

Public and Private Spending: Some Australian Evidence

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Abstract

This paper examines empirical relationships between government expenditure and private spending in Australia, to see whether government expenditure reduces, or crowds out, private expenditure or encourages it. Particular attention is paid to the effect on private investment expenditure and the possibility of a change occurring in the relationship between public and private is examined. Regression analysis found no significant evidence of crowding out. Public investment was found to compliment private investment in the period before 1974, but not in the period since then.

1 Introduction

The relationship between public and private expenditure has been the subject of theoretical debate and empirical investigations at least since publication of the *General Theory of Employment, Interest and Money* in 1936. The emphasis of research in this area has ranged from those studies that were mainly concerned with the effectiveness of fiscal measures in stimulating output to those that examined substitutability and complementarity relationships between government and private spending. The former studies include Barro (1974), Kormendi (1983) and Feldstein (1982), while in the latter category Aschauer (1989), Bailey (1971), Barro (1981), Monadjemi (1993) and Karras (1994) may be mentioned. The empirical results of these studies in both categories are highly controversial. The first group of studies generally examined the empirical implications of the Ricardian equivalence hypothesis (REH). This hypothesis argues that for a given

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pattern of government expenditure, a tax cut financed by an increase in debt has no effect on macroeconomic variables. As stated in Seater (1993), 'the debt/tax mix is irrelevant'. Kormendi (1983) provided the strongest support for the REH. The theoretical arguments and the empirical findings of most of the studies in this group were summarised in Seater (1993), in which he argued that good empirical studies are supportive of the REH, and those studies that refute it generally lack econometric precision. In the second group most of the studies, except Karras (1994), provided evidence in support of the substitutability hypothesis.

To examine the relationship between private and government spending it is essential to distinguish between different types of expenditure. Some categories of government expenditure such as expenditure on roads, education, airports and research, may increase private sector's productivity and, hence, may complement private investment expenditure. However, there are certain types of government consumption expenditure on food and health which may substitute for private consumption expenditure on these items. Moreover, as Karras (1994) has shown, the relationship between government and private spending is influenced by the size of the government. Karras (1994) argued that as the size of the government sector increases, it is likely that the relationship between private and public spending turns into substitutability rather than complementarity. Perhaps this change in the relationship is due to provision of more public services, rather than infrastructure as the size of the government sector expands.

The purpose of this paper is to examine empirical relationships between government and private spending in Australia, including the possibility of change in the relationship as the size of the government changes. The theoretical underpinning of the paper is developed in Section 2. In Section 3, the relationship between various types of government and private spending is investigated. The issue of the influence of the size of government is examined in Section 4. A summary and concluding remarks are offered in Section 5.

2 Theoretical Discussion

The importance of the relationship between private and public expenditure bears upon the issue of the crowding-out effect of an increase in public expenditure. In turn, the crowding-out effect tends to reduce the effectiveness of public expenditure policy as a stabilization device. If international capital mobility is less than perfect, government expenditure may 'crowd-out' private investment by reducing the supply of funds and raising interest

rates or it may 'crowd-out' through the REH. The crowding out effect of government spending may occur in relation to the private consumption as well as the private investment. Therefore, it is appropriate to investigate the relationship between each type of government and private expenditure separately.

Aschauer (1989) argued that the relationship between public capital and private investment depends on the effect of public spending on private sector's marginal productivity of capital.¹ Public expenditure may have a complementary relationship with private investment if that type of expenditure improves the productivity of private investment. In this case, public spending leads to an increase in private investment. There is 'crowding-in' rather than 'crowding-out' However, public consumption and investment expenditure may 'crowd out' private spending if the relationship between public and private expenditure is based on substitutability. This issue was discussed in Aschauer (1989), in which it was shown that public capital had a positive effect on productivity of private capital. In Aschauer's article, the productivity of private capital was measured by the rate of return on non-financial corporate capital. However, Aschauer also showed that government investment 'crowded out' private investment by a factor of one to one. These two results seem to be contradictory. If public capital increases the marginal productivity of private sector, then government investment must complement private investment and cause a crowding in rather than 'crowding-out'. The results in Monadjemi (1993) showed a consistent and negative effect of government spending on both private sector's investment and productivity.

3 Some Empirical Evidence

As a preliminary approach to the relationship between private and public spending, Figures 1 and 2 show the ratios of cyclically adjusted real private investment to real GDP against ratios of cyclically adjusted real public investment and consumption expenditure to real GDP respectively from 1960.1 – 1991.4. Some opposite movements of private and public investment ratios, particularly in the mid-1960s, late 1970s and late 1980s, may be observed from Figure 1. However, as indicated by Figure 2, private investment and government consumption ratios move closely throughout the entire 30 years.

Figure 1

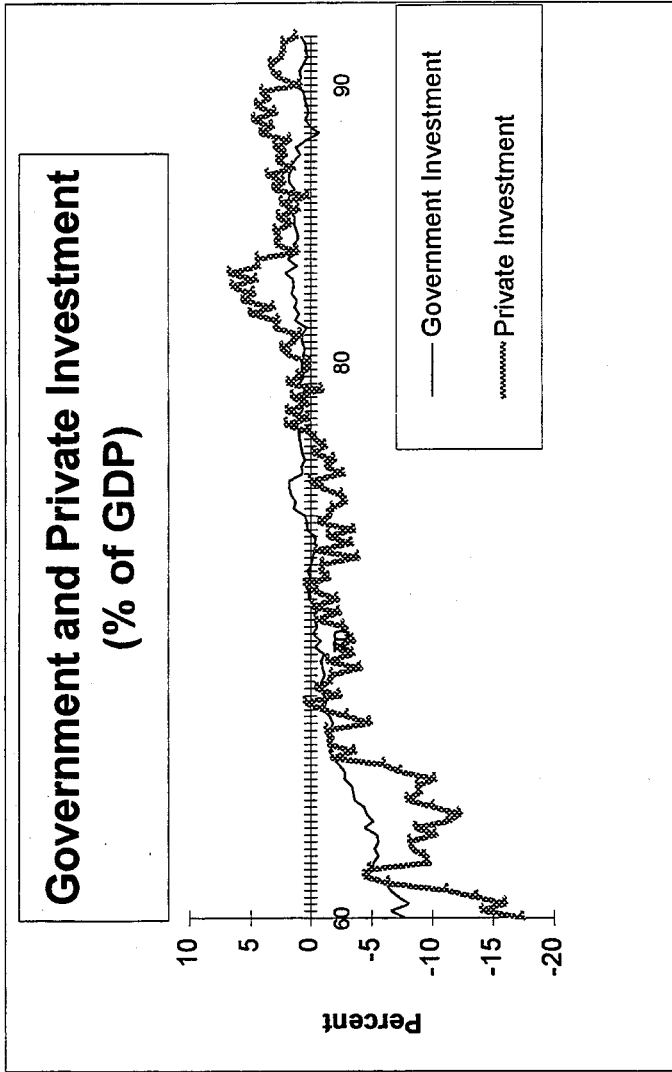
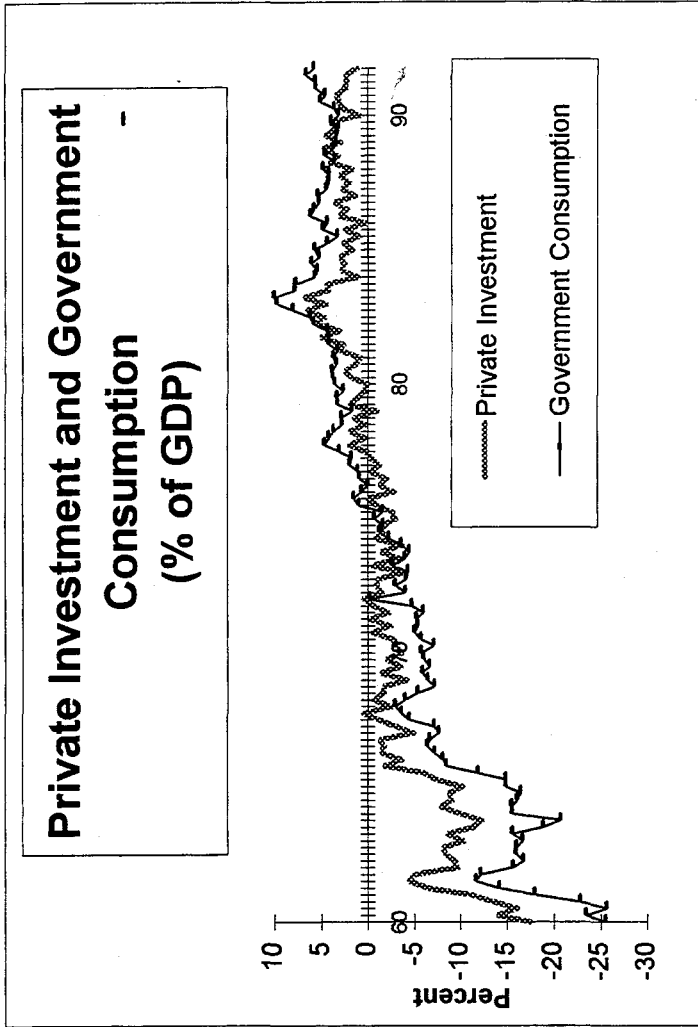


Figure 2



In Table 1, mean, standard deviation and pairwise simple coefficient of correlation between various types of spending are shown. The low volatility of government defence expenditure is indicated by its low standard deviation. The rest of the spending categories seem to be equally volatile. At this stage, on the basis of coefficient of correlation, two possible areas of crowding-out may be identified, namely government and private investment, and government defence spending and private consumption.

Table 1: Mean, Standard Deviation and Correlation Coefficients

	Mean	Standard Deviation		Coefficient of Correlation
Private Consumption (Cp)	0.59	0.013	Cp, Cg	0.09
Government Consumption (Cg)	0.17	0.014	Ip, Cg	0.10
Private Investment (Ip)	0.10	0.014	Ip, Ig	-0.38**
Government Investment (Ig)	0.07	0.012	Ig, Cp	0.15
Public Defence Spending (Dg)	0.03	0.005	Dg, Cp	-0.20*
Public Spending on Education (Eg)	0.04	0.01	Eg, Cp	0.13
Public Spending on Social Welfare (Sg)	0.03	0.011	Sg, Cp	0.06

Note: All values are in real term relative to real GDP. Investment is defined as expenditure on equipment and structure.

* and ** represent significance at the 5 per cent and 1 per cent level, respectively.

Following Aschauer (1989), regression analyses are used to examine the relationship between cyclically adjusted real private investment and the composition of government spending. The results of these regressions are reported in Appendix A. The results are for the entire period of 1960-1991 and also for the two subperiods of 1960-1974 and 1975-1991. The results for the entire sample period show very little evidence in support of the 'crowding-out effect'. The coefficients of government investment and components of government consumption are either insignificant or they are positive and significantly different from zero. There is more evidence for 'crowding in', though why it should be particularly associated with defence spending is not clear.

4 The Size of the Government

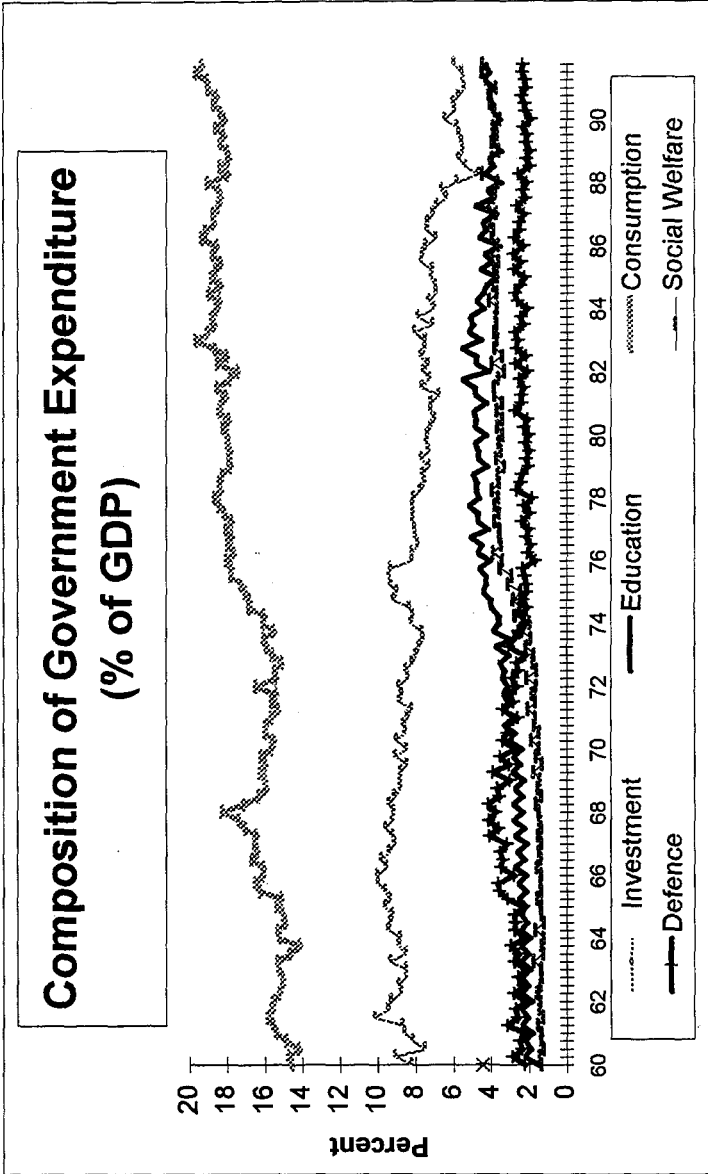
The issue of the size of the government and private sector's spending was discussed in Karras (1994). Karras showed a complementary relationship

between private and government consumption for a group of 30 countries. Karras also argued that as the size of the government increases, the complementary relationship may become weaker and move towards substitutability. This is because in the early stages of development with a small government, public spending is mainly directed towards areas of infrastructure which tend to increase the marginal productivity of private investment. However, as the size of the public sector expands, governments tend to offer services which are substitutes for private spending rather than complementing them. Karras (1994) showed that in countries with a small government, increases in government spending resulted in a larger increase in marginal utility of private consumption than in countries with a large public sector.

Figure 3 shows the size of the government in Australia, measured by real government consumption, as well as composition of government spending in relation to real GDP. As indicated, the size of the government in relation to economic activity increased significantly at the beginning of 1973-74 and remained high between 18 to 20 per cent of GDP. Government spending on education and social welfare followed the trend of total government consumption expenditure. Government investment expenditure was relatively stable from 1960 to the early 1970s and showed a declining trend in the latter part of the 1970s and 1980s. Expenditure on defence as a proportion of real output remained stable during the three decades under consideration. Inspection of the composition of government spending may indicate that, as the size of the government relative to the size of the economy rose in the mid-1970s, government spending on education and social welfare also rose, but government investment spending declined. However, all of these components of government spending remained stable from 1960-1974. These trends tend to provide some support for the relationship between size of government and the changes in the composition of government expenditure suggested by Karras (1994).

The effect of change in the size of the government predicted by Karras is supported by the coefficients of government investment expenditure in two sub-periods, in the appendix A. In the first period, when the size of the government was relatively small, government investment did appear to complement private investment, but the relationship between them changed to substitutability in the second period. However, both government defence and education expenditures tended to complement private investment in both periods.

Figure 3



5 Conclusions

In this study, the relationship between private and public spending in Australia was examined using quarterly data over the period of 1960-1991. Regression results of cyclically adjusted private investment and different types of government spending failed to show any significant substitutability relationship between private and government spending. Moreover, it was shown that government investment spending complemented private investment in the earlier sub-sample but not in the latter period.

Data Appendix

Australia Data (Seasonally adjusted real values in millions of Australian dollars)

GDP Real GDP, millions of 1984-85 dollars. Source: *Quarterly Estimates of National Income and Expenditure Australia (NIE)*, Catalogue No. 5206, various issues.

Cp = Real value of private consumption expenditure on semi-durables, non-durables and services, millions of 1984-85 dollars. Source: *NIE*, various issues.

Cg = Real value of government current expenditure, millions of 1984-85 dollars. Source: *NIE*, various issues.

Ip = Real value of private expenditure on equipment and structure, millions of 1984-85 dollars. Source: *NIE*, various issues.

Ig = Real value of government expenditure on equipment and structure, millions of 1984-85 dollars. Source: *NIE*, various issues.

Dg = Real public sector outlays on defence, millions of 1984-85 dollars. Source: *NIE*, various issues.

Eg = Real public sector outlays on education, millions of 1984-85 dollars. Source: *NIE*, various issues.

Sg = Real public sector outlays on social welfare, millions of 1984-85 dollars. Source: *NIE*, various issues.

Appendix A

Regression Results: Private Investment and Government Spending

Independent Variables	Sample Period		
	1960.1–1991.4	1960.1–1973.4	1974.1–1991.4
Constant	-0.08 (-2.53)	0.14 (-2.37)	-0.05 (-1.70)
Ip-1	0.62 (16.65)	0.59 (12.10)	0.52 (8.11)
Ig	-0.32 (-1.58)	0.96 (2.50)	-0.69 (-3.23)
Dg	2.48 (8.39)	1.71 (4.46)	2.56 (4.63)
Sg	0.73 (2.14)	-0.72 (-0.52)	0.46 (1.03)
Eg	1.09 (3.57)	3.27 (4.73)	1.16 (3.15)
Pc	-0.13 (-1.04)	-0.67 (-2.70)	-0.10 (-0.76)
R ²	0.93	0.92	0.80
Q(8)	6.69 (0.57)	8.72 (0.37)	6.88 (0.55)
SE	0.01	0.01	0.01

The dependent variable in all three regressions is the ratios of cyclically adjusted real private investment to real GDP. Values in parentheses are 't' ratios. Q(8) is Ljung-Box statistic (for eight lags) for testing the null hypothesis that residuals are white noise and values in parentheses are probabilities of accepting the null hypothesis. Ip, Ig, Dg, Sg, Eg and Pc are the ratios to GDP of private investment, government investment, defence spending, social welfare spending, spending on education and corporate trading profit, respectively. All variables are in real values. Ip and Ig are cyclically adjusted by the method described earlier.

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