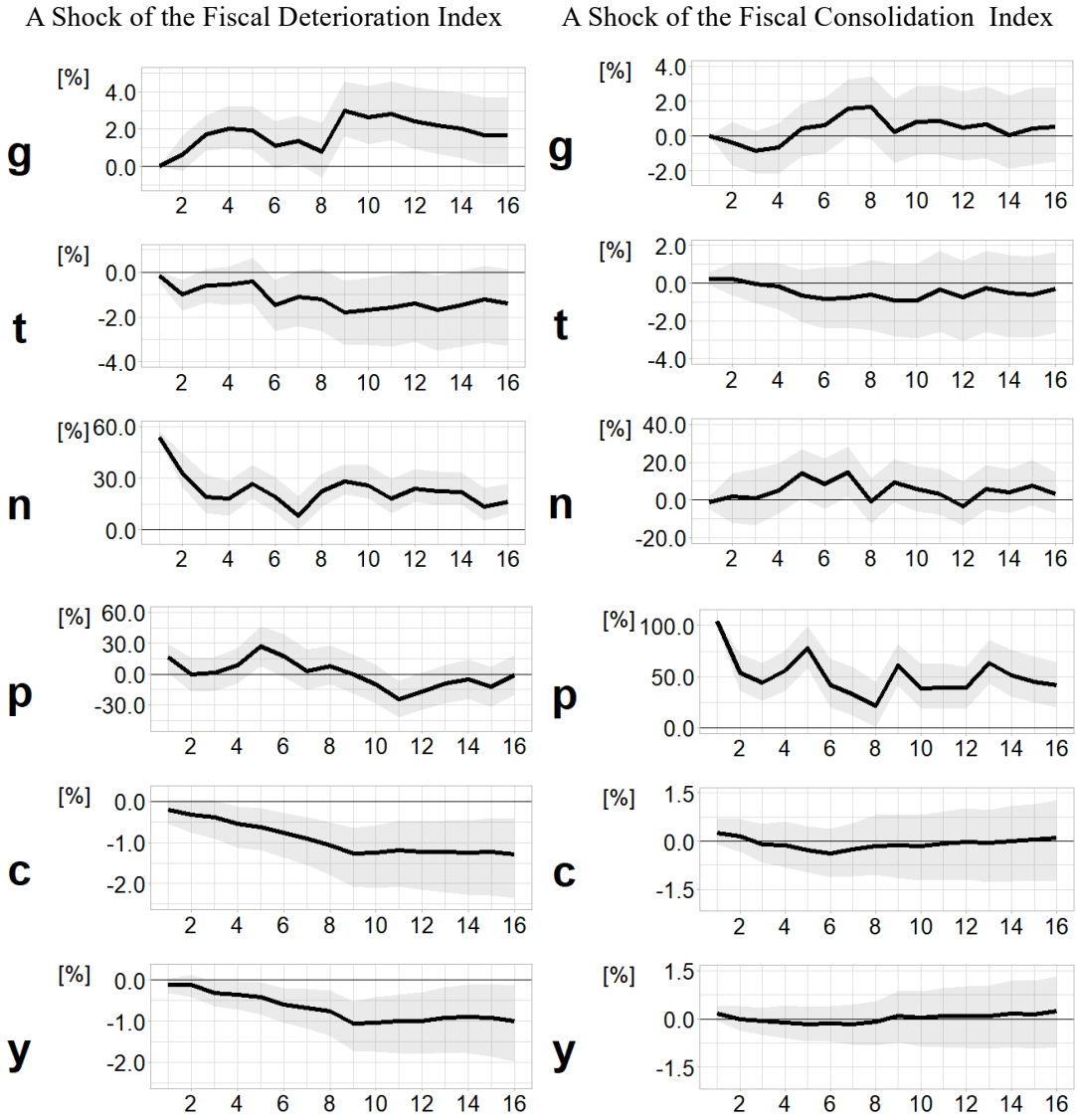
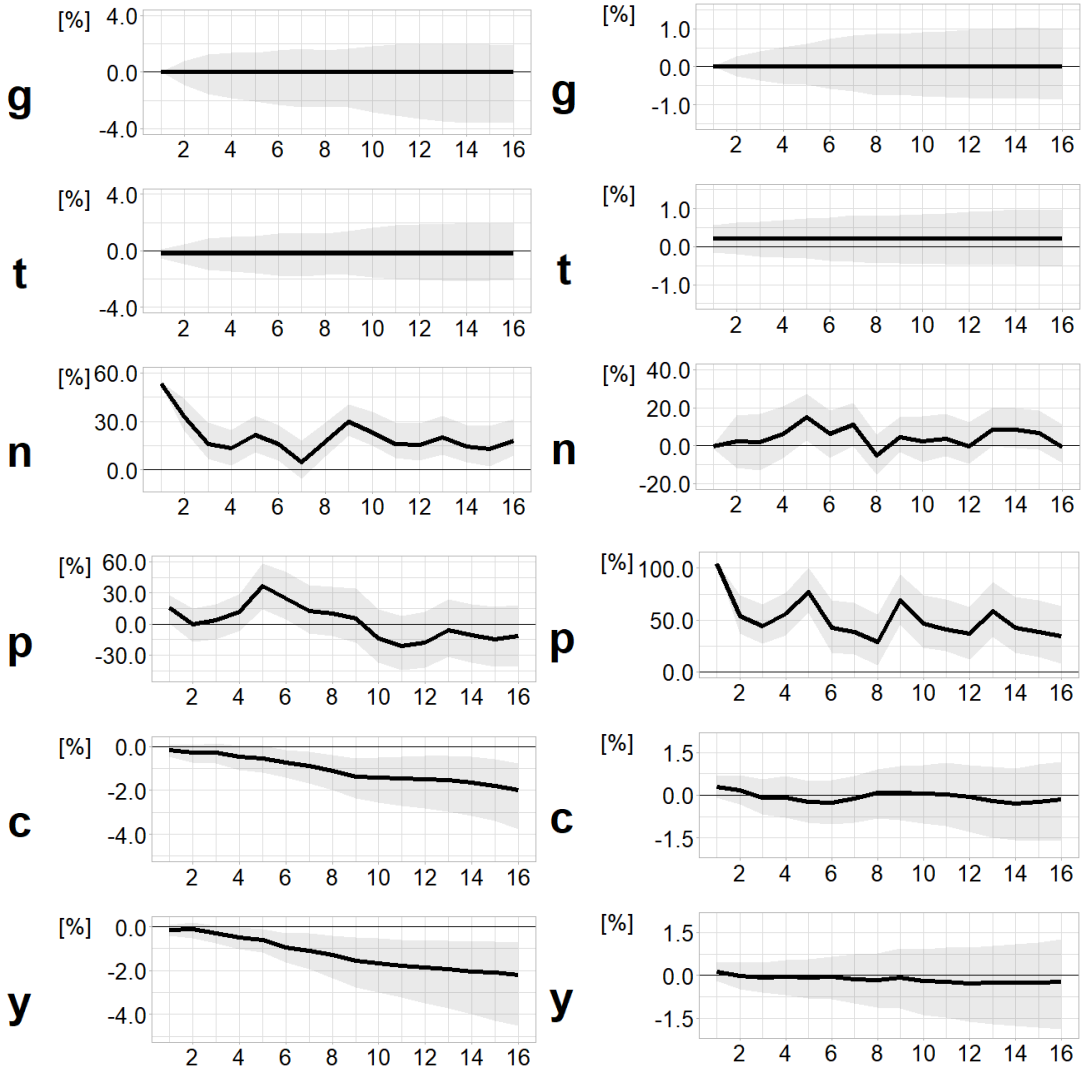


Figure 5: Cumulative Impulse Responses for a Shock of the Indices in Coefficients Constraint

A Shock of the Fiscal Deterioration Index A Shock of the Fiscal Consolidation Index



5. Conclusion

In this study, we used indices of fiscal deterioration and fiscal consolidation expectations created from newspaper articles to test whether the change of fiscal burden that cannot be captured by fiscal balances are affecting private demand. Specifically, we estimated a SVEC model, which includes these indices, real private consumption, real GDP, which represent private demand, and fiscal data such as primary expenditures and primary revenues, and conducted impulse response analysis.

The results of the analysis confirm that a rise in the Fiscal Deterioration Expectation Index significantly reduces real private consumption and real GDP, even controlling for primary balance. In addition, despite an increase in primary expenditure and decrease in primary revenue in response to the Fiscal Deterioration Expectation Index shock, private demand showed no signs of recovery. This result suggests the occurrence of a non-Keynesian effect. Furthermore, these suppressive effects on demand due to rising Fiscal Deterioration Expectation Index are confirmed, even when considering the simultaneous rise in fiscal deterioration expectations during periods of economic decline, and the impact of fiscal balance deterioration on private demand.

Therefore, when analyzing the relationship between changes in the private sector's perceived fiscal burdens and private demand, it can be said that fiscal balances are insufficient in capturing changes in the private sector's perceptions. Particularly during periods when there are more articles leading to expectations of fiscal deterioration, since the fiscal burden, which cannot be captured by fiscal balances, influences on private demand, the estimation results using fiscal balance data could potentially bias.

Lastly, a note of caution regarding the analysis of this study. In this analysis, we created indices of fiscal deterioration expectations and fiscal consolidation expectations from newspaper articles as proxies for fiscal burden perceived by private sector. However, these indices do not fully compensate for the fluctuations in fiscal burden that cannot be captured by fiscal data. For instance, the impact of a finance minister's statement on fiscal burden can vary depending on when and in what context the statement was made, even if the content is the same. However, the indices we created represent the total value of articles leading to expectations of fiscal deterioration, thereby assuming that all such statements have the same impact on fiscal burden. While the continuous publication of articles on the same topic may partially capture the rise in fiscal burden from event to event, it is difficult to say that the indicators in this study can fully capture the differences in the rise in fiscal uncertainty from event to event. In addition, the indices were used only articles from the Nikkei Newspaper. Given that the content and expression of articles vary by newspaper, it would be desirable to use articles from multiple newspapers.

This study pointed out that fiscal balances cannot fully capture changes in the private sector's perceived fiscal burden. In the future, it will be necessary to resolve the aforementioned issues and create an indicator that correctly represents fiscal burden itself.

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Appendix: A

To grasp the size of automatic stabilizing functions, it is necessary to measure output elasticities of each tax category. In this study, following Kameda (2012), we estimate the output elasticities of individual income tax, corporate income tax, indirect taxes, and transfer payments, obtaining a_{ty} by taking a weighted average based on the revenue amounts of each tax category (A.1).

$$a_{ty} = \Sigma_i \eta_{TiBi} \eta_{Biy} \frac{\widetilde{T_i}}{\widetilde{T}} \qquad \text{(A. 1)}$$

η_{TiBi} represents the tax base elasticity of revenue, η_{Biy} represents the output elasticity of the tax base, and $\widetilde{T_i}$ represents the revenue amount for each tax category. In Kameda (2012), the output elasticities of individual income tax and transfer payments were set to 0, while the tax base output elasticity of corporate income tax was 4.47, and the tax base elasticity of revenue for corporate income tax was 0.79. The output elasticity of indirect taxes was set to 1. Based on these parameters and using the average revenue amounts during the estimation period, the weighted average yielded an estimated value of a_{ty} as 0.83.

Next, we consider the value of a_{tc}, which represents the automatic stabilizing function of revenue through changes in consumption using quarterly data. Therefore, in this study, we designate a_{tc} as the consumption elasticity of revenue and estimate it as follows (A.2).

$$a_{tc} = \eta_{TB_i} \eta_{B_i c} \qquad \text{(A.2)}$$

η_{TB_i} represents the indirect tax elasticity of revenue, and $\eta_{B_i c}$ represents the consumption elasticity of indirect taxes. The consumption elasticity of indirect taxes is set to 1, similar to the output elasticity. Furthermore, by assuming that the indirect tax elasticity of revenue is equal to the proportion of indirect taxes in primary revenue, the estimated value of a_{tc} is 0.33.