Chapter 4

Efficacy and Sustainability of Fiscal Policies – A Case of Korea-

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March 2011

This chapter should be cited as
Hur, S. K., and S. E. Kim (2011), 'Efficacy and Sustaniability of Fiscal Policies- A Case of Korea-', in Ito, T. and F. Parulian (eds.), *Assessment on the Impact of Stimulus, Fiscal Transparency and Fiscal Risk*. ERIA Research Project Report 2010-01, pp.117-168. ERIA [online]. Available at: www.eria.org/publications/research_project_reports/images/pdf/y2010/no1/ch4Korea.pdf

CHAPTER 4

Efficacy and Sustainability of Fiscal Policies -A Case of Korea-

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This study examines the expansionary fiscal policies taken in Korea during the recent Global Financial Crisis (GFC) and evaluates their effectiveness in the recovery process. Like other neighbor economies, Korean economy suffered from the tremor of the GFC mostly through the trade channel. However, rapidly depreciating Korean currency improved trade balance, which in turn absorbed the downward pressure at least in the initial period of the GFC. As the trade surplus simmered down, the growth in domestic demand took the place and led the quick recovery from the recession. In this context, we focus on the period after 2008. Q3 and discuss whether and how the unusually expansionary fiscal stimulus packages sustained the domestic demand.

Next, we also forecast how soon and easily the fiscal stance will return to normalcy based on the Medium Term Fiscal Management Plan (MFMP) announced by Korean government. In addition, from a long term perspective, we identify several potential risk factors on fiscal sustainability of Korea, such as National Public Pension, National Health Insurance, and hidden debt of public enterprises

[1]The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the official position of Korea Development Institute.

Executive Summary

The turmoil triggered by the U.S. financial market in July 2007 spread fast around the world, plunging the global financial system into chaos. In response to the Global Financial Crisis (GFC), Korean government announced several fiscal stimulus packages. This paper is purposed to examine whether these unusual expansionary fiscal policy contributed to the quick recovery from the crisis. Next, it evaluates so called "the exit plan" of Korean government from a fiscal side and forecast whether the plan will retrieve fiscal balance effectively. Then, the paper identifies potential risk factors on various fiscal areas and suggests long-term measures for them.

An official report from Ministry Of Strategy and Finance (MOSF) confirmed that the size of fiscal stimulus package was 38.8 tril. won (3.6% of GDP) in 2009 and 17.1 tril. won (1.5%) in 2010. In terms of composition, the fiscal stimulus package consists of various fiscal items but seems to concentrate more on tax cut, SOC building and support for SMEs and self-employed. According to fiscal index such as FIS and FI, they increased sharply in response to the negative real GDP deviation following the GFC. We could recognize, regardless of measures to rely on, that the fiscal stimulus package executed after the GFC is quite substantial and unusual in the fiscal history of Korea.

It is assessed that Korea's fiscal stimulus package was quite effective and has an important role for Korea's rapid recovery. According to simulation results from KDI macroeconomic VAR model, expansionary fiscal policy during the GFC contributes to boost economic growth in 2009~2010. For example, contribution of fiscal stimulus on real GDP growth in the first half of 2009 was 1.4%p and in the second half was 1.1%p. The effects of fiscal stimulus also continued in 2010, but its magnitudes become smaller than previous year. These findings are also supported by circumstantial evidence in Hur *et al.* (2010). Overall, these empirical results lend support to the popular belief that countercyclical fiscal policy boosted aggregate demand and output at least in Korea as well as rest of developing Asia during the GFC.

Korean economy recently announced the exit plan via Medium Term Fiscal Management Plan for 2010~2014. The priority of fiscal policy is on fiscal consolidation. The medium-term fiscal targets are to return to balance of operational budget in 2013~14 and to reach the government debt to 31.8% in 2014. During these periods, government revenue will grow annually at 7.7%, while expenditure at 4.8% only. Then, operational budget deficit will be improved from △2.7% to GDP in 2010 to △2.0% in 2011 and will record 0.2% surplus in 2014. As a result, the government debt will be maintained not to exceed mid 30% of GDP and will continue to decrease until 2014. More specifically, the target areas for medium term resource allocations are R&D to enhance the future growth and social welfare spending to improve safety net. However, it is worth noting that the fiscal balance and the government debt to GDP ratio are based on too optimistic economic growth forecast.

Under these circumstances, there are several potential risk factors on fiscal sustainability of Korea mainly due to ageing demographic structure as well as hidden debt of public enterprises. According to a long-term fiscal projection, social welfare and health expenditure will grow gradually for the period of 2015 to 2050. In 2050, it is expected that social welfare and health expenditure will be 16.9% and 3.6% of GDP respectively. Consequently, Korea's government debt continuously rises for the projection period. It is expected to get to 140.1% of GDP in 2050.

For fiscal sustainability, Korean government needs to perform the following reforms. In a short and medium term perspectives, Korea government should continue to establish fiscal foundation as well as enforcement of SOEs' debt reduction. By reviewing a fiscal project on a zero-based budget, projects that are neither essential nor urgent should be terminated. Also by improving the performance evaluation and feedback systems, the fiscal programs should be streamlined consistently to effectively adjust tax expenditures. On the tax revenue side, it is necessary to expand the tax base by diminishing tax redemption and reduction and non-refundable tax credit, while at the same time expand the tax revenue base by enhancing the accuracy of reporting income through consistent improvement in tax administration.

In a long term perspective, institutional reform associated with social welfare such as public pension is required. Periodical release a long-term fiscal outlook report which takes into account low fertility rate and population aging will be helpful to get publics' consent related to increase in contributions.

1. Introduction

The turmoil triggered by the U.S. financial market in July 2007 spread fast around the world, plunging the global financial system into chaos. All nations, consequently, have been experiencing devastating panic due to following economic recessions and rising unemployment rates, though in different degrees.

The "flight to quality" triggered by the downfall of financial markets in developed economies detonated the drastic credit crunch in developing countries especially centering on foreign exchange. These, combined with gloomy economic outlook, caused stifling exchange and interest rate hikes as well as sudden stock market crashes. This was the economic calamity faced by developing countries regardless of their extent to exposure to direct financial losses. The next round came from the trade side, where exports of most countries (if not all) dropped rapidly as recessions in developed countries became materialized and prolonged. Therefore, it was inevitable for most of the world economies to suffer recession as well as to adjust employment.

In response to enormous political pressure, governments around the world after experiencing, first-handedly, the detriments of the recent crisis on their economies, have announced and launched massive fiscal stimulus packages in addition to monetary easing with an aim to put their economies back on track. Like other countries, Korea also announced several fiscal stimulus packages after the crisis.

This paper is purposed to examine whether these unusually expansionary (from a long history of fiscal conservatism in Korea) fiscal policy contributed to the quick recovery from the crisis. Next, it evaluates so called "the exit plan" of Korean

government from a fiscal side and forecast whether the plan will retrieve fiscal balance effectively. Then, the paper identifies potential risk factors on various fiscal areas and suggests long-term measures for them.

2. Assessment of Fiscal Position: Before and After the GFC

Like other Asian countries, Korean economy was distant from the very sources of the GFC. Thus, the need for injection of liquidity into the economy was not imminent. Instead usual combination of fiscal expansion and monetary easing was executed in response to the crisis. Looking back to the past three decades of fiscal records, the magnitude of fiscal expansion is unprecedented. Of course monetary easing represented by the low policy rate (call rate in Korea) was responsive and substantial[2]. In this study, however, we narrow down our focus on the expansionary fiscal measures taken during the crisis and evaluate how effective they were and what will be their long-term consequences on fiscal sustainability.

2.1. Size and Composition of Fiscal Stimulus

The estimated size of Fiscal Stimulus Package in Korea varies from a source to another. An official report from Ministry Of Strategy and Finance (MOSF, 2010a) confirmed that the size of fiscal stimulus package was 38.8 Tril. Won (3.6% of GDP) in 2009. It also announced that additional 17.1 Tril. Won (1.5%) would be used in 2010. These figures are very close to Table 1 (reminded that the current GDP of Korea approximately amounts to 1,000 Tril. Won)[3].

[2] See Figure A1 in Appendix A.

[3] It is another issue whether these fiscal stimulus packages were executed as announced. To make it worse, it is not easily feasible to track down all the fiscal items and check whether certain items increased exactly as planned. Hence, in the following analyses, instead we use either the fiscal record (for empirical analysis) or assume that the fiscal stimulus packages were executed as Korean government announced (for simulations).

Table 1. Fiscal Stimulus Packages (% of GDP)

	2009	2010
Revenue measures	**-1.0**	**-1.2**
Permanent tax cuts	-0.7	-1.0
Temporary measures	-0.3	-0.2
Expenditure measures	**2.6**	
2009 revised budget	1.0	
- SOC expansion in regional areas	0.4	
- Support for SMEs and self-employed	0.3	
- Support for low-income households	0.1	
- Local government support	0.1	
- Other	0.1	
2009 supplementary budget	1.7	
- Support for low-income households	0.4	
- Support for SMEs and self-employed	0.4	
- Support for employment	0.3	
- Local government support	0.3	
- Green growth and other investment spending	0.2	
Total	**3.6**	**1.2**

Source: Leif Lybecker Eskesen, "Countering the Cycle – The Effectiveness of Fiscal Policy in Korea", WP/09/249, IMF, 2009.11.

In terms of composition, the fiscal stimulus package consists of various fiscal items but seems to concentrate more on tax cut, SOC building and support for SMEs and self-employed. These are the items known to have bigger or more persistent multiplier effects according to various literatures. S. Kim (1997) reports that the government investment tends to boost private economic activities whereas the government consumption is likely to crowd out them. Also, W. Kim (2006) and Hur (2007) claim that tax cut tends to have more persistent boosting effect than spending increase. In this context, the composition of fiscal stimulus package of Korea was appropriate.

2.2. Size of "Discretionary" Fiscal Stimulus

The announced fiscal stimulus package includes increments both by automatic stabilizer and by discretionary policy. Governments tend to exaggerate the magnitudes of fiscal expansion at an occasion like this. Of course, Korean government is not an

exception. Though conceptually clear, it is a very intriguing task to decompose changes in fiscal variables into the two parts empirically. Thus, here we use the following two alternatives. The first one includes FI and FIS, which are commonly used as proxies for "discretionary" fiscal stimulus for their simplicity.

Following the IMF method (refer to Heller *et al.* (1986) and Lee (2006), we first find a point of time, at which real GDP is closest to potential GDP or GDP gap is almost zero. At the point of time, the ratios of government revenue to GDP and expenditure to GDP are denoted to be $t_0 \equiv T_0 / y_0$ and $g_0 \equiv G_0 / y_0$ respectively. Then, we define the cyclically neutral balance by $B_n \equiv t_0 y - g_0 y^*$, where y is a real GDP and y^* potential GDP. Such a definition of the cyclically neutral balance accepts that fiscal stance is regarded neither expansionary nor contractionary when revenue grows at the speed of real GDP while expenditure at the speed of potential GDP. Thus, by taking the difference between the cyclically neutral balance (B_n) and the current fiscal balance (B), IMF comes up with a measure of fiscal stance called *FIS* in abbreviation.

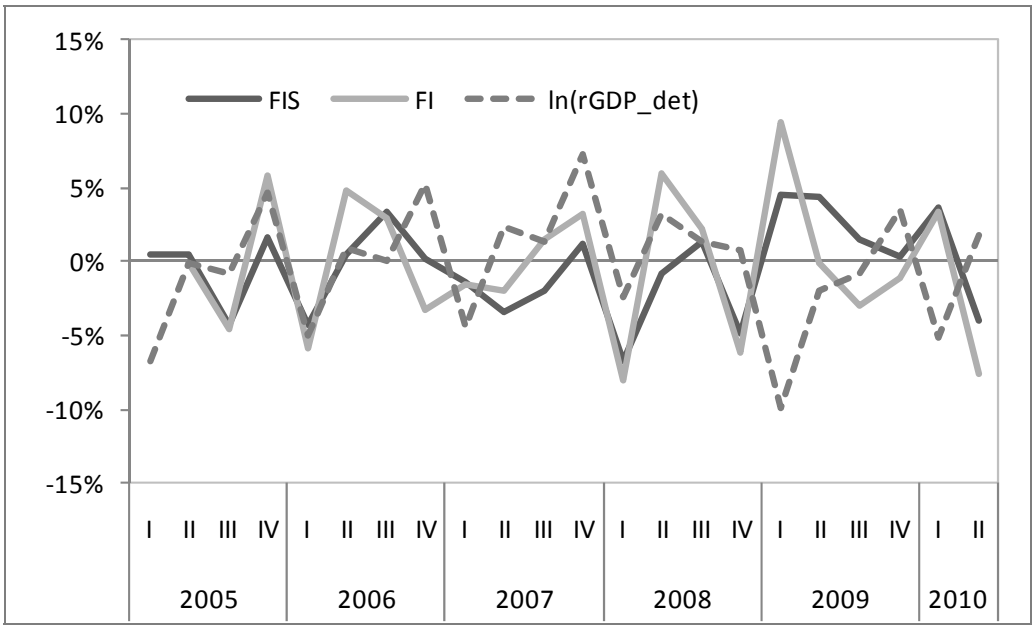
$$FIS \equiv B_n - B$$

Precisely speaking, the negative sign of FIS implies that the current fiscal stance is contractionary compared with the reference point of time 0 while the positive sign implies expansionary fiscal stance.

On the second thought, however, sometimes it would be more useful if there is a measure comparing the current fiscal stance with the previous one. Hence, for the purpose, Fiscal Impulse (*FI*) indicator is suggested in the ratio of *FIS* change to potential GDP. Of course, the signs of *FI* are interpreted similar to those of *FIS*, but in this case they indicate the change of fiscal stance from that in the previous period.

$$FI \equiv \Delta(FIS / y^*)$$

Figure 1. Fiscal Stance (*FIS*), Fiscal Impulse (*FI*), and Real GDP Deviation



Note: (1) Authors' own calculation
(2) ln(rGDP_det)=ln(real GDP)-ln(real GDP*)
(3) Real GDP* is seasonally adjusted and HP-filtered.

Applying the above definitions to the macro and fiscal data of Korea, we calculate FIS and FI, and compare them with the deviation of real GDP from the long-run trend as shown in Figure 1. The figure is drawn with the consolidated fiscal data including both the central and the local governments since 2005[4]. It shows that FIS and especially FI increased sharply in response to the negative real GDP deviation following the GFC. Such an aggressive fiscal reaction had not been observed before then. Of course, even before the GFC, it is known that fiscal policy of Korea responds (slightly) in a counter-cyclical way[5]. In terms of both magnitude and responsiveness, however,

[4] Before 2005, the consolidated budget data only covers the central government activities.

[5] For example, Lee (2006) measures how responsive the Korean fiscal framework to a business cycle. He, using a longer series of the central budget data (the fiscal data available in Monthly Statistical Bulletin published by Bank of Korea), calculates FI and FIS, regress them on the past GDP gaps, and reports that overall fiscal policy, especially expenditure side, properly responded to economic conditions. On the other hand, based on the observations that average FIs do not show the significant difference between expansionary and recessionary periods, he doubts whether the fiscal policy timing has been proper.

the fiscal stimulus package executed after the GFC is somewhat unprecedented in the fiscal history of Korea with an exception of the 1997 currency crisis[6]. Anyway, these above two measures of fiscal stance unanimously confirm that fiscal stimulus package of Korea concentrated on the period between 2009 Q1~2009 Q2.

For comparisons with *FI* and *FIS*, we also estimate a three-variable Structural VAR following Blanchard and Perotti (2002) with three different identification strategies[7]. The three key variables real GDP(Y_t), government expenditure(G_t), and tax revenue(T_t). All of them are logarized after being divided by population size and are seasonally adjusted and detrended by HP-filter. A reason for detrending all the variables is because we would like to focus on business cycles not on long-term non-stationary movements. Anyway, a VAR system of X_t is represented as:

$$X_t = A(L)X_{t-1} + U_t, X_t \equiv \begin{pmatrix} T_t \\ G_t \\ Y_t \end{pmatrix}, U_t \equiv \begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix}$$

The above VAR system is not complete in that detailed assumptions on the disturbance term U_t are needed for specifications.

The first identification strategy is simple Cholesky Decomposition, which restricts U_t in the following way.

$$\begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} \equiv \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} + \begin{pmatrix} 1 & 0 & 0 \\ b_1 & 1 & 0 \\ c_1 & c_2 & 1 \end{pmatrix} \begin{pmatrix} e^t{}_t \\ e^g{}_t \\ e^y{}_t \end{pmatrix}$$

Second, as a typical example of institutional identification strategies, we adopt Blanchard and Perotti (2002), whose shock identification is represented as

[6] In the 1997 currency crisis, financial institutions including several major domestic banks were directly hit and most of fiscal resources flew into the restructuring or the resolution process of those distressed ones. In contrast, this time was different and most of fiscal stimulus package was allocated to sustain domestic demand.

[7] For the details on the identification strategies mentioned briefly here, refer to Hur (2007).

$$\begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} \equiv \begin{pmatrix} 0 & 0 & \alpha_3 \\ 0 & 0 & \beta_3 \\ \gamma_1 & \gamma_2 & 0 \end{pmatrix} \begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} + \begin{pmatrix} 1 & a_2 & 0 \\ b_1 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} e^t{}_t \\ e^g{}_t \\ e^y{}_t \end{pmatrix}$$

The third identification strategy borrows the restrictions on β_1 and β_3(=0) from the budget data in addition to α_3, based on the almost common perception that the government of Korea has kept the principle of "Expenditure within Revenue" since 1980s[8] (Koh, 2002). Due to the long tradition of fiscal consolidation or maintaining the balanced budget, the level of expenditure still tends to be determined within the revenue forecasts. Exploiting such a tendency of fiscal conservatism, we assign a restriction on β_1 by running a regression of expenditure increment on tax revenue increase and borrowing the coefficient thereof. Compared with other identification strategies, this one highlights the contemporaneous relation in the disturbance term U_t.

$$\begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} \equiv \begin{pmatrix} 0 & \alpha_2 & \alpha_3 \\ \beta_1 & 0 & \beta_3 \\ \gamma_1 & \gamma_2 & 0 \end{pmatrix} \begin{pmatrix} t_t \\ g_t \\ y_t \end{pmatrix} + \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} e^t{}_t \\ e^g{}_t \\ e^y{}_t \end{pmatrix}$$

Based on the estimates from the above SVARs[9], I calculate orthogonal shocks in tax revenue and expenditure and define them to be the second measures for discretionary fiscal policies. The next correlation table shows how they are correlated with FI and FIS.

According to the upper part of Table 2, regardless of identification strategies taken, FIS and FI tend to have positive correlation with contemporaneous discretionary expenditure change ($e^g{}_t$) and negative correlation with contemporaneous discretionary revenue change ($e^t{}_t$). Especially, the correlations are statistically significant between FI and discretionary expenditure measures.

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[8] [Quoted from Koh (2002)] "One important principle in fiscal management was established in this period. It was the principle of "Expenditure within Revenue," or the balanced budget principle. While not formalized in a law or a regulation, it acted as self-discipline imposed on the budget authorities against imprudent management of the budget."

[9] This study uses the consolidated budget data instead of the fiscal data from BOK's Monthly Statistical Bulletin. In this regard, this paper is differentiated from Hur (2007).

Furthermore, in the lower part of Table 2, which identifies the discretionary fiscal stimulus to be $e_t \equiv e^g{}_t - e^t{}_t$, the correlations of e_t with $e^g{}_t$ and $e^t{}_t$ turn out to be bigger and more significant.

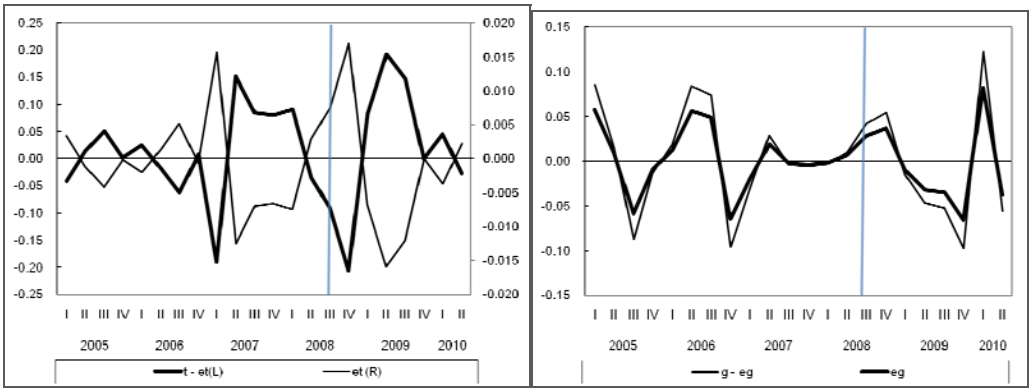
Table 2. Correlations among the Measures of Discret. Fiscal Stimulus

	Identification Strategy I		Identification Strategy II		Identification Strategy III (#)	
	Discret. Tax	Discret. Exp	Discret. Tax	Discret. Exp	Discret. Tax	Discret. Exp
FIS	-0.25	0.32+	-0.27	0.30	-0.25	0.30
FI	-0.08	0.43**	-0.11	0.42***	-0.08	0.42***

Discret. Fiscal Stimulus	Identification Strategy I	Identification Strategy II	Identification Strategy III (#)
FIS	0.35+	0.33+	0.36***
FI	0.45**	0.44**	0.45**

Note: (1) *, **, *** and + is significant at the 5%, 10% and 15% levels or better, respectively.
(2) Identification Strategy 3(#) assumes the fiscal stance of "Expenditure within Revenue."

Figure 2. Identification Strategy III



In Figure 2, the left graph indicates that automatic stabilizer ($t_t - e^t{}_t$) works slightly stronger against the discretionary part ($e^t{}_t$) in revenue side. In other words, discretionary tax policy tends to countervail the working of automatic stabilizer, which may reflect a long tradition of fiscal consolidation. Combined with so called the "Expenditure within Revenue" principle, this tendency of counteracting automatic

stabilizer implies that fiscal policy of Korea was not fully responsive to economic fluctuations at least in the revenue side.

On the other hand, the right hand side graph shows co-movement of the automatic stabilizer ($g_t - e^{g}{}_t$) and the discretionary spending expansion ($e^{g}{}_t$) in expenditure side. This result is consistent with Lee (2006), which notes the responsiveness of expenditure side.

Summing up the results so far, we could recognize, regardless of measures to rely on, that the fiscal stimulus package executed after the GFC is quite substantial and unusual in the fiscal history of Korea. Especially it is so, considered that Korea has a long tradition of fiscal conservatism.

2.3. Fiscal Expenditure vs. Tax Cuts

Tax cuts are known to have more persistent effect than expenditure increase. Tax cuts tend to last at least for a few years. This pattern is also supported by empirics (Hur (2007) and W. Kim (2006)). It is inferred that most tax reductions or deductions centered around corporate investments or on the purchase of durable goods, which are likely to have longer lagging and spill-over effects. Compared with tax cuts, expenditure increment comprises various types of government consumption and investments, which are known to have different multiplier effects.

On the other hand, compared with the current expenditure, capital expenditure and tax reduction seem to have more persistent impact on the economy. According to S. Kim, 1997, the government investment tends to boost private economic activities whereas the government consumption is likely to crowd out them. Of course, the current expenditure has greater one shot impact. Appendix E exhibits simulation results of measuring the effects of expenditure increase and compare fiscal multipliers item by item[10].

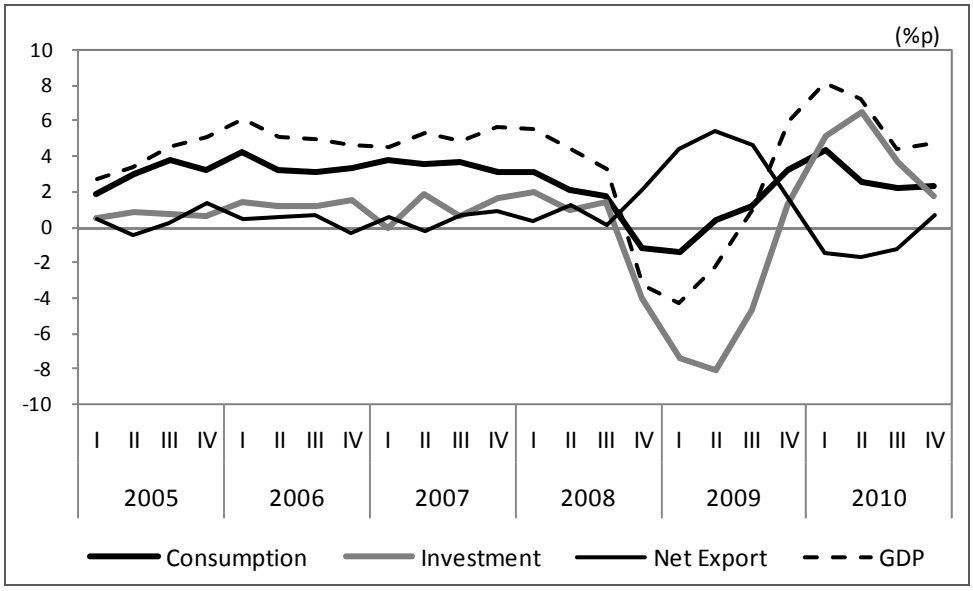
[10] The simulations are obtained from the KDI forecasting model. As usual, economic models tend to show what we believe rather than what we should see.

3. Impact of Fiscal Stimulus Package, Exit Strategy, and Identification of Future Fiscal and Macroeconomic Risk

3.1. Evaluate the Effectiveness of Fiscal Stimulus Combating an Economic Crisis

From 2008 Q3 to 2009 Q3, each component of the national income contributed to economic growth in the order of Net Export > Consumption > Investment. Rapidly depreciating Won (Korean currency) improved trade balance dramatically[11]. In the meantime, substantial investment from the government sector counteracted fallen private investment.

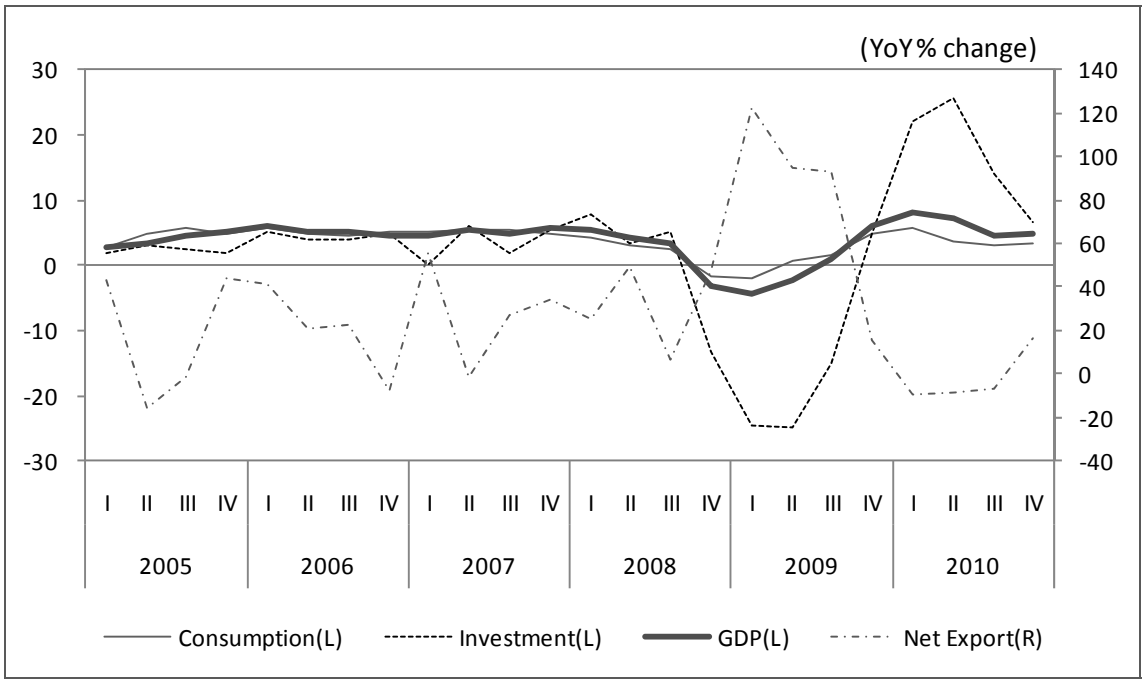
Figure 1. Growth Contribution by Components



Source: Bank of Korea

[11] For the movements in Korean won as well as imports and exports, refer to Figure A2 and A3 in Appendix A.

Figure 2. Growth Rates by Its Components



Source: Bank of Korea.

Since 2009 Q4, domestic components led the economic recovery of Korea replacing trade sectors. This may be a sign of lagged boosting effect from the fiscal stimulus package, considered that most of fiscal stimulus package were concentrated before 2009 Q4. On the other hand, equal or more credit could be given to the outperformed trade sector in the previous periods.

On the efficacy of fiscal policies in Korea, the existing literatures haven't reached unanimous decision. S. Kim (2007) extended Blanchard and Perotti (2002) by including price variable and interest rate. He used the consolidated fiscal data. Either side of fiscal policies is not sustained. On the other hand, W. Kim (2006) applied the method of Blanchard and Perotti (2002) to the data of Bank of Korea Monthly Bulletin. Both expenditure increase and tax cuts seem to have boosting effects. Tax cuts tend to have more persistent effects. For the older literatures, refer to Appendix D.

In contrast with empirical methods, the next table summarizes the simulation results of evaluating the effects of the fiscal stimulus package using KDI macroeconomic VAR model. According to simulation results, expansionary fiscal policy such as

supplementary budget and extended tax exemption and reduction during the GFC, contributes to boost economic growth in 2009~2010. For example, contribution of fiscal stimulus on real GDP growth in the first half of 2009 was 1.4%p and in the second half was 1.1%p. It is assessed that fiscal stimulus had an important role for Korean economy to record positive growth rate in 2009. In addition, the effects of fiscal stimulus also continued in 2010, but its magnitudes became smaller than previous year.

Table 1. Contribution of Fiscal Stimulus Package to GDP Growth

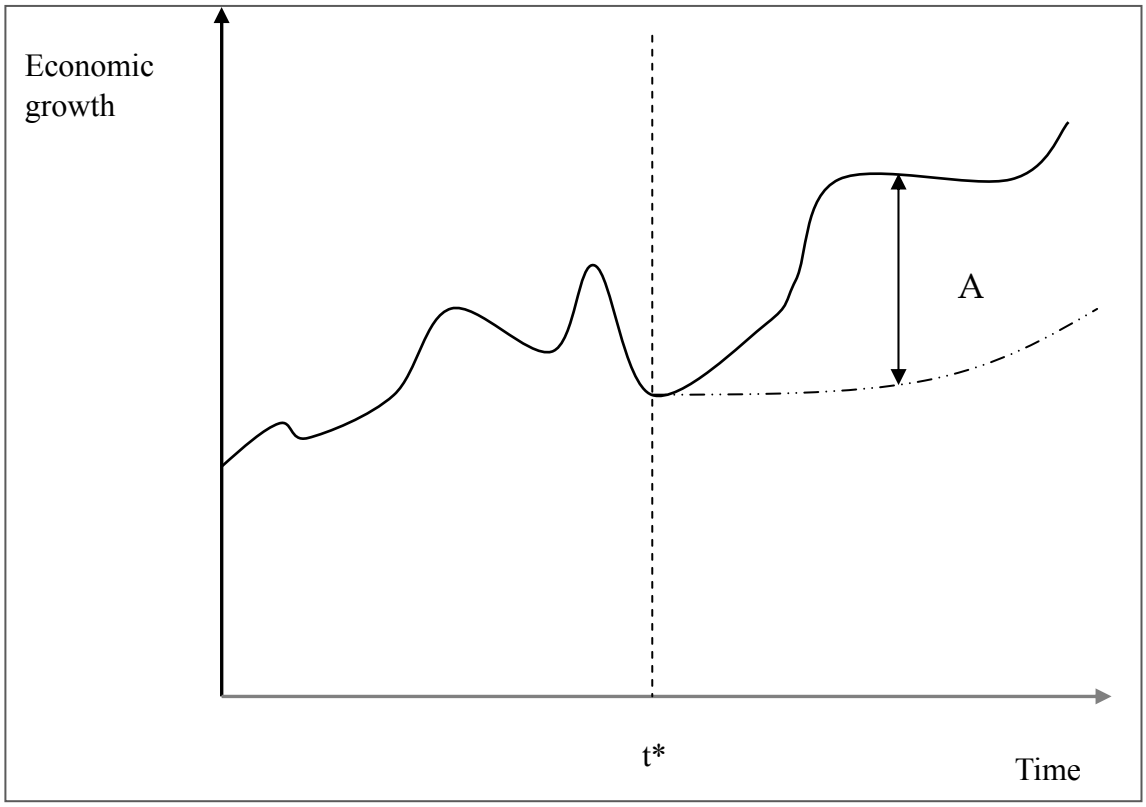
	2009(p)					2010(p)		
	1/4	2/4	1st half	2nd half	Year	1st half	2nd half	Year
Real GDP growth rate (%) (A)	-4.3	-2.2	-3.2	3.5	0.2	7.6	4.6	6.1
Contribution of Fiscal Stimulus Package (%p) (B)	1.2	1.7	1.4	1.1	1.3	0.7	0.3	0.5
Real GDP growth rate in absence of Fiscal Stimulus Package (%) (A-B)	-5.5	-3.9	-4.6	2.4	-1.1	6.9	4.3	5.6

Note: (1) (p) is preliminary.
(2) All the figures measure year-on-year changes (unit: %, % p).

The simulation results above are supported by circumstantial evidence based on the methodology of Hur *et al* (2010). They design the empirical framework to evaluate the effectiveness of countercyclical fiscal policy in developing Asia during the GFC. The empirical framework consists of two stages. The first stage involves estimation of a panel vector auto-regression (PVAR) model using historical data to generate dynamic GDP forecasts of each sample country during the global crisis from 2008 Q4 to 2009 Q3. The choice of 2008 Q3 as the breakpoint also coincides with the bankruptcy of Lehman Brothers in September 2008 which triggered the global financial crisis.[12]

[12] Concentrating the analysis on 2008 Q4 – 2009 Q3 allows us to assess whether the fiscal stimulus helped support demand and output precisely when the economy faced the greatest risk of a meltdown.

Figure 3. Forecast and Actual Post-Crisis Output Growth Path



Note: t* represents the time period when the crisis broke out, 2008 Q3.

The second stage involves a cross-country regression with the gap between actual GDP and forecast GDP on a number of explanatory variables. Of particular interest to us are interaction terms between fiscal variables and dummy for developing Asia that captures impact of fiscal policy for the developing Asia countries.[13]

Tables 4 and 5 report the results of cross-country regressions on the gap between actual output and dynamic output forecasts for the crisis period generated by 4-variable PVAR models. The only difference is that Korea is treated as Asian country in Table 2, while as non-Asian country in Table 3. For both cases, the fiscal policies in developing Asia countries are likely to be more effective than the rest of the world. More interestingly, when Korea is treated as non-Asia country, the magnitude and significance of interaction term between fiscal policy and Asia dummy becomes much

[13] For detail empirical framework, refer to Appendix B.

weaker. This implies Korea's fiscal stimulus package was quite effective and has an important role for Korea's rapid recovery. Overall, these empirical results lend limited support to the popular belief that countercyclical fiscal policy boosted aggregate demand and output at least in Korea as well as rest of developing Asia during the GFC.

Table 2. Regression Results from De-Trended 4-Variable PVAR (~2009.3Q)

– Korea as Asian Country

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln GDP_{it-1}^{det*}$	**0.441*****	**0.464*****	**0.412*****	**0.437*****	**0.418*****	**0.444*****
	(0.10)	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**
$\ln global\_GDP_{it}^{det}$	**-0.005***	**-0.004***	**-0.005***	**-0.005***	**-0.005***	**-0.004***
	(0.002)	**(0.002)**	**(0.003)**	**(0.003)**	**(0.003)**	**(0.003)**
$\ln REV_{it-1}^{det*}$	0.044	0.044	0.033	0.032	0.033	0.031
	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)
$\ln EXP_{it-1}^{det*}$	**-0.125****	**-0.125****	**-0.122****	**-0.122****	**-0.122****	**-0.122****
	(0.05)	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**
$TS\_1yr_{it-1}^{diff}$		-0.504		-0.580		-0.550
		(0.35)		(0.36)		(0.38)
$TS\_3yr_{it-1}^{diff}$	-0.512		-0.555		-0.495	
	(0.35)		(0.36)		(0.38)	
$POLICY_{it-1}^{diff}$	**-0.914***	**-0.882***	**-0.905***	**-0.890***	**-0.898***	**-0.908***
	(0.46)	**(0.45)**	**(0.47)**	**(0.46)**	**(0.48)**	**(0.47)**
$\ln REER_{it-1}^{det*}$	0.016	0.027	0.027	0.039	0.025	0.038
	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
$ASIA_i * \ln REV_{it-1}^{det}$	**-0.128*****	**-0.122****	**-0.134****	**-0.127****	**-0.131***	**-0.119***
	(0.05)	**(0.05)**	**(0.06)**	**(0.06)**	**(0.07)**	**(0.07)**
$ASIA_i * \ln EXP_{it-1}^{det}$	**0.145****	**0.146****	**0.157****	**0.157****	**0.170****	**0.168****
	(0.06)	**(0.06)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**
$open_{i,t-1} * \ln REV_{it-1}^{det}$			0.005	0.005	0.005	0.005
			(0.01)	(0.01)	(0.01)	(0.01)
$open_{i,t-1} * \ln EXP_{it-1}^{det}$			-0.003	-0.003	-0.003	-0.003
			(0.01)	(0.01)	(0.01)	(0.01)
$FS_i * \ln REV_{it-1}^{det}$					-0.135	-0.214
					(0.53)	(0.54)
$FS_i * \ln EXP_{it-1}^{det}$					-0.405	-0.385
					(0.58)	(0.58)
Constant	-0.02*	-0.02*	-0.02*	-0.02**	-0.02*	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	80	80	76	76	76	76
R-squared	0.411	0.411	0.419	0.421	0.426	0.429

Source: Author's estimation.

Note: 1) Standard errors in parentheses.

2) *** p<0.01, ** p<0.05, * p<0.1

Table 3. Regression Results from De-Trended 4-Variable PVAR (~2009.3Q)

– Korea as Non-Asian Country

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln GDP_{it-1}^{det*}$	**0.467*****	**0.488*****	**0.442*****	**0.467*****	**0.451*****	**0.478*****
	(0.10)	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**
$\ln global\_GDP_{it}^{det}$	**-0.004***	-0.004	**-0.005***	-0.004	**-0.005***	-0.004
	(0.003)	(0.003)	**(0.003)**	(0.003)	**(0.003)**	(0.003)
$\ln REV_{it-1}^{det*}$	0.015	0.015	-0.001	-0.003	0.015	0.014
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$\ln EXP_{it-1}^{det*}$	**-0.085***	**-0.085***	-0.078	-0.079	**-0.098***	**-0.099***
	(0.05)	**(0.05)**	(0.05)	(0.05)	**(0.05)**	**(0.05)**
$TS\_1yr_{it-1}^{diff}$		-0.476		-0.577		-0.632
		(0.36)		(0.38)		(0.39)
$TS\_3yr_{it-1}^{diff}$	-0.466		-0.531		-0.564	
	(0.36)		(0.37)		(0.38)	
$POLICY_{it-1}^{diff}$	**-0.950****	**-0.932****	**-0.952***	**-0.951****	**-1.033****	**-1.045****
	(0.47)	**(0.46)**	**(0.48)**	**(0.47)**	**(0.48)**	**(0.47)**
$\ln REER_{it-1}^{det*}$	0.010	0.021	0.018	0.030	0.030	0.044
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
$ASIA_i * \ln REV_{it-1}^{det}$	**-0.102****	**-0.095***	-0.090	-0.080	-0.108	-0.097
	(0.05)	**(0.05)**	(0.07)	(0.07)	(0.07)	(0.07)
$ASIA_i * \ln EXP_{it-1}^{det}$	**0.123****	**0.124****	**0.126***	**0.126***	**0.139***	**0.139***
	(0.06)	**(0.06)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**
$open_{i,t-1} * \ln REV_{it-1}^{det}$			0.002	0.002	0.004	0.004
			(0.01)	(0.01)	(0.01)	(0.01)
$open_{i,t-1} * \ln EXP_{it-1}^{det}$			-0.002	-0.002	-0.003	-0.002
			(0.01)	(0.01)	(0.01)	(0.01)
$FS_i * \ln REV_{it-1}^{det}$					-0.739	-0.769
					(0.49)	(0.49)
$FS_i * \ln EXP_{it-1}^{det}$					0.350	0.367
					(0.56)	(0.56)
Constant	-0.023**	-0.024**	-0.024**	-0.026**	-0.023*	-0.024**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	80	80	76	76	76	76
R-squared	0.385	0.386	0.389	0.392	0.412	0.416

Source: Author's estimation.

Note: 1) Standard errors in parentheses.

2) *** p<0.01, ** p<0.05, * p<0.1

3.2. Is the Exit Strategy Clearly Laid Out?

On September 28th, 2010, the Cabinet meeting passed "The Medium Term Fiscal Management Plan for 2010~2014". This plan revised the MFMP for 2009~2013 based on changes in economic environments as well as fiscal conditions. One of major changes is the faster growth than expectation in 2010. The government expected real GDP growth of 5.0% in the beginning of 2010. According to recent preliminary calculation of Bank of Korea, it is expected to record 6.1% mainly due to expansion of domestic demand and soaring of export as well as expansionary fiscal policy.

In the mean time, the fiscal stimulus in 2009 led the operational fiscal balance deficit of 4.5% to GDP, which is the highest level since economic crisis in 1997. Although the government debt currently recorded at mid 30% to GDP is more favorable compared to advanced economy, it is worth noting that government debt has grown rapidly. The government debt is projected to reach 36.1% to GDP in 2010 from 10.3% in 1997. Furthermore, its growth rate is likely to be accelerated due to the demographic structure unless proper institutional reforms on national pension and health care system are undertaken.

In addition to these changes, there still exist a number of uncertainties that Korean economy should consider. First, while the global economy is showing a moderate recovery, downward risks are growing due to Eurozone countries' tightening measures in response to the risks of public finance crisis and their sluggish performance in employment. Amid the continued concern over public finance crisis risks in Eurozone, the global financial markets appear to still be unstable at least in fiscal crisis countries such as Greece, Ireland, and Portugal. Fiscal austerity measures taken in these countries are likely to be an obstacle for Eurozone economy to get back to normalcy. Second, domestic employment is still sluggish and the effect of economic recovery is not enough propagated to low and middle-income classes. These will certainly demand more spending on social safety net for them. Third, it needs for the engine of economic growth such as green industry to be reinforced to complement a drop of the potential GDP growth during the GFC. Lastly, fiscal soundness should be consolidated for the

future external shocks as well as rapid progress of ageing demographic structure and the possibility of the reunification of North and South Korea.

Under these circumstances, Korean government announced the policy priority on fiscal consolidation as well as continued support for low-income class, SMEs, and self-employed through the MFMP for 2010~2014. The medium-term fiscal targets are to return to balance of operational budget in 2013~14 and to reach the government debt to 31.8% in 2014. According to the MFMP for 2010~2014, the government revenue will grow annually at 7.7%, while expenditure at 4.8%. The operational budget deficit will be reduced from ∆2.7% to GDP in 2010 to ∆2.0% in 2011 and will record 0.2% surplus in 2014. As a result, the government debt will be maintained not to exceed mid 30% of GDP and will continue to decrease until 2014.

Table 4. Medium Term Fiscal Balance

	2010	**2011**	**2012**	**2013**	**2014**
Consolidated Public Sector Finance Balance (% of GDP)	∆2.0 (∆0.2)	5.0 (0.4)	18.0 (1.3)	27.4 (1.9)	37.9 (2.5)
Social Security Contribution Balance	28.1	30.3	32.3	33.7	35.2
Operational Budget Balance (% of GDP)	∆30.1 (∆2.7)	∆25.3 (∆2.0)	∆14.3 (∆1.1)	∆6.2 (∆0.4)	2.7 (0.2)

Table 5. Prospect for National Debt (2010~2014) Unit: Tril. Won

	2010		2011	2012	2013	2014
	Budget	Forecast				
Public Debt (% of GDP)	407.2 (36.1)	400.4 (34.7)	436.8 (35.2)	468.1 (35.1)	485.7 (33.8)	492.2 (31.8)
Liabilities for Debt Financing (% of Public Debt)	196.2 (48.2)	200.0 (50.0)	221.0 (50.6)	236.5 (50.5)	242.4 (49.9)	238.7 (48.5)
Financial Liabilities (% of Public Debt)	211.0 (51.8)	200.3 (50.0)	215.8 (49.4)	231.6 (49.5)	243.3 (50.1)	253.5 (51.5)

Source: MOSF (2010b).

The target areas for medium term resource allocations are R&D to enhance the future growth and social welfare spending to improve safety net. To reflect these, the budget for 2011 earmarks a high increase in expenditure on R&D, health, social welfare, and education to secure growth potential and continue to support low- and middle-income classes. In the other hand, some raise concerns over a low increase in expenditure on industry, SMEs, energy and SOCs. This restricted increase, however, is considered appropriate based on the principle of limiting government intervention in market failures.

Table 6. Resource Allocation Plan by Sectors Unit: Tril. Won, %.

	2010	2011	2012	2013	2014	Annual Growth
1. R&D	13.7	14.9	16.6	18.1	19.1	8.7
2. Industry, SMEs, and energy	15.1	15.2	15.5	16.0	16.0	1.4
3. SOC	25.1	24.3	22.4	22.9	23.5	-1.7
4. Agriculture, forestry, and fisheries	17.3	17.7	18.2	16.9	17.6	0.5
5. Healthcare and welfare	81.2	86.3	92.8	98.1	102.4	5.9
6. Education	38.3	41.3	44.9	48.2	52.1	8.0
7. Culture, sports, and tourism	3.9	4.1	4.2	4.2	4.3	2.7
8. Environment	5.4	5.7	5.7	5.7	6.0	2.4
9.Defense (General Account)	29.6	31.3	32.9	34.2	35.6	4.8
10.Reunification and foreign affairs	3.3	3.7	3.9	4.2	4.5	7.7
11.Public order and safety	12.9	13.6	14.2	14.3	14.7	3.2
12.General administration	48.7	53.2	57.1	59.5	62.8	6.5
Total Expenditure	292.8	309.6	324.8	337.7	353.0	4.8

Note: R&D is the aggregate of R&D expenses across all areas.

More specifically, Korean government declared a number of exit strategies to secure fiscal sustainability through the budget for fiscal year 2011 and the MFMP for 2010~2014. First, a soft fiscal rule is temporarily introduced until operational fiscal deficit returns to balance in 2014. That is to maintain the growth of aggregate expenditure lower than that of aggregate revenue by 2~3%p. In addition, whenever a program accompanying mandatory spending is newly introduced, counter revenue plan should be proposed by reducing expenditure of other existing program or enacting new revenue bills. Second, the keynote of fiscal policy moves to improvement of efficiency of expenditure from encouragement of advance expenditure. The ratio of front loading out of aggregate expenditure was over 65% in 2009, 62% in 2010 and will be mid 50% in 2011, which is near to historical average since 2002. That is because Korean economy is near getting back to normalcy due to brisk exports and improved employment and household income. Instead, fiscal consolidation aggravated during the GFC needs to be restored so that the government should focus more on the efficiency of expenditure to reduce the squandering of the government's resources. Third, for tax exemption and reduction, the government will strictly manage the scope and level based on assessment and will confirm if initial objectives are still meaningful. Tax exemption and reduction rapidly increased in response to the GFC should be reevaluated to expand the tax-base and to consolidate fiscal soundness. Lastly, for the expenditure, along with bold actions for expenditure restructuring, there will be efforts on improving the expenditure efficiency such as establishing fiscal regulations based on strict performance evaluation on fiscal projects.

Table 7. Tax Exemption and Reduction

(Unit: 100 million KW)

	2006	2007	2008	2009
National Tax Exemption and Reduction(A)	213,380	229,652	287,827	283,968
National Tax Revenues(B)	1,380,443	1,614,591	1,673,060	1,646,382
National Tax Exemption and Reduction Ratio(A/(A+B))	13.4%	12.5%	14.7%	14.7%

Source: MOSF (2009).

A number of critics on exit strategy and the MFMP for 2010~2014, however, are raised. First, the fiscal balance and the government debt to GDP ratio are based on too optimistic economic growth forecast. The forecasted growth rates are about 5.0% annually during 2011~2014, but it is widely agreed that potential growth of Korean economy is early 4% level. Anyhow, this plan is likely to be achieved at least in 2011 due to unexpectedly high growth in 2010, even if growth rate in 2011 is lower than 5.0%. In contrast, the plan from 2012 to 2014 will require extraordinary effort of Korean government. If growth rate records lower than 5.0%, tax revenue will be less than forecasted level and it will lead increase of government debt ratio. For expenditure in these periods, it is somewhat under-projected compared to historical trend. For instance, average annual growth of social welfare expenditure in 2010~2014 is only 5.9%, which is much lower than in 2004~2008, 11.8%. Second, more active policy efforts are required for success of the fiscal rule recently introduced, because the government has no incentive to obey it without any enforcement such as performance evaluation. Third, more concrete plans on expanding the revenue base and restructuring expenditure should be provided in order to secure fiscal soundness. In addition, the process of compiling and reviewing the taxation and budget plans should place a priority on the improvement of fiscal consolidation so as to create an

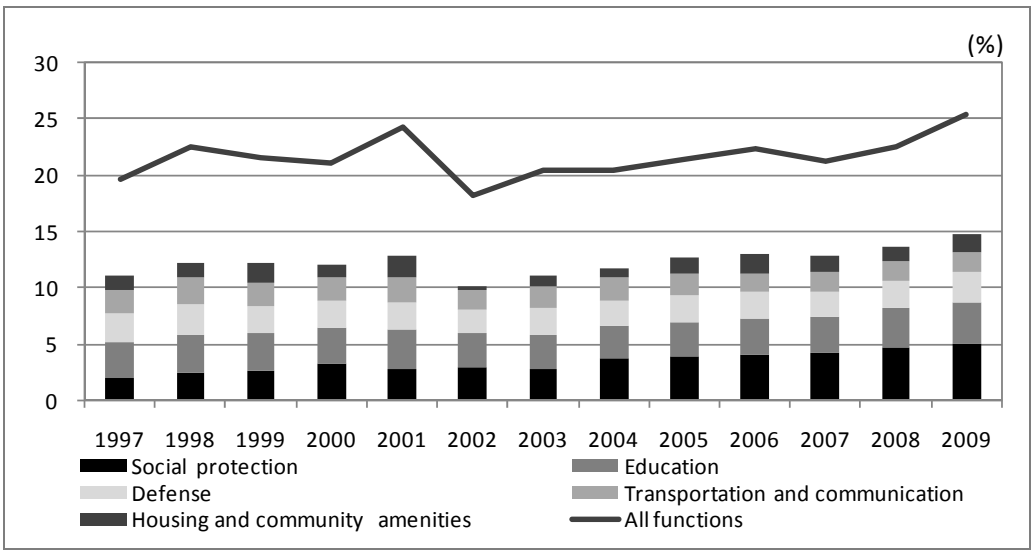
environment where the tax revenue and expenditure restructuring could be implemented without any failure.

4. Has the Fiscal Expenditure to GDP become Permanently Higher?

Looking backward plotted in Figure 5, it is too early to tell whether fiscal expenditure in terms of percentage of GDP moves along a upward trend. The recent fiscal stimulus package in response of the GFC definitely raised the level of government spending. It is also noticeable that the portion of social protection is continuously increasing. This pattern is attributable to partly support for low-income class and SMEs, and automatic increase due to change of demographic structure.

On the other hand, looking forward, the fiscal expenditure to GDP is expected to grow substantially. It is well known that Korea is one of the fastest countries in the world with respect to aging demography. Thus, the burden of the National Medical Insurance and National Public Pension will grow rapidly. The National Medical Insurance account is predicted to be deficit within years unless personal contributions and government subsidy increase. According to long term prediction of National Public Pension, it is expected to be depleted in 2050s. Under these perspectives, institutional reform plans for raising premiums and contributions are required, although it is not easy to get public approval. For detail prediction, refer fiscal sustainability in the next section.

Figure 4. Central Government Fiscal Expenditure to GDP



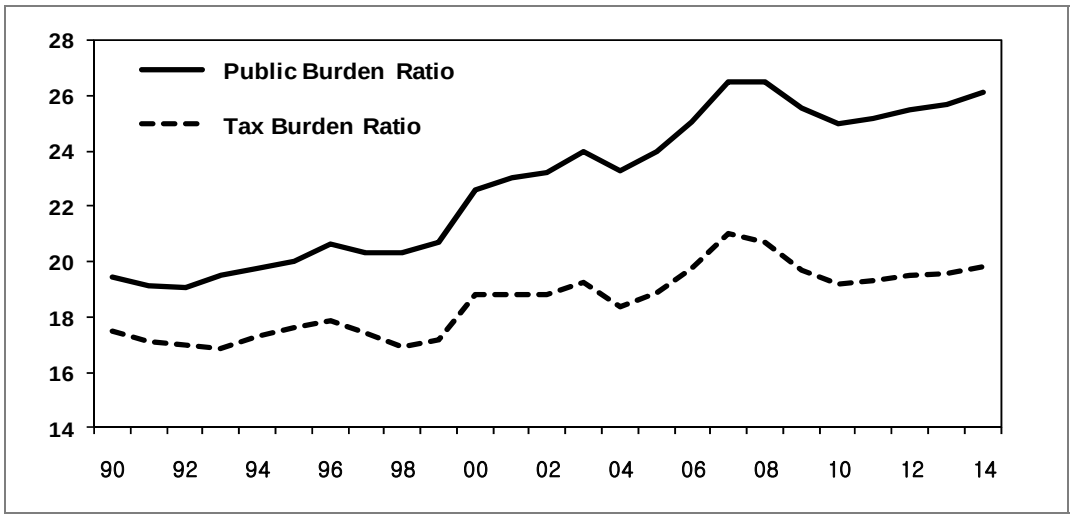
Source: MOSF.

Looking at the revenue side can help to see whether there exists permanent increase of fiscal expenditure. For the revenue side, tax burden ratio (ratio of aggregate tax revenue to GDP) had stayed below 20% level until the mid 2000s. While a sharp spike of tax burden ratio in the mid 2000s was mainly due to an increased taxation such as property tax, real estate tax, a decrease of it since 2008 is attributable to tax cut policy of the current ruling party. Then although tax burden ratio is expected to stay below 20% level for the medium term from 2010 to 2014, it should grow gradually to maintain government debt ratio at certain stable level since then. Public burden ratio which is the summation of tax burden ratio and social security contributions ratio such as public pension, health care contributions will also grow rapidly in accordance with increase of mandatory spending. As it is clearly shown in the Figure 6, social security contribution ratio, the gap between public and tax burden ratio have continued to rise.

In short, the fiscal expenditure to GDP will not exhibit a radical increase in the medium term, but it will grow gradually and permanently until demographic structure is stabilized.

Figure 5. Public and Tax Burden Ratio

(Unit: % of GDP)



Source: MOSF.

5. Is there Any Risk to Fiscal Sustainability?

Fiscal sustainability is commonly measured by IFS (Index for Fiscal Sustainability) and FS gap (Fiscal Sustainability gap). IFS developed by IMF is an index showing whether target government debt ratio is attainable. Recent calculation of Korea's IFS records 0.84, which implies fiscal sustainability given target government debt ratio of 60%. Korea's IFS is ranked at 5th out of 28 OECD countries. In addition, FS gap, difference between required and actual primary fiscal balance to stabilize government debt ratio at 60% records 1.58%p, which is second highest out of 28 OECD countries. IFS and FS gap seems to support fiscal sustainability of Korea. However, it should be cautious in interpretation of IFS and FS gap because they are quite sensitive to measure of cyclically adjusted primary budget balance. In addition, growth rate of GDP seems a bit exaggerated when considering recent decline of potential GDP growth due to the GFC and change of demographic structure. Thus, these results do not certainly guarantee future fiscal sustainability of Korean economy.

Table 8. Index for Fiscal Sustainability (IFS)

	Growth rate (avg of 2010-2011)	Interest rate (avg of 2010-2011)	Cyclically adjusted primary budget balance (2010)	Gov't Debt (2010)	IFS $\left[\frac{(1+r_t)}{(1+g_t)} - \frac{(ps_t + ps^*)}{(b_{t-1} + b^*)}\right]$		
	g	*r*	*ps*	*b*	IFS	Absolute value	Ranking
Switzerland	5.9	4.0	-4.0	54.6	-0.01	0.01	1
Slovakia	4.4	4.7	-6.4	44.7	0.64	0.64	2
Australia	7.7	6.1	-1.8	23.4	0.77	0.77	3
Canada	6.2	4.2	-1.4	81.7	0.79	0.79	4
Korea	**7.4**	**5.7**	**1.0**	**36.2**	**0.84**	**0.84**	**5**
Czech	4.0	4.5	-3.0	48.4	0.86	0.86	6
Luxemburg	4.6	4.2	-2.2	23.6	0.87	0.87	7
New Zealand	5.8	6.2	-3.1	40.3	0.90	0.90	8
Denmark	3.6	4.1	-0.5	55.0	1.01	1.01	9
Iceland	6.3	6.2	-2.6	128.1	1.03	1.03	10
Norway	2.6	2.8	0.3	41.6	1.09	1.09	11
Sweden	5.0	3.8	1.7	54.6	1.12	1.12	12
Belgium	3.2	4.0	1.9	103.6	1.16	1.16	13
Austria	3.0	4.0	-1.1	74.0	1.32	1.32	14
Portugal	1.2	1.9	-5.0	199.2	1.32	1.32	14
U.S	4.2	4.7	-7.1	89.6	1.33	1.33	16
Finland	4.1	4.0	-0.4	61.0	1.36	1.36	17
Hungary	4.6	7.3	2.1	87.0	1.40	1.40	18
France	2.8	4.1	-3.2	93.8	1.44	1.44	19
U.K	3.7	4.7	-5.7	82.3	1.47	1.47	20
Germany	2.4	3.8	-1.2	80.9	1.48	1.48	21
Netherland	2.5	4.0	-2.0	75.1	1.55	1.55	22
Italy	2.2	4.6	1.8	132.0	1.70	1.70	23
Japan	1.9	4.9	-2.8	95.0	2.15	2.15	24
Poland	6.4	5.4	-4.8	61.9	3.34	3.34	25
Spain	0.5	4.4	-5.2	72.8	3.94	3.94	26
Greece	-2.6	7.1	1.0	129.1	-5.06	5.06	27
Ireland	0.0	5.3	-4.7	82.9	6.59	6.59	28

Source: Park (2010).

Table 9. Fiscal Sustainability Gap (FS Gap)

	Required Primary Balance (ps*, %)	Actual Primary Balance (ps, %)	FS Gap (%p)	Ranking
Sweden	-0.6	1.7	2.39	1
Korea	**-0.6**	**1.0**	**1.58**	**2**
Belgium	0.9	1.9	1.04	3
Norway	0.1	0.3	0.23	4
Canada	-1.5	-1.4	0.11	5
Hungary	2.2	2.1	-0.15	6
Finland	-0.1	-0.4	-0.32	7
Denmark	0.3	-0.5	-0.84	8
Italy	3.0	1.8	-1.22	9
Australia	-0.3	-1.8	-1.46	10
Austria	0.7	-1.1	-1.81	11
Luxemburg	-0.1	-2.2	-2.13	12
Germany	1.1	-1.2	-2.35	13
Iceland	-0.1	-2.6	-2.49	14
Switzerland	-0.9	-4.0	-3.08	15
Netherland	1.1	-2.0	-3.09	16
New Zealand	0.1	-3.1	-3.22	17
Czech	0.3	-3.0	-3.22	17
Poland	-0.6	-4.8	-4.17	19
France	1.2	-3.2	-4.43	20
Japan	2.9	-2.8	-5.68	21
Portugal	1.2	-5.0	-6.25	22
U.K	0.8	-5.7	-6.50	23
Slovakia	0.1	-6.4	-6.58	24
U.S	0.4	-7.1	-7.48	25
Spain	2.8	-5.2	-7.99	26
Ireland	4.4	-4.7	-9.17	27
Greece	12.8	1.0	-11.82	28

Source: Park (2010).

Instead, long term fiscal projection based on assumptions of current policies, stable taxes, and other key demographic and macroeconomic parameters can provide a means fiscal sustainability. Fiscal projections offer invaluable signposts to help current government to respond to known fiscal pressures and risks in a gradual manner, earlier

rather than later, and help future government avoid being forced to adopt sudden policy changes. In doing so, it can also help future government to position themselves better to manage unforeseen or less predictable fiscal pressures.

Recently Kim (2010) estimates fiscal balance and government debt of Korea from 2010 to 2050. He first forecasts macroeconomic variables such as growth rate of GDP, interest rate, total factor productivity, and real wage based upon population projection and Cobb-Douglas production function. Then given prediction of macroeconomic variables, he estimates aggregate expenditure, aggregate revenue, and government debt by assuming that government debt increases as much as fiscal deficit. In order to minimize arbitrary manipulation of expenditure and emphasize the effect of change in social welfare and health spending, it is assumed that the GDP ratio of all other sectors expenditure excluding social welfare and health spending are maintained the average in the MFMP for 2010~2014 for whole projection period. For social welfare and health expenditure projection, sub-categories are first estimated respectively by considering personal contributions, benefits based on demographic structure and current institutions. Then aggregate expenditure by summing all sectors is calculated. In aggregate revenue side, it is assumed that central government tax burden is fixed at 16.0% of GDP which is the average in MFMP for 2010~2014 and that all other revenue including local tax revenue, non-tax revenue are fixed at the average from 2007 to 2010.[14]

The projection results show that social welfare and health expenditure will grow gradually for the period of 2015 to 2050. In 2050, it is expected that social welfare and health expenditure will be 16.9% and 3.6% of GDP respectively. Consequently, Korea's government debt continuously rises for the projection period. It is expected to get to 140.1% of GDP in 2050. It implies that current Korea's fiscal position may not be within safety bound in the future. Instead, government debt ratio decreases under relaxed assumption of central government tax burden. When central government tax burden ratio gradually rises from 16.0% to 17.0% (scenario 1), it falls to 111.0%.

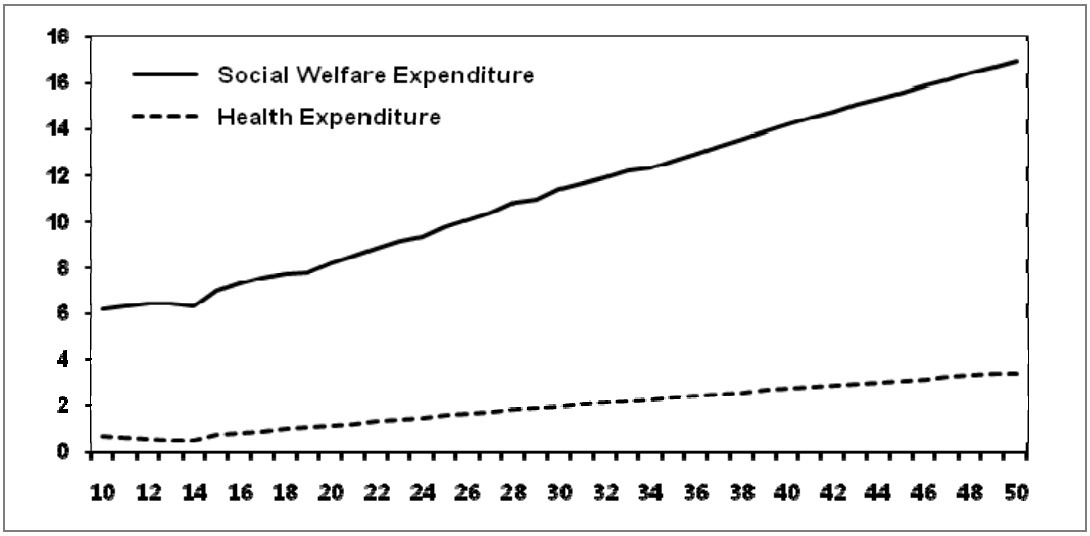
[14] Kim (2010) uses historical average to project local tax revenue, non-tax revenue because MFMP does not provide these numbers.

Similarly when rises from 16.0% to 18.0% (scenario 2), it falls to 80.5%.

In these perspectives, it is confirmed that major risk components of future fiscal sustainability in Korea are social welfare and health expenditure. For future fiscal sustainability, institutional reform related to social safety net and/or increase of tax burdens are required. In addition, it is worth noting that if cost of reunification of North and South Korea is included, the government debt will increase faster than fiscal projection above.

Figure 6. Social Welfare and Health Expenditure Prediction

(Unit: % of GDP)



Source: Kim (2010).

Table 10. Fiscal Balance and Government Debt Prediction

(Unit: % of GDP)

	Consolidated Public Sector Finance Balance	Social Security Contribution Balance	Operational Budget Balance	Government Debt
2010	-0.2	2.4	-2.7	36.1
2015	2.7	3.7	-1.0	31.5
2020	2.0	3.7	-1.7	30.4
2025	-0.1	2.9	-2.9	35.6
2030	-2.0	2.5	-4.5	47.3
2035	-4.2	1.6	-5.8	64.3
2040	-6.8	0.5	-7.2	85.6
2045	-9.7	-0.9	-8.8	111.3
2050	-12.7	-2.2	-10.5	141.4

Source: Kim (2010).

Table 11. Government Debt Based on Tax Ratio to GDP

(Unit: % of GDP)

	Basic Scenario	**Scenario 1**	**Scenario 2**
2010	36.1	36.1	36.1
2015	31.5	31.5	31.5
2020	30.4	29.2	27.5
2025	35.6	30.3	25.0
2030	47.3	37.2	27.0
2035	64.3	49.3	34.3
2040	85.6	65.6	24.5
2045	111.3	86.1	61.0
2050	141.4	111.0	80.5

Source: Kim (2010).

6. Fiscal Transparency and Anticipating Policy for Future Crisis

6.1. Hidden Debt

Government guaranteed debt is not included in the reported public debt by following GFSM 2001 (Government Financial Statistics Manual 2001, IMF). However, Government guaranteed debt has increased sharply since 2008 and will

amount to 41.3 Tril. Won next year (3.3% of GDP). The size of the government guaranteed debt will increase further than the previous table if Korea Development Bank (KDB) is privatized. If that happens, the burden will be heavier by approximately 22 Tril. Won.

According to the National Fiscal Act (revised last May), the government has submitted a 5-year plan for the government guaranteed debt to the National Assembly. Although it is expected that the government guaranteed debt will stay at the level of about 40.0 Tril. Won, it may soar in economic crisis period such as the global financial crisis.

Table 12. Government Guaranteed Debt

(Unit: Tril. Won)

	2008	2009	2010	2011	2012	2013	2014
Guaranteed Debt	28.1	29.8	34.9	41.3	42.5	38.6	35.4

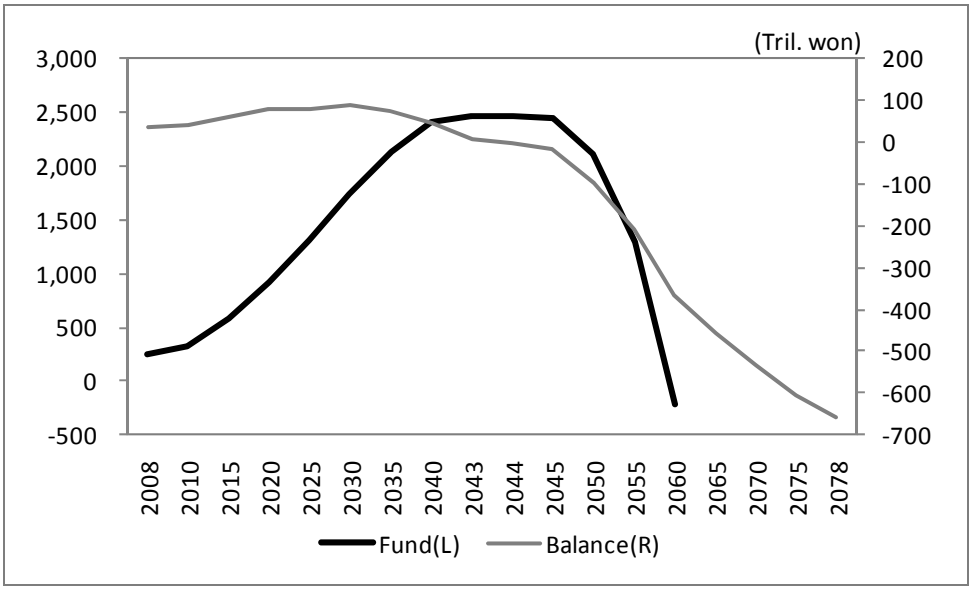
Source: MOSF.

6.2. The Future of Social Security

As it is shown in the previous section, the main reason of soaring in social welfare expenditure is going to the National Pension Fund. Without raising contribution rate and lowering income replacement ratio, the National Pension Fund will be exhausted in around 2050.

Other concerns are Public Employees' Pension Fund and Teachers' Pension Fund, the first of which has been already exhausted and the second of which is about to be exhausted in the near future. In order to make up the losses of PEPF, 43.5 Tril. Won of the government support will be required in 2010~2019.

Figure 7. Forecast of Korea National Pension Fund and Balance

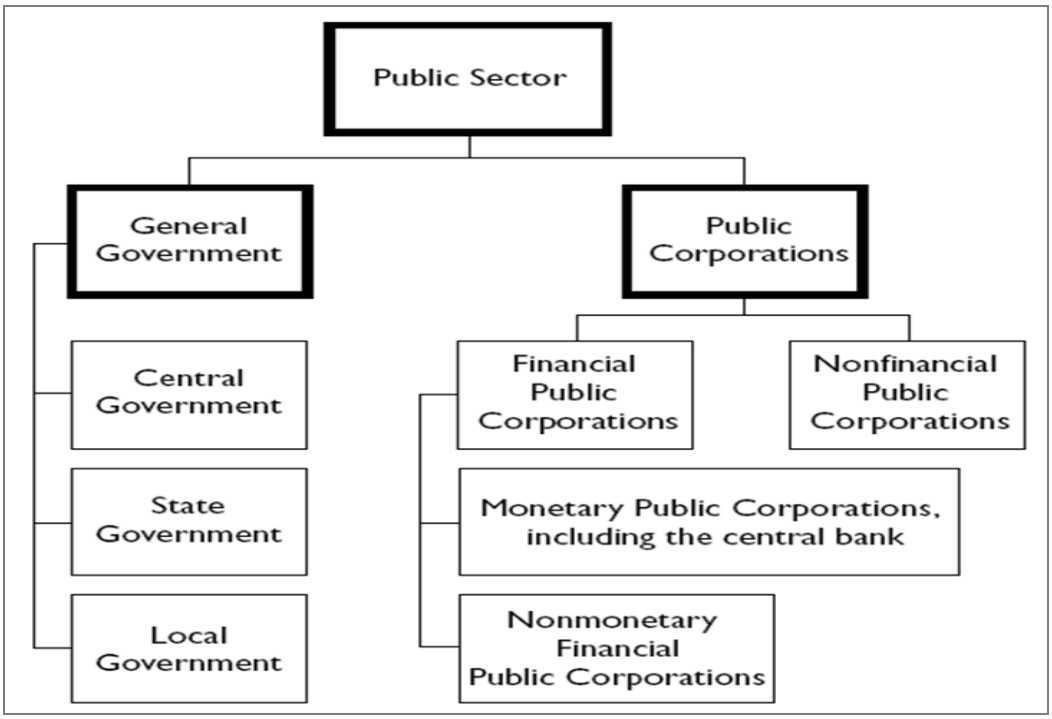


Source: National Pension Services (NPS) of Korea, 2008.11

6.3. State Owned Enterprises' (SOEs) Debt

Korean economy define State Owned Enterprises (SOEs) by following IMF's GFSM 2001. As it is shown in Figure 9, SOEs are a subset of nonfinancial public corporations. More specifically, any nonfinancial public corporations that satisfy certain conditions such as asset size and sales to production cost ratio are defined as SOEs. In this case, the debt of nonfinancial public corporations excluding SOEs in Korea is included in the government debt as well as general government debt.

Figure 8. The Public Sector



Source: Government Finance Statistics Manual 2001 (GFSM 2001), IMF.

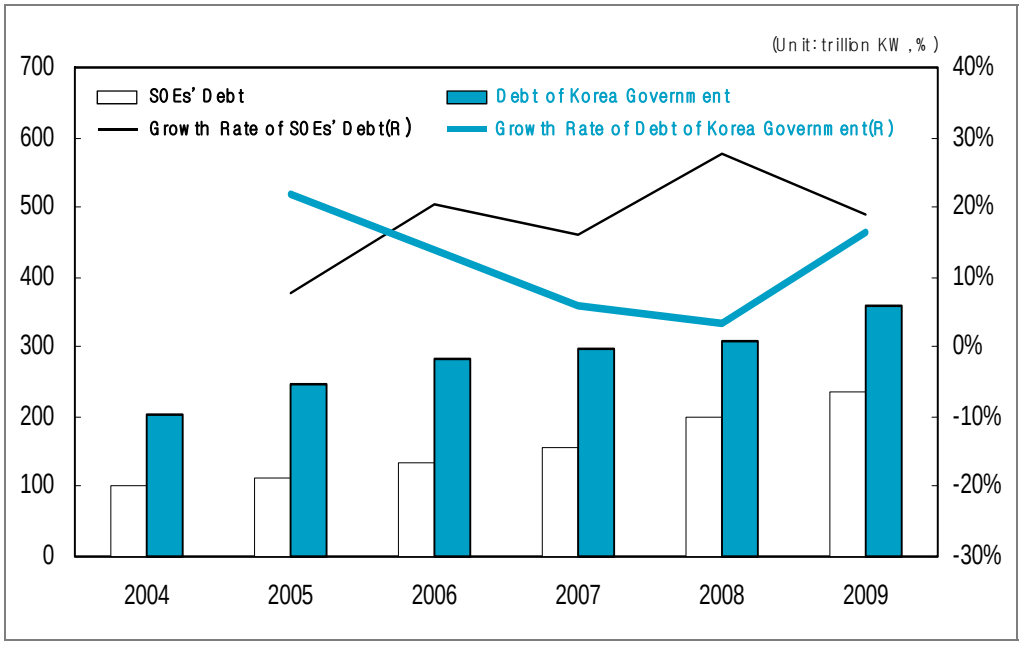
Recently SOEs' debt is too rapidly increasing even when their sales volume and the rising pace of assets are considered. According to financial statement of 21 SOEs monitored by the central government, their aggregate debt in 2009 is 235.1 Tril. Won, which is over 60% of the government's official debt and 20% of GDP. [15] The average growth rate of their debt in 2004~2009 is 17.9%, which is much higher than that of government debt, 12.0%. It is also noticeable that over 90% of SOEs' debt is attributable to top 6 SOEs' one in terms of asset size, and over 50% to top SOE, which is Korea Housing and Land. In the meantime, the financial sustainability indicators of major SOEs such as the ratio of profit to net sales have been declined due to price control by the government, increase of international commodity price and partially recent GFC.

Although SOEs' debt is not included in the reported public debt, realization of

[15] There are also hundreds of SOEs monitored by the local government. When local SOEs debt is included, aggregate debt SOEs will rise. However, local SOEs debt is relatively small compared to central SOEs so that it is not included here.

credit defaults of SMEs will have magnificent negative impact to the whole economy and will demand huge amount of government funds to stabilize them again. Under these circumstances, recent analysis of KDI on SOEs' financial status suggests that they need to increase short term liquidity and decrease debt ratio gradually. The followings are specifically recommended for SOEs' soundness: voluntary de-leveraging by focusing on proper level of profit, actualization of public fares, reform of SOEs evaluation frame, detailed disclosure of financial statements of SOEs.

Figure 9. Korea Government and SOEs' Debt



Source: Korea Investors Service DB and MOSF.

6.4. Anticipating Policy for Future Crisis

As long as current level of fiscal soundness is maintained, Korea government will actively intervene in response of future economic crises. In this perspective, the governments' fiscal policy stance at present is considered appropriate in that active effort for fiscal consolidation. This year's policy stance is evaluated a bit expansionary following the previous year since operational budget balance is expected to run deficit. However, the size of deficit will decrease compared to last year.

In a short and medium term perspectives, Korea government will continue to establish fiscal foundation as well as enforcement of SOEs' debt reduction. By reviewing a fiscal project on a zero-based budget, projects that are neither essential nor urgent should be terminated. Also by improving the performance evaluation and feedback systems, the fiscal programs should be streamlined consistently to effectively adjust tax expenditures. On the tax revenue side, it is necessary to expand the tax base by diminishing tax redemption and reduction and non-refundable tax credit, while at the same time expand the tax revenue base by enhancing the accuracy of reporting income through consistent improvement in tax administration.

In a long term perspective, institutional reform associated with social welfare such as public pension is required. As confirmed from fiscal projections, government debt will grow gradually. Periodical release a long-term fiscal outlook report which takes into account low fertility rate and population aging will be helpful to get publics' consent related to increase in contributions and so on.

7. Concluding Remarks

This study is to measure the contributions of the fiscal stimulus package to the recovery of Korean economy from the GFC and to discuss how the fiscal stance is redirected toward the pre-crisis state of fiscal consolidation in the medium-term. In addition, it identifies several potential risk factors to fiscal sustainability of Korea, such as National Public Pension, National Health Insurance, and SOEs' debt from a long-term perspective.

Through examining the series of key macro and fiscal variables based on the existing literature, our study confirms the following facts. First, in light of the historical trend of fiscal consolidation, the fiscal stimulus package during the GFC is unusual and unprecedented both in terms of timing and magnitude. Though the past empirical works have split decisions, circumstantial evidences seem to indicate that the

massive fiscal expansion after the crisis sustained the aggregate demand after the currency depreciation lost its influence on trade balance.

Second, Korean government perceives clearly the need of returning to normalcy and has reflected already on the Medium Term Fiscal Management Plan. However, the plan is based on too optimistic economic growth forecast and needs more detailed sub-programs.

Third, it is clear that social welfare and health expenditure are major risk components. For fiscal sustainability, institutional reform related to social safety net including NPS and/or increase of tax burdens are required. In addition to rapidly aging demography, it is worth noting that the cost of reunification of North and South Korea may add the fiscal burden seriously.

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Appendix A.

Table A1. Basic Government Debt Statistics

(Unit: Bil.Won, %)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Public Debt	60.3	80.4	93.6	111.4	122.1	133.6	165.7	203.1	248.0	282.8	298.9	309.0
(% of GDP)	12.3	16.6	18.6	18.5	18.7	18.5	21.6	24.6	28.7	31.1	30.7	30.2
- General Acc.	-	9.7	20.1	22.1	24.5	26.4	29.4	31.9	40.9	48.9	55.6	63.0
- Public Fund	-	-	-	-	-	-	14.4	29.4	42.4	53.2	52.7	49.2
- FX Stabilization Fund	4.2	9.0	10.8	13.5	14.6	20.7	33.5	51.3	67.1	78.6	89.7	94.0
- National Housing Fund	16.4	19.0	24.0	27.8	31.7	34.0	36.8	36.7	39.7	43.3	43.6	45.2
- Local Government Net Debt	9.9	9.0	8.9	10.4	9.0	7.0	6.9	7.0	9.2	9.6	9.8	10.3
-Others	29.8	33.7	29.8	37.6	42.3	45.5	44.7	46.8	48.7	49.2	47.5	47.3

Source: MOSF.

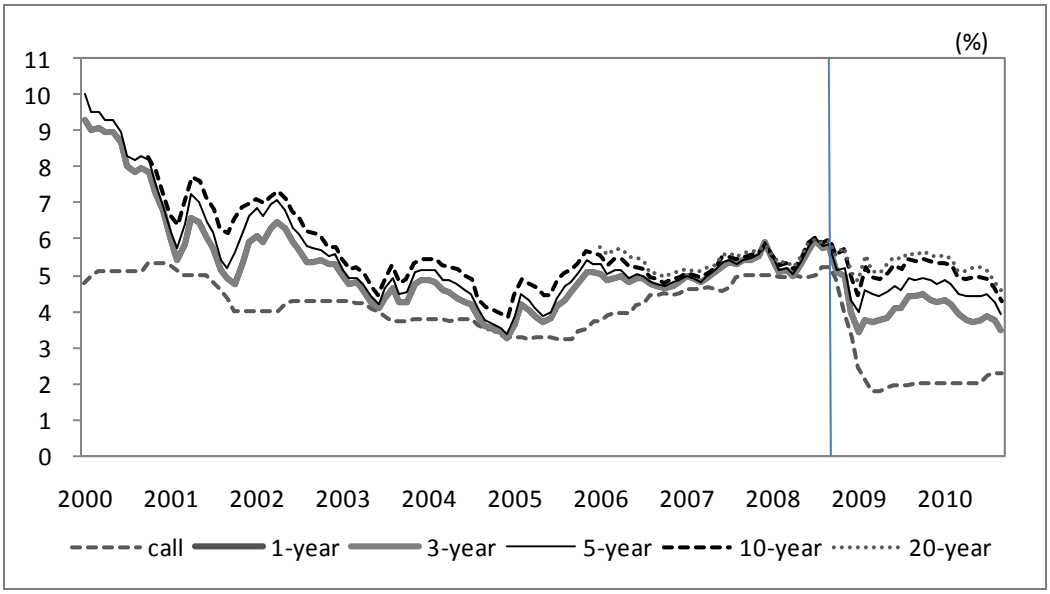
Table A2. Consolidated Government Finance

(Unit: Tril. Won)

	Year	Revenue	Current rev.	Capital rev.	Exp. and net lending	Current exp.	Capital exp.	Net lending	Fiscal Balance
Total	2005	244.58	239.80	4.78	242.54	172.88	63.09	6.58	2.03
	2006	271.00	265.63	5.37	260.80	189.94	62.68	8.19	10.20
	2007	310.66	304.06	6.60	268.32	185.30	72.66	10.36	42.34
	2008	314.58	310.74	3.83	297.29	209.18	80.68	7.43	17.29
	2009	315.02	310.48	4.54	352.67	238.36	96.22	18.10	-37.65
Central	2005	188.56	187.27	1.28	127.52	108.66	14.76	4.11	61.03
Gov't	2006	206.40	204.92	1.48	139.52	118.05	14.25	7.22	66.88
	2007	240.01	238.07	1.94	137.58	107.02	22.35	8.21	102.43
	2008	246.48	244.58	1.90	149.03	117.98	24.46	6.59	97.45
	2009	246.32	243.79	2.53	174.80	138.10	19.95	16.75	71.52
Local	2005	54.80	51.43	3.37	84.73	38.81	43.44	2.48	-29.93
Gov't	2006	63.25	59.55	3.71	90.80	44.61	45.22	0.96	-27.55
	2007	67.58	63.21	4.36	98.10	48.83	47.12	2.15	-30.52
	2008	66.20	64.44	1.76	111.64	58.82	51.99	0.83	-45.44
	2009	66.84	65.13	1.71	137.89	66.13	70.44	1.32	-71.05
Local	2005	1.22	1.09	0.13	30.29	25.41	4.88		-29.07
Edu.	2006	1.35	1.16	0.18	30.48	27.28	3.20		-29.13
	2007	3.07	2.78	0.29	32.64	29.46	3.18		-29.57
	2008	1.90	1.73	0.17	36.62	32.38	4.23	0.01	-34.72
	2009	1.87	1.57	0.30	39.98	34.13	5.83	0.03	-38.12

Source: MOSF.

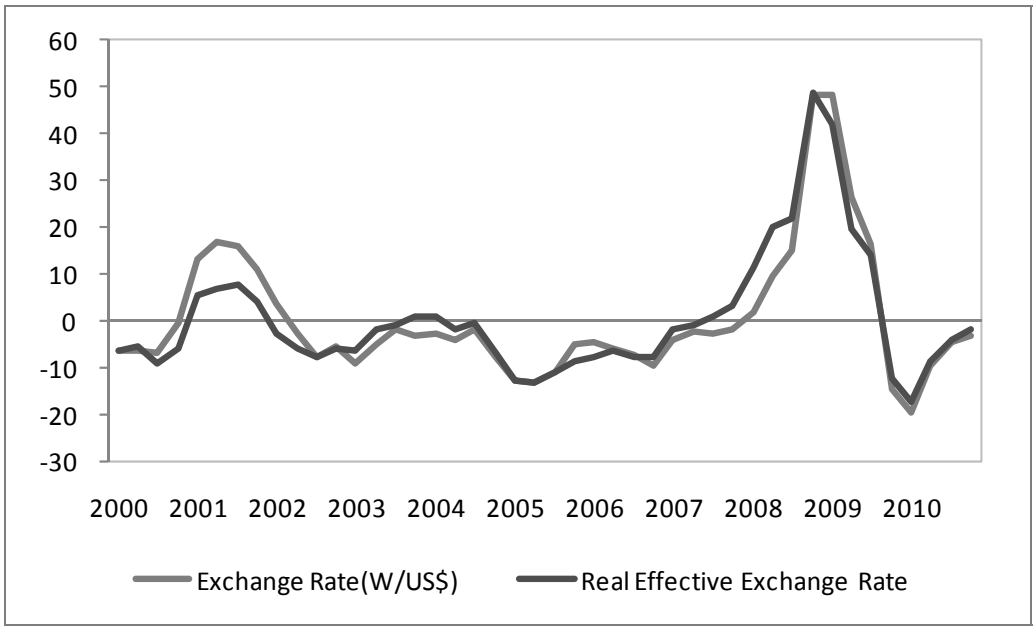
Figure A1. Yield Rates of Government Bonds (Market Interest Rate of Government Bonds)



Source: Bank of Korea.

Figure A2. Changes in Exchange Rates

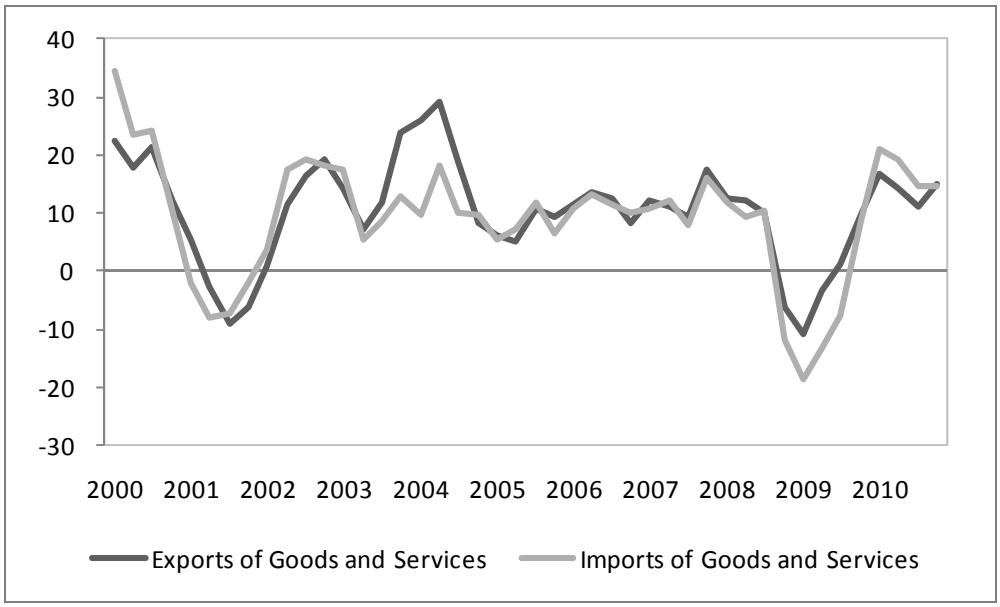
(Unit: YoY % Change)



Source: Bank of Korea and KDI.

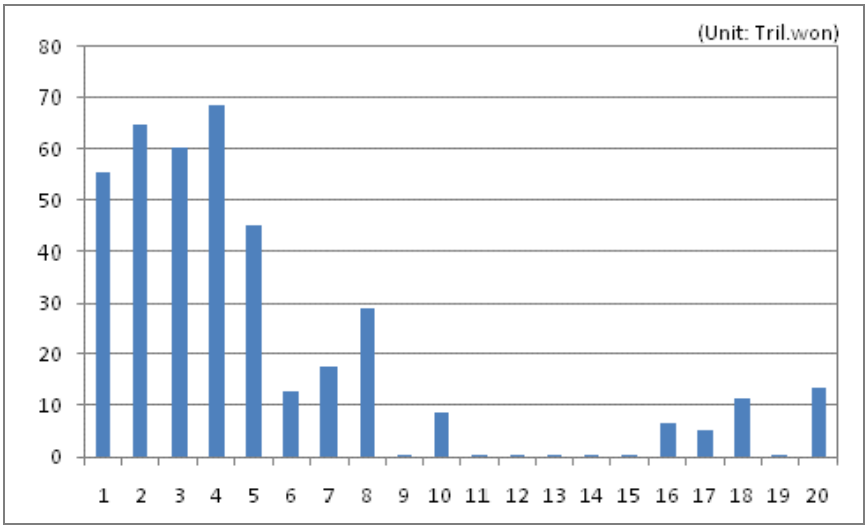
Figure A3. Real Growth Rates of Exports and Imports of Goods and Services

(Unit: YoY % Change)



Source: Bank of Korea.

Figure A4. A Distribution of Government Bond Maturities (Outstanding Gov't Bonds by Maturities)



Source : Korea Financial Investment Association (KOFIA).

Note : The fixed date is 2010.10.11.

Appendix B.

1. List of Variables and Their Data Sources

The data used in the empirical analysis are from G-20 economies plus 6 developing Asian countries - Hong Kong, China; Malaysia; Philippines; Singapore; Taipei, China; and Thailand. The quarterly values of the following variables are included in the data set.

(1) GDP and GDP deflator: IFS (mostly in local currency unit)

(2) Interest rates: policy rate, term spread (central banks, Bloomberg)

(3) Exchange rates: real effective exchange rate (BIS) and local currency unit per US dollar (IFS)

(4) Trade volume: export and import between any pair of countries (IMF DOTS)

(5) Government fiscal statistics (IFS, Bloomberg and OECD STAT): Total government revenues and expenditures

(6) Fiscal soundness, defined as fiscal balance/ GDP

(7) Economic openness, defined as trade volume/ GDP

2. Notations for Variables and their Definitions

(1) i : country, t : time

(2) $X_{it}^{\det} \equiv X_{it} - X_{it}^{hp}$

$X_{it}^{\det}$ refers to the detrended time-series obtained by subtracting HP-filtered X_{it}^{hp} from the original time-series X_{it}

(3) $TS_{it}^{t} \equiv GOV\_BOND_{it} - POLICY_{it}^{hp}$

Term spread refers to the yield of 1-year or 3-year government bonds minus the policy interest rate (e.g. Federal fund rate in the US).

(4) $global\_GDP_{jt} = \sum_{i \neq j} GDP_{it}$

From country j's perspective, the global GDP is the sum of GDPs of all countries in the

data set except herself.

(5) REV_{it} , EXP_{it} , $BALANCE_{it} \equiv REV_{it} - EXP_{it}$

Government revenue, government expenditure and fiscal balance.

(6) $openess_{it}$

Economic openness is defined as trade volume – i.e. sum of imports and exports – divided by GDP.

(7) FS_i

Historical fiscal soundness is defined as the average of quarterly fiscal balance divided by quarterly GDP up to 2008 Q3.

(8) *Asia*

A dummy variable which takes on the value of 1 if the observation belongs to a developing Asian country – China, Hong Kong, China, India, Indonesia, Korea, Malaysia, Philippines, Taipei,China, Singapore or Thailand – and 0 otherwise.

(9) $X_{it}^{\det *} \equiv X_{it}^{\det} - X_{it}^{pred}$

For any quantity variable $X_{it}^{\det}$, $X_{it}^{\det *}$ is defined as the part which cannot be explained by PVAR since X_{it}^{pred} is the value of X_{it} predicted by PVAR.

(10) $X_{it}^{diff} \equiv X_{i,t} - X_{i,t-1}$

For price variables such as interest rate, term spreads and real effective exchange rate, first order differences are noted as above.

3. De-trended 4 Variable PVAR model

$$\begin{bmatrix} GDP_{it} \\ globalGDP_{it} \\ REV_{it} \\ EXP_{it} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} GDP_{it-1} \\ GDP_{it-2} \\ GDP_{it-3} \\ GDP_{it-4} \end{bmatrix} + \begin{bmatrix} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \\ b_{41} & b_{42} & b_{43} & b_{44} \end{bmatrix} \begin{bmatrix} globalGDP_{it-1} \\ globalGDP_{it-2} \\ globalGDP_{it-3} \\ globalGDP_{it-4} \end{bmatrix}$$
$$+ \begin{bmatrix} c_{11} & c_{12} & c_{13} & c_{14} \\ c_{21} & c_{22} & c_{23} & c_{24} \\ c_{31} & c_{32} & c_{33} & c_{34} \\ c_{41} & c_{42} & c_{43} & c_{44} \end{bmatrix} \begin{bmatrix} REV_{it-1} \\ REV_{it-2} \\ REV_{it-3} \\ REV_{it-4} \end{bmatrix} + \begin{bmatrix} d_{11} & d_{12} & d_{13} & d_{14} \\ d_{21} & d_{22} & d_{23} & d_{24} \\ d_{31} & d_{32} & d_{33} & d_{34} \\ d_{41} & d_{42} & d_{43} & d_{44} \end{bmatrix} \begin{bmatrix} EXP_{it-1} \\ EXP_{it-2} \\ EXP_{it-3} \\ EXP_{it-4} \end{bmatrix} + \begin{bmatrix} U_{it}^{1} \\ U_{it}^{2} \\ U_{it}^{3} \\ U_{it}^{4} \end{bmatrix}$$

Appendix C.

Table C1. Major Fiscal Stimulus Measures of Korea

(Unit: Trillion Won)

Major Stimulus Measures	Allocation
November 2008	
• Spending on infrastructure and other government projects	4.6
• Assistance to small businesses	3.4
• Social transfers to low income households	1.0
• Local government expenditures	1.1
• To tackle unemployment problems and support small business start-ups	0.3
• Tax cuts	3.0
December 2008	
• Expansion of internship system and increasing job positions for underprivileged	4.9
• Increase of Social Overhead Capital (SOC) projects	24.7
• Stabilization of SME's	3.9
• Supporting regional finances	1.9
January 2009	
• Will invest in projects pertaining to energy conservation, recycling, carbon reduction, and waste management	
• Improved information and energy infrastructure	
• Preventing floods, securing water resources, creating green spaces, and developing areas around the four rivers	
• Increased investment in low carbon transportation	
• Investment in environment-friendly LED lights	
March 2009	
• Job creation and maintenance	3.5
• Assist SMEs and self-employed through expanded credit guarantees and increased government financing	4.5

• Revitalize provincial economies	3.0
• Nurturing future growth engines	2.5
• Assistance to low income households	4.2
August 2009	
• Tax incentives for self-employed business owners and SMEs	
• Tax incentives to be granted on money used for micro-credit loans, educational, art, cultural, and social welfare purposes	
• Tax deduction on R&D investment will be expanded to 20-25 percent for large enterprises and 30-35 percent for SMEs.	
• Tax deduction and exemption to be given to green industry-related financial products.	

Source: Ministry of Strategy and Finance, various press releases; Comprehensive policy Measures to Overcome the Ongoing Economic Difficulties, Monthly Economic Bulletin (November 2008). Both are available at www.mosf.go.kr.

Table C2. Supplementary Budgets since the East Asian Currency Crisis

(Unit: Tril. KW, % of GDP)

Year	Times	Amount	Source of revenue	Major Projects	Gov't Submission date	National Assembly resolution date
1998	1	△1.4(0.3)	Tax revenue reduction in 1998 and SMEs disposal income, etc.	Expenditure cuts due to lack of tax revenues and Financial restructuring support	2.9	3.25
1998	2	13.9 (2.8) (increased exp. 6.7, reduced rev. △72)	Surplus from BOK (bonds issuance etc.), Stock sales and Tax reduction in 1998	SOC investment expansion and Corporate restructuring · SMEs support	7.30	9.25
1999	1	0.8 (0.1)	Surplus from BOK and IBRD Grant Assistance	Relief measure for the unemployed and fishery support	3.31	4.27
1999	2	2.7 (0.5)	Tax revenue increase in 1999 and Surplus from 1998 budget	Low· middle income household aid and Countermeasures reserve funds against natural calamities	6.29	8.11
2000	1	2.3 (0.4)	Surplus from 1999 budget Surplus from BOK	Low income household aid and Relief measure for the youth unemployed	6.29	10.13
2001	1	5.1 (0.8)	Surplus from 2000 budget and Surplus from BOK	Countermeasures reserve funds against natural calamities	6.22	9.3
2001	2	1.6 (0.3)	Expected interest accruals and disused amount	Construction investment (SOC, etc)	10.23	11.5
2002	1	4.1 (0.6)	Surplus from 2001 budget and Stock sales revenue (KT)	Countermeasures reserve funds against natural calamities	9.10	9.13
2003	1	4.5 (0.6)	Surplus from 2002 budget and Tax reassessment	Construction investment (SOC, etc) and Boosting regional economy	6.5	7.15
2003	2	3.0 (0.4)	Gov't bonds issuance	Countermeasures against natural calamities	10.2	10.24
2004	1	2.5 (0.3) (increased exp. 1.8, reduced rev. △0.6)	Gov't bonds issuance and Surplus from 2004 budget	Low income household aid	7.2	7.15
2005	1	4.9 (0.6) (increased exp. 0.6 reduced rev. 4.2)	Tax revenue reduction in 2005 and Gov't bonds issuance	Medical care aid, subsistence benefit and land purchase for U.S. military base relocation	9.29	11.16
2006	1	2.2 (0.2)	Surplus from 2005 budget and Gov't bonds issuance	Natural disaster relief expenditure	8.18	8.29
2008	1	4.6 (0.4)	Surplus from 2007 budget	Oil price support for low income household and Transport network expansion	6.20	9.18
2009	1	2.8 (2.7) (increased exp. 1.7, reduced rev. △ 1.1)	Surplus and buffer fund	Low income household aid and facilities support to SMEs	3.30	4.29

Source: MOSF.

Appendix D.

1. Relevant Korean Literature

	Methodology	Results
Park, J.(1995)	- Single equation approaches - (Feldstein(1982) and Kormendi (1983)) - VAR(Cholesky decomposition)	- Ricardian Equivalence Hypothesis is not sustained by either of the single equation approaches. - An impulse response of private consumption to the government expenditure reveals the positive effect over a long time horizon.
Kim, S.(1997)	- VAR(Cholesky decomposition) - The government expenditures are classified into six subgroups and their impacts on consumption, investment and income are separately estimated	- The impact of government expenditures differs significantly item by item. - The government investment tends to boost private economic activities whereas the government consumption is likely to crowd out them.
Park, H and J. Choi(1997)	- VAR with seven variables (Cholesky decomposition) - The seven variables are government expenditure, bonds, money stock, interest rate, exchange rate, consumption, and current account balance.	- Not able to reject Ricardian Equivalence theorem - Insignificant impact of fiscal deficit, government debt and spending increase on consumption, interest rate, exchange rate, and current account balance
Choi, J.(2002)	- Estimation of asset demand functions with the inclusion of the government bond - Causality analysis of a VAR system	- The government debt doesn't seem to be perceived as net wealth by consumers. - Insignificant impact of government debt and money stock(not hi-powered money) on real GDP, nominal GDP and GDP deflator
Kim, S.(2003)	- Structural VAR of all the components of national income identity(private consumption, investment, net export and the remaining sectors) with dummy variables identifying a structural break (Cholesky decomposition) - Fiscal variables, such as government consumption, investment and tax revenues are given exogenous in the VAR system.	- After the Currency crisis, the impact of government expenditure on GDP changed signs from (-) to (+). - During the same period, the impact of the government investment on the private investment as well as the government consumption on the private consumption changed signs from (-) to (+).
Kim, S.(2005)	- Structural VAR of GDP, price (P) and money stock (M) with dummy variables considering a structural break (before and after the Currency Crisis) - Fiscal variables, such as government consumption, investment and tax revenues are given exogenous in the VAR system.	- Before the Currency crisis, an exogenous shock from the government expenditures had negative influence on price and money stock while it has positive influence on GDP. - After the Currency crisis, the exogenous government expenditure shock had negative influence on price and GDP, while it has positive influence on the money stock.

Appendix E.

1. Size of Fiscal Multipliers by Types

Table E1. Multiplier Effects from 10 Tril. Won Increment of Capital Expenditure

(Unit: % p)

Quarter	1st	2nd	3rd	4th	5th	6th	7th	8th
Real GDP	0.25	0.19	0.17	0.15	0.13	0.11	0.09	0.07
Private consumption	0.05	0.09	0.11	0.12	0.11	0.11	0.10	0.09
Equipment investment	1.78	1.39	1.09	0.84	0.64	0.46	0.31	0.18
Construction investment	1.19	1.11	1.03	0.95	0.87	0.79	0.72	0.65
CPI	0.01	0.04	0.06	0.08	0.10	0.12	0.14	0.16
Current account/GDP	-0.15	-0.17	-0.15	-0.13	-0.11	-0.10	-0.08	-0.07
Interest rate (%)	0.03	0.05	0.07	0.09	0.11	0.13	0.14	0.15

Note: (1) y-o-y change excl. current account/ GDP and interest rate.
(2) These estimates are calculated from the KDI Forecasting Model.

Table E2. Multiplier Effects from 10 Tril. Won Increment of Current Expenditure

(Unit: % p)

Quarter	1st	2nd	3rd	4th	5th	6th	7th	8th
Real GDP	0.76	0.01	0.07	0.05	0.02	0.00	-0.01	-0.01
Private consumption	0.18	0.17	0.13	0.09	0.06	0.04	0.02	0.01
Equipment investment	1.36	0.69	0.41	0.21	0.04	-0.09	-0.17	-0.23
Construction investment	0.25	0.21	0.19	0.17	0.15	0.12	0.09	0.07
CPI	0.04	0.08	0.10	0.12	0.13	0.13	0.14	0.14
Current account/GDP	-0.45	-0.17	-0.06	-0.03	-0.02	-0.01	0.00	0.01
Interest rate (%)	0.08	0.10	0.11	0.12	0.13	0.13	0.13	0.14

Note: (1) y-o-y change excl. current account/ GDP and interest rate.
(2) These estimates are calculated from the KDI Forecasting Model.

Table E3. Multiplier Effects from 10 Tril. Won Reduction of Tax Revenue

(Unit: %p)

Quarter	1st	2nd	3rd	4th	5th	6th	7th	8th
Real GDP	0.46	0.44	0.35	0.27	0.19	0.12	0.08	0.04
Private consumption	1.28	1.33	1.06	0.77	0.53	0.37	0.25	0.17
Equipment investment	0.80	1.19	1.22	1.04	0.76	0.46	0.19	-0.04
Construction investment	0.15	0.27	0.34	0.38	0.38	0.35	0.32	0.27
CPI	0.02	0.07	0.12	0.16	0.21	0.24	0.26	0.28
Current account/GDP	-0.27	-0.36	-0.32	-0.24	-0.17	-0.12	-0.08	-0.04
Interest rate (%)	0.05	0.10	0.15	0.19	0.22	0.24	0.25	0.26

Note: (1) y-o-y change excl. current account/ GDP and interest rate.
(2) These estimates are calculated from the KDI Forecasting Model.