
A Note on the Effects of Public Finance on the Economy

Eui-Gak Hwang

Korea University, Seoul and Visiting Professor, University of Pretoria 1999

ABSTRACT

This note attempts to measure the effects of aggregate government expenditure on GNP growth and monetary policy in a growing economy. A version of the standard St Louis model is used for empirical estimation. Related effects were also estimated by means of South Korean data for the period 1970-1988. The findings, *inter alia*, support the position that government bondholding is regarded as an asset, not a future tax burden.

JEL E 63

INTRODUCTION

Most developing economies experience that they are mostly on the short side of resource availability. In other words, the demand for public investment for economic development exceeds the supply of tax revenue. Foreign resources and trade also play an important role in financing economic development. However, here we simply choose to set aside the functions of foreign resources and trade in order to solely look into the role of public finance in economic development.

Most LDCs mainly depend upon domestic resources for their development. Two important domestic means of filling the savings gap are inflation tax and deficit financing.

Extensive studies have shown empirical evidence for some Latin American and Asian countries that suggested positive and significant correlation between money supply and real output growth between 1959 and 1966. It is indeed tempting for the deficit-stricken LDCs to resort to inflation as a major "tax" to finance their public expenditure to promote economic development, particularly when the tax revenue as a proportion of the gross national product is low and tax elasticity with respect to income is not always greater than unity. Given certain demand-for-money assumptions, inflation can raise revenue. The practice of the

government gaining real revenue from inflation has a long history. The normal procedure today is for the government to finance some of its spending by selling government bonds to the central bank, while the central bank pays for the bonds with newly printed currency. This procedure results in an increase in prices.

A high rate of inflation tends to exert a negative influence on real income growth by distorting the efficient allocation of resources. It must also be noted that many LDCs experience significant inequalities in the distribution of income and inflationary financing, which often tends to redistribute income in favour of profits rather than wages, which may deepen existing inequalities. Of course, it may be argued that even if inflation promotes more inequality, it tends to raise the profit share and thereby the saving ratio in national income, and this could have a beneficial effect on growth. It is however highly inconclusive whether a higher profit share or higher consumption, due to more equal income distribution, would have a more favourable effect on growth in the LDCs. Mundell (1965) illustrated the relationship between inflation and economic growth by using the basic quantity-theory equation. Subsequently, many studies on the issues of both government revenue from inflation and the welfare cost of inflation have been made (Baily, 1956; Friedman, 1971; Barro, 1972; McKinnon, 1973).

This note attempts to empirically evaluate, firstly, the effects of aggregate government spending on the economy and, secondly, of deficit financing on the welfare of the public.

EMPIRICAL ANALYSIS

Public finance policy is closely related to the big trade-off between efficiency and equality which became an important part of the economic lexicon with the publication of Arthur Okun's book, *Equity and Efficiency*, in 1975. The first question has been widely pursued in the well-known controversy between the Keynesian multiplier approach and the monetarist assertion that fiscal expansion policy only ends up with crowding-out effects. All positive and normative aspects of the effects of government taxation and expenditure on the economy constitute an important topic of macroeconomic research. Welfare effects of taxation as well as alternative forms of public spending need to be analyzed in an overlapping-generations model framework. However, we explore only a simple relationship between government fiscal policy and the aggregate economy in South Korea using quarterly data for the period 1971-1988. The reason for choosing this observation period is that at the time Korea depended most heavily upon deficit financing for her economic development. To obtain a

simple elasticity estimate of the effects of aggregate government spending on GNP growth, the following standard St Louis model was used:

$$\dot{Y}_t = a + \sum_{i=0}^4 \beta_i \dot{M}_{t-i}^k + \sum_{i=0}^3 \partial_i G_{t-i} + Et \quad (1)$$

$k=1: M_1, \quad k=2: M_2, \quad \text{and} \quad k=3: M_3$

- where \dot{Y} = real income growth rate after seasonal adjustment
 \dot{M}_1 = growth rate of money supply (M_1)
 \dot{M}_2 = growth rate of total money supply (M_2)
 \dot{M}_3 = growth rate of total liquidity (M_3)
 \dot{G} = growth rate of aggregate government spending, that consists of consumption and investment expenditure of central government
 Et = white noise

The estimated results are given in Table 1.

Table 1 Regression Results of Equation (1) with different M^k

1971 (i) – 1998 (iv)			
	\dot{M}_1	\dot{M}_2	\dot{M}_3
∂_0	0.0532	0.0324	0.0151
β_0	0.1646	-0.5099	-0.2487
β_1	-0.1316	0.6599	0.1449
β_2	0.3291	0.1177	0.1638
β_3	-0.0867	0.7050	0.3306
β_4	0.1957	-0.4796	-
∂_1	0.1348	0.1609	0.1249
∂_2	0.0827	0.1038	0.1130
∂_3	0.0277	0.0224	0.0700
∂_4	0.0768	0.0448	0.0966
R_2	0.7242	0.718292	0.6060
RMSE	0.0551	0.0556	0.0645
DW	0.9170	0.9640	0.6730

Notes: RMSE = root mean square error; DW = Durbin-Watson Statistics

The long-term effect of government spending on GNP growth rate is 0.322 compared with 0.3092 of money supply (\dot{M}_1) while the elasticity coefficient for government spending is 0.3319 compared with 0.4931 of total money supply (\dot{M}_2). This shows that government spending is more effective than monetary policy when M_1 is considered, but less effective when M_2 is taken into consideration. The drawback with the equation lies in an identification problem, because the regression relationship of income growth on both government expenditure and money supply does not explicitly explain whether it is a demand equation or a supply equation. Furthermore, the equation does not take account of the negative effects of taxes on income. Therefore, an index is derived explicitly to consider the net demand effects of government fiscal policy, following the Rutaro Komiya and Kazuo Yasui (1984) model.

$$ADGX = GX - TX \left(1 - \frac{NS}{NI} \right) \quad (2)$$

where $ADGX$ = net demand effect of the government sector
 GX = government consumption and investment expenditure
 TX = direct plus indirect taxes
 NS = national saving
 NI = national income

The approximate effect of the government sector on aggregate demand can be found from the annual percentage change rate of the index. The net demand effect of government expenditure fluctuates with each peak recorded in 1972, 1975, and 1980, and has remained on a steady slow growth path since 1983. (This can easily be seen if we calculate percentage changes of $ADGX$ over time for the 1970-1988 period). A set of simple regressions are computed to check the causal relation between government expenditure (GX) and net demand effect ($ADGX$). The correlation coefficient of $ADGX$ on GX is estimated to be 0.65, showing that a unit change in GX results in a marginal increase of 0.65 unit of $ADGX$. Additional results were obtained for the relationships between the growth rate of government spending (GXR) and the consumer price inflation rate ($CPIR$), between the growth rate of government spending (GXR) and interest rates (IRR), and between government spending (GX) and GNP as well as exports (EXPORT):

$$1. \quad ADGX = -226.422 + 0.65007 GX \quad R^2=0.9974 \\ (3.812 \quad (89.160))$$

2. $CPIR = 1.7496 + 0.4418 GXR$ $R^2=0.6263$
(0.756) (5.338)
3. $IRR = 10.7583 + 0.13895 GXR$ $R^2=0.2279$
(6.202) (2.240)
4. $GNP = -3582.37 + 6.1686 GX$ $R^2=0.9637$
(-1.324) (21.238)
5. $EXPORT = -846.5196 + 2.6447 GX$ $R^2=0.9178$
(-0.473) (13.773)

Figures in parenthesis are all t statistics.

Table 2 Statistics used for the derivation of ADGX* (billions of won)

	CXC	CXX	TX	NI	NS	ADGX
1970	263.4	141.2	280.1	2 355.9	510.7	185.2
1971	344.0	153.8	251.1	2 887.7	556.9	214.4
1972	425.3	151.0	362.0	3 574.3	734.2	288.7
1973	451.7	162.4	428.1	4 549.5	1 233.5	302.1
1974	734.3	205.1	696.8	6 415.7	1 565.6	412.6
1975	1 121.1	338.2	949.6	8 408.7	1 865.5	720.4
1976	1 520.6	429.7	1 317.7	11 418.2	3 451.3	1 030.9
1977	1 919.1	623.0	1 634.8	14 568.9	5 017.1	1 470.3
1978	2 501.2	921.3	2 224.8	19 637.9	7 331.0	2 028.2
1979	3 059.4	1 323.0	2 998.4	24 898.9	8 928.5	2 459.2
1980	4 386.6	1 706.6	3 582.8	29 176.8	8 702.5	3 580.0
1981	5 515.0	1 993.9	4 463.5	35 994.4	10 627.4	4 363.3
1982	6 254.7	2 420.2	5 140.0	40 758.7	13 062.1	5 182.1
1983	6 851.9	2 821.6	6 015.0	47 790.2	17 343.3	5 841.4
1984	7 262.6	3 283.3	6 490.9	54 469.3	20 996.1	6 557.0
1985	8 135.9	3 678.5	7 228.4	60 755.1	23 037.7	7 356.9
1986	9 400.7	3 615.4	8 174.3	70 645.2	30 321.6	8 350.3
1987	10 708.5	4 071.2	9 660.3	82 113.0	39 006.2	9 708.3
1988	12 763.1	4 968.8	12 205.0	96 408.0	47 132.5	11 493.3

*CXC = government consumption expenditure; CXX = government fixed capital formation; TX = direct and indirect taxes; NI = national income; NS = national saving; ADGX = $GX - TX(1 - NI)$ where $GX = CXC + CXX$.

(Sources: Bank of Korea, National Income Statistics, various issues; Economic Statistics Yearbook, various issues.)

Lastly, the welfare (or wealth) effects of government deficit financing were explored by regressing total private consumption expenditure (PCT) on sets of explanatory variables including permanent income (Y), private assets value (W), social insurance assets (SW), government expenditure (G), taxes (T), and government bonds outstanding (D).

The hypothesis for this analysis is based on the government budget constraint equation, that is, $G-T = Db+dM$, where G is government expenditure and T government tax revenue. If $G-T > 0$, then there is a government budget deficit, which must be financed either through additional bond issue (dB) or a change in money supply (dM).

Assuming no inflationary revenue financing, that is $dM=0$, bond issue financing (dB) may or may not have an effect on the real sector. As briefly discussed in the beginning of this note, Keynesians emphasize the short-run direct effect of public bond financing on real income, but monetarists argue that the wealth effect of government bonds will increase the demand for money by private wealth holders, which in turn increases interest rates, thus resulting in crowding-out effects of government expenditure by a fall in private investment. How much does the amount of government bonds outstanding affect private-sector wealth? A Cochrane-Orcutt estimation method applied to a somewhat modified version of the Blinder-Solow model (1973) for Korean data, produced the result that government bonds had had about a 48% wealth effect on the aggregate consumption function estimate, while it influenced 58 per cent of the wealth effect on per capita consumption function estimation. The outcome implicitly explains that government bondholding is regarded as an asset instead of a future tax burden more vividly by each individual than by consumers as a whole. Keeping such *a priori* net asset effect of bonds in mind, the regression analysis of total private consumption expenditure on explanatory variables produced the following equation for the period 1971-1988 in South Korea:

$$\begin{aligned} \ln C = & 1.648 + 0.730 \ln Y + 0.122 \ln W - 0.596 \ln SW \\ & (1.72) \quad (6.60) \quad (1.56) \quad (1.41) \\ & + 0.127 \ln G - 0.125 \ln T + 0.346 \ln D \\ & (1.46) \quad (1.41) \quad (1.31) \\ R^2 = & 0.990; DW = 1.60 \end{aligned}$$

The facts that an empirical testing of the marketability of government bonds featured about 48 per cent in the aggregate consumption function and about 58 per cent in the individual consumption function, and that the marginal consumption expenditure (C) with respect to change in government bonds

outstanding (D) showed a positive elasticity of 0.346, well explain the significant existence of the net positive relationship between the amount of government bonds outstanding and its net wealth effect in South Korea.

SUGGESTION FOR FURTHER RESEARCH

This note has very briefly dealt with the effects of aggregate government spending on the economy as well as of deficit financing on the wealth of the public. The results give us some macro level conclusions as expected, but more micro-level studies need to be attempted. For example, it would be interesting to check the effects of both inflationary and non-inflationary deficit financing on economic development and growth. This can easily be done by regressing the GDP growth rate on a set of relevant explanatory variables, particularly on the deficit financing and inflation tax variables. Such an attempt may well be made for South African data, too.

REFERENCES

1. BAILY, M.J. (1956) "Welfare Cost of Inflationary Finance", *Journal of Political Economy*, September/October.
2. BARROW, R.J. (1972) "Inflationary Finance and the Welfare Cost of Inflation", *Journal of Political Economy*, September/October.
3. FELDSTEIN, M. (1956) "Welfare Cost of Inflationary Finance", *Journal of Political Economy*, September/October.
4. FRIEDMAN, M. (1971) "Government Revenue from Inflation", *Journal of Political Economy*, July/August.
5. HWANG, E.G. (1993) *The Korean Economies: A Comparison of North and South*, Clarendon Press Oxford, 146-188.
6. MCKINNON, R.I. (1973) *Money and Capital in Economic Development*, Brookings Institution, Washington, D.C.
7. MUNDELL, R. (1965) "Growth, Stability and Inflationary Finance", *Journal of Political Economy*, March/April.
8. KOMIYA, R. & YASUI, K. (1984) "Japan's Macroeconomic Performance since the First Oil Crisis: Review and Appraisal", *Carnegie-Rochester Conference Series and Public Policy*, No 20, Amsterdam, North-Holland.
9. KORMENDI, R.C. (1983) "Government Debt, Government Spending, Private Sector Behaviour", *American Economic Review*, 73: 994-1010.