Can we detect the presence of non-Keynesian effect empirically?

Hosin Song[*]and Hyung-Soo Park[†]

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Abstract

After the recent economic crisis, the fiscal consolidations have become critical tasks to many countries. In this situation some economists and policy decision makers argue that fiscal consolidations can promote economic growth, which is called non-Keynesian effects. In this paper, we propose to test if such non-Keynesian effects can be found generally from 26 OECD countries fiscal consolidation experiences. We find that such non-Keynesian effects do not work in general. Presumably, it might happen only in some specific cases.

Keywords: non-Keynesian effect test, fiscal consolidation

JEL codes: C12, C35, E62, H30, H62

1. Introduction

[*]Korea Institute of Public Finance, Seoul, Korea, hsong@kipf.re.kr

[†]Korea Institute of Public Finance, Seoul, Korea, hspark@kipf.re.kr

After the recent crisis during 2008-2009, most economists and policy decision makers agree with that it is time to implement the fiscal consolidation policy. Some argue that fiscal consolidation may encourage the economic growth. Such positive effect of fiscal consolidation on the economic growth is called non-Keynesian effect. In this paper, we try to find whether the implementation of fiscal consolidations promote an economic growth or not. The purpose of this paper is to confirm the existence of the general non-Keynesian effect empirically. Non-Keynesian effect have been based on some literatures such as Sutherland(1997), Blanchard (1990) and Bertola and Drazen(1993). But, empirical works to test non-Keynesian effect are very rare, except for Burger and Zagler (2008) and Guidice, Turrini and Veld (2007), hereafter GTV (2007). Burger and Zagler (2008) try to test non-Keynesian effect by casting a question that a consumption behavior in times of fiscal consolidation is different that in times of no fiscal consolidations. They present some empirical evidence for non-Keynesian effect.[1] GTV (2007) find that fiscal consolidations based on expenditure cut tend to promote the economic growth more than fiscal consolidations based on tax revenue increase via probit regression analysis .

This paper works as another empirical paper to test general non-Keynesian effect based on fiscal consolidation experiences of OECD countries. Like Burger and Zagler (2008) and GTV (2007), most empirical literature regarding fiscal consolidations have been dealing with simple association of fiscal consolidations and changes of major fiscal variables such as public debt or fiscal balance. Alesina, Ardagna and Gali (1998), hereafter AAG (1998), is a good example. In AAG (1998) type literature, authors usually defines

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[1]They show the evidence supporting a theory that an increase in tax revenues reduces the distortionary bias of future taxation, and thus brings about consumers more confidence and more consumption.

the fiscal consolidations using cyclically adjusted fiscal balance. Based on such definition a fiscal consolidation, AAG (1998) define a successful fiscal consolidation episode by the event where public debt to GDP ratio dropped by some threshold amount after fiscal consolidation started. Moreover, they define expansionary fiscal consolidation to be the case in which the growth rate is more than that of G7 by some amount after the fiscal consolidation is implemented. In such literature, the direct impact of fiscal consolidation on economic growth has not been considered rigorously because of endogeneity problem due to simultaneity. Fiscal consolidations may affect the economic growth and vice versa. Moreover, the country which is pursuing fiscal consolidations may have comparatively weak eagerness for economic growth. This means that implementing fiscal consolidation is related to a self-selection problem, which leads to biased estimates because of endogeneity. In this paper we try to estimate the pure impact of fiscal consolidation on economic growth by taking into account endogeneity problem. In section 2, we address the fiscal consolidation episodes among OECD countries according to our definition. In section 3, we will introduce the specification to test the general presence of non-Keynesian effect and show the estimation results using OECD countries data. In section 4, we have some concluding remarks regarding some limitations of this paper.

2. Fiscal Consolidations

2.1. Definition and Episodes of Fiscal Consolidations

Based on cyclically adjusted primary balance(CAPB) in "OECD Economic Outlook 86", we define the fiscal consolidation by the case in which

CAPB improves by more than 1.5 percent point of GDP for one year. Since the standard deviation of CAPB/GDP during 1993-2009 is 1.5 percent point, we define 1.5 percent point to be the threshold of fiscal consolidation.[2]

With our definition of fiscal consolidation, we have 57 fiscal consolidation episodes out of 615 observations of 26 OECD countries during 1993-2009.The following table shows the fiscal consolidation episodes of OECD countries according to our definition of fiscal consolidation. See Table 1.

2.2. Fiscal Consolidation related Variables

We assume that the implementation of fiscal consolidation is related to variables such as the structure of political system, political events, tax structure, expenditure structure and financial market related variables. The following table shows summary statistics of some main variable.

	average	standard deviation	min	max
dummy of fiscal consolidation	0.1	0.3	0	1
dummy of federation	0.3	0.5	0	1
dummy of presidential system	0.2	0.4	0	1
dummy of election	0.3	0.5	0	1
tax /GDP, %	43.1	7.4	26.6	62.9
expenditure/GDP, %	45.4	7.4	26.8	70.9
debt/GDP (%)	63.0	30.2	7.6	189.3
long-term interest rate, %	7.0	3.1	1.0	20.2

The following summary statistics shows the summary information conditional on the fiscal consolidation. If we simply look at growth rate in the table below, the growth rate under fiscal consolidation is slightly higher than

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[2]Our threshold level is the same as that in EU(2007) and Alesina and Perotti(1997).

that under no fiscal consolidation. But, it is just simple association, not causal relationship. The question of interest is whether the fiscal consolidation promotes the economic growth purely with eliminating the endogeneity. Next section will introduce such question.

	Fiscal Consolidation	No Fiscal Consolidation
dummy of federation	0.224	0.358
dummy of presidential system	0.140	0.212
dummy of election	0.211	0.305
CAPB/GDP, %	0.873	0.019
tax/GDP, %	46.386	42.748
expenditure/GDP. %	47.900	45.105
growth rate, %	2.525	2.507
debt/GDP, %	65.973	62.724
long-term interest rate, %	8.348	6.826

3. Test of Non-Keynesian Effect

We use the following specification to test the general presence of non-Keynesian effect.

$$\omega_{i,t}^{*} = x_{i,t}'\beta + \epsilon_{i,t} \quad \text{where } I(\omega_{i,t}^{*} > 0) = 1 \tag{1}$$

$$y_{i,t} = \alpha I(\omega_{i,t}^{*} > 0) + z_{i,t}'\gamma + \eta_{i,t} \tag{2}$$

where ϖ^{*} is a latent variable to represent the willingness to implement the fiscal consolidation, y is growth rate, x is a vector of variables which affect fiscal consolidation and z is a vector of variables which can affect economic growth. The vector x consists of a dummy variable of federation,

a dummy of presidential system, parliament election dummy, personal income tax revenue/GDP, corporate income tax revenue/GDP, consumption tax revenue/GDP, wealth tax revenue/GDP, current expenditure/GDP, capital expenditure/GDP, a lagged debt/GDP, a lagged long-term interest rate. The vector z consists of growth rate of G7 countries, debt/GDP, long-term interest rate, log exchange rate, time, constant. Note that $\epsilon_{i,t}$ is assumed to follow certain distribution which may be unknown.

The parameter of interest is α, which is the effect of the fiscal consolidation on the economic growth rate. The purpose of this paper is to estimate the parameter α consistently while taking into account the endogeneity of $I(\omega_{i,t}^* > 0)$. The fiscal consolidation itself may be endogeneous because of self-selection. The country which implements the fiscal consolidation may tend to be less concerned about the economic growth. In that sense the variable $I(\omega_{i,t}^* > 0)$ is endogeneous, that is, $E[\eta_{i,t}|I(w_{i,t}^*)] \neq 0$. To tackle with this self-selection problem, we will choose the following estimation strategy.

At the first stage, estimate the probability $\widehat{F}(x_{i,t}|\widehat{\beta}) = I(\epsilon_{i,t} > -x_{i,t}'\widehat{\beta})$ using binary variable estimation method. At this stage, using any parametric binary variable estimation method such as probit or logit is fine. At the next stage, eliminate the endogeneity of dummy variable $I(\omega_{i,t}^* > 0)$ by regressing the binary variable $I(\omega_{i,t}^* > 0)$ on $x_{i,t}$ and $F(x_{i,t}|\widehat{\beta}_1)$ and use the estimate as instrument, which brings us $\widehat{D} = \widehat{\delta}_1 I(w_{i,t}^* > 0) + \widehat{\delta}_2 F(x_{i,t}|\widehat{\beta})$. Then estimate α by regressing y on $\widehat{D}$ and z, and the resulting estimate $\widehat{\alpha}$ is consistent. The estimation results show that the fiscal consolidations have negative effect on economic growth. We can not reject the null hypothesis $H_0 : \alpha < 0$ at 5 percent significance level. See Table 2 for estimation results in detail[3] It implies that non-Keynesian effect is hardly to find empirically.

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[3]The number in the parenthesis in Table 2 is a standard error.

4. Concluding remarks

 In this paper, we try to detect non-Keynesian effect which promotes the economic growth in spite of fiscal consolidations. Based on 26 OECD countries fiscal consolidation episodes during 1970-2009, we estimate the pure effect of fiscal consolidation on the growth by eliminating self-selection endogeneity of fiscal consolidation. Estimation results say that the null hypothesis that fiscal consolidations have positive effect on growth is rejected at 1 % significance level. Therefore, non-Keynesian effect could not be detected empirically among OECD countries. It implies that non-Keynesian effects are hard to find in reality. In other words non-Keynesian effect is very limited phenomenon, but not in general.

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Table 1: **Episodes of fiscal consolidations among OECD countries**

	period	# of obs	# of fiscal consolidations	year
Australia	1971-09	38	0	-
Austria	1976-09	33	4	84, 96, 97, 01
Belgium	1985-09	24	1	93
Canada	1970-09	39	5	81,86,95,96,97
Czech	1999-09	10	1	04
Denmark	1990-09	19	1	05
Finland	1977-09	32	6	81,84,88,94,98,00
France	1978-09	31	0	-
Germany	1991-09	18	0	-
Greece	1992-09	17	3	94,96,05
Hungary	1993-09	16	3	95,07,09
Iceland	1992-09	17	1	05
Ireland	1990-09	19	0	-
Italy	1980-09	29	5	82,83,91,93,95
Japan	1992-09	17	0	-
Luxembourg	1990-09	19	3	93,94,97
Netherlands	1971-09	38	5	72,83,88,91,93
New Zealand	1986-09	23	4	87,89,00,02
Norway	1992-09	17	5	94,95,00,04,06
Poland	1996-09	13	0	-
Portugal	1992-09	17	2	95,06
Spain	1992-09	17	0	-
Sweden	1992-09	17	2	96,97
Switzerland	1990-09	19	1	00
U. K.	1972-09	37	4	80,82,97,98
U. S. A.	1970-09	39	1	76
Total 26	1970-09	615	57	

Table 2: Estimation Results

	using Probit	using Logit
fiscal consolidation implementation	-1.6847	-1.6368
	(0.7873)	(0.7459)
growth rate of G7	0.9647	0.9637
	(0.0700)	(0.0700)
debt/GDP	-0.0135	-0.0135
	(0.0023)	(0.0023)
long-term interest rate	0.0130	0.0124
	(0.0376)	(0.0377)
log exchange rate	0.0928	0.0934
	(0.0591)	(0.0591)
time	0.0497	0.0497
	(0.0130)	(0.0130)
constant	-98.0806	-97.9268
	(26.0982)	(26.0762)
# of observations	518	518
R^2	0.3647	0.3650