The Keynesian Multiplier Effect Reconsidered

by

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Abstract

In the textbook Keynesian framework, government spending for useless public works has a larger multiplier effect than do government transfer payments. In other words, spending for useless public works increases accounting national income by more than would an equivalent increase in government transfer payments. Nevertheless, their effects on the national benefit are identical. For both, the national benefit equals the direct benefit created by the spending. If there are two income classes, some transfers reduce both the national income and the national benefit. Some government purchases completely crowd out private consumption and reduce the national benefit.

Governments of the US, the EU countries and Japan have responded to the recent worldwide recession with fiscal expansion. The intellectual basis for this cannot be found in neoclassical economics, implying as it does that government spending merely crowds out private spending. Rather, the notion that government spending stimulates aggregate demand rests on the Keynesian multiplier model. Although the multiplier model is enshrined in the textbooks, and has been for years, there are still some fundamental aspects of it that have not so far been remarked. In the textbook Keynesian framework, government spending for useless public works has a larger multiplier effect than do government transfer payments. This may have misled those who use that framework into thinking that spending for useless public works would do more to enrich an economy than would an equivalent increase in government transfer payments. In the following, I will show that even within the standard Keynesian framework, this is incorrect.

The source of the misunderstanding that I address is a conflation of national income with national benefit measured in terms of income. They are not always the same. When there is government spending on useless public works, it adds directly to the national income by more than it adds to actual national benefit. I will argue that government transfers, such as unemployment relief expenditure, lump-sum benefits adopted by Japan's Obuchi administration in 1999, and U.S. tax rebates implemented by the Bush administration in 2001, are economically equivalent to spending on useless public works, even though the effect on accounting national income differs between the two. In this sense, the actual benefit of public works spending tends to be exaggerated under the present national income accounting. Further implications follow from extending the multiplier model to the case where people have differing marginal propensities to consume. In this framework, government purchases can completely crowd out private consumption even in the standard Keynesian setting.

1. Reinterpreting the Multiplier Effect

Most undergraduate textbooks of macroeconomics state that the multiplier effect of government purchases is larger than that of transfers.[1] This is regardless of the purpose of the purchases: Even useless public works spending generates a higher multiplier effect than a transfer does. The theory on which this is based focuses not on the benefit caused by

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[1] See Keynes (p.127, 1936) and the textbook by Itoh (2001, p.61) for such statements.

government purchases and transfers but on the income created. Government purchases initially create new income, which in turn yields new consumption spending, creating still more income, and so on. In contrast, a transfer does not initially create new income though the subsequent process is the same, so its multiplier effect is smaller than that of government purchases, to be precise, smaller by the magnitude of the initial expenditure.

However, the economic effect of useless government purchases must be equivalent to that of a transfer. Let us compare a direct transfer, such as unemployment benefits, with useless public works, for example, a 'dig a hole and fill it' project. Unemployment benefits are directly paid to unemployed people without making them work. In the case of the useless project, the government hires workers, (let's say) ones who would otherwise be unemployed, makes them dig a hole and fill it, and pays salaries to them. Neither the payment of unemployment benefits, nor the hiring of unemployed workers to complete useless projects, directly produces anything of value. They are the same in all aspects except for the pretext of the payment, unemployment benefits in the one instance and salaries in the other.[2]

The same logic applies to the government purchase of some commodities. For example concrete is produced from gravel and limestone and the payments for these are distributed to miners and haulers. Thus, purchasing concrete is equivalent to paying unemployment benefits to miners and haulers, unless something useful is produced from the concrete. The conventional multiplier theory, however, mathematically shows that the multiplier effect of government purchases is larger than that of government transfers.

Let us review the conventional logic, and show why such a discrepancy arises. For simplicity, let us ignore private investment. In this case disposable income Y^d equals revenues from fiscal spending G plus consumption demand C minus tax payments T,

$$Y^d = G + C - T,$$

and hence consumption C satisfies

$$C = F(G + C - T), \tag{1}$$

where $F(.)$ represents the consumption function.[3] Note that (1) is valid whether fiscal spending G is government purchases or transfers. National income Y is then

$$Y = \alpha G + C, \tag{2}$$

where

$$\alpha = 1 \quad \text{for government purchases,}$$

$$\alpha = 0 \quad \text{for transfers.} \tag{3}$$

(1) and (2) reproduce the standard multiplier effect:

$$dY/dG = \alpha + dC/dG, \tag{4}$$

where

$$dC/dG = F'/(1 - F') \quad \text{under a loan budget (i.e., } dT = 0\text{),}$$

$$dC/dG = 0 \quad \text{under a balanced budget (i.e., } dT = dG\text{).} \tag{5}$$

The first term of (4), α, is the direct effect of fiscal spending on income, which I call the government demand effect. The second term, dC/dG, is the effect on household consumption provoked by fiscal payments, which I call the transfer effect. Note that there is no difference in the transfer effect between unemployment benefits, public works and government purchases since household behavior is the same once they receive the payments.

Equations (3) and (4) imply that the multiplier effect of public works spending (or government purchases) is larger than that of a transfer payment. This is because the multiplier theory focuses not on the benefit but on the amount of spending. The national accounting system follows such convention and public works spending is in its entirety added to national income regardless of its benefit, whereas a transfer payment is not. Thus, the effect of public works spending tends to be exaggerated.[4] In order to show this property let us consider utility $U(C, G)$ and analyze the welfare effect of fiscal spending.

A change in welfare measured in terms of consumption, which we call dB, is

$$dB/dG = (1/U_C)dU/dG = dC/dG + \theta, \quad \text{where } \theta \equiv U_G/U_C \tag{6}$$

and dC/dG is given by (5). If fiscal spending G is a transfer payment, such as unemployment benefits and tax rebates, θ equals zero and hence the effect on total benefit B consists of only the transfer effect, as is consistent with (3) and (4). In the case of useless public works, again θ equals 0. Therefore, useless public works are equivalent to unemployment benefits, although in the standard multiplier theory they are considered to be more stimulative than unemployment benefits. Moreover, (6) implies that public works spending is still more

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[4] In fact, Alesina and Perotti (1997), Alesina et al. (1998), Kneller et al. (1999) and von Hagen and Strauch (2001) use national accounting data for analysis of fiscal consolidations in OECD countries and find that reductions in transfers tend to be more successful than reductions in public investment –i.e., the former contract national income less than the latter. Gupta et al. (2005) show the same tendency in developing countries. Kuznets (1948) expresses another concern about such tendency: Although they are uniformly regarded as final consumption, in reality they may be used for intermediate goods and then are duplicated in calculating national income.

beneficial than a transfer payment as long as it yields some direct benefit ($\theta > 0$). This is the case even if the spending is larger than the benefit ($1 > \theta$).

2. The Transfer and Redistribution Effect

The transfer effect is important especially when people have differing marginal propensities to consume. This section modifies (5) to deal with the case where there are two groups of people and their marginal propensities to consume differ from each other.

Let F_i represent the consumption function of group i (for $i = 1, 2$),

$$C_1 = F_1(\sigma_1 C + G_1 - T_1), \quad C_2 = F_2(\sigma_2 C + G_2 - T_2). \tag{7}$$

Aggregate consumption C given by (1) is revised to be

$$C = F_1(\sigma_1 C + G_1 - T_1) + F_2(\sigma_2 C + G_2 - T_2), \quad \text{where } \sigma_1 + \sigma_2 = 1. \tag{8}$$

Here, σ_i, G_i and T_i respectively denote group i's share of income generated by consumption C, fiscal spending paid to group i, and taxes imposed on group i. Without loss of generality, we assume

$$1 \geq F_1' > F_2' \geq 0, \tag{9}$$

and then group 2 is naturally considered to be rich compared to group 1. From (8),

$$dC = \frac{F_1' d(G_1 - T_1) + F_2' d(G_2 - T_2)}{1 - [\sigma_1 F_1' + (1 - \sigma_1) F_2']}, \tag{10}$$

where $d(G_i - T_i)$ stands for an increase in group i's net receipt from fiscal spending. From (9) and (10), fiscal spending distributed to the poor has a larger stimulative effect on C than does fiscal spending distributed to the rich.

Moreover, under a balanced budget:

$$dG - dT = d(G_1 - T_1) + d(G_2 - T_2) = 0,$$

(4), (7), (9) and (10) give

$$\frac{dC}{d(G_1 - T_1)} = -\frac{dC}{d(G_2 - T_2)} = \frac{F_1' - F_2'}{1 - [\sigma_1 F_1' + (1 - \sigma_1) F_2']} > 0,$$

$$\frac{dC_1}{d(G_1 - T_1)} = -\frac{dC_1}{d(G_2 - T_2)} = \frac{F_1'(1 - F_2')}{1 - [\sigma_1 F_1' + (1 - \sigma_1) F_2']} > 0,$$

$$\frac{dC_2}{d(G_1 - T_1)} = -\frac{dC_2}{d(G_2 - T_2)} = \frac{-F_2'(1 - F_1')}{1 - [\sigma_1 F_1' + (1 - \sigma_1) F_2']} \leq 0.$$

$$\frac{dY}{d(G_i - T_i)} = \alpha + \frac{dC}{d(G_i - T_i)} \quad \text{for } i = 1, 2. \tag{11}$$

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Thus, a transfer from the rich to the poor, where $\alpha = 0$, increases both aggregate consumption C and national income Y, while a transfer from the poor to the rich decreases both C and Y. A typical example of the former is unemployment compensation. In particular, if people of group 1 are unemployed and spend all additional income on consumption, which is to say that

$$\sigma_1 = 0, \text{ and } F_1' = 1,$$

then, from (3) and (11), it follows that

$$\frac{\mathrm{d}C}{\mathrm{d}(G_1 - T_1)} = 1, \quad \frac{\mathrm{d}C_1}{\mathrm{d}(G_1 - T_1)} = 1, \quad \frac{\mathrm{d}C_2}{\mathrm{d}(G_1 - T_1)} = 0, \quad \frac{\mathrm{d}Y}{\mathrm{d}(G_1 - T_1)} = 1. \tag{12}$$

This implies that if the government increases unemployment benefits by imposing a tax on the employed, aggregate consumption C and national income Y increase by that magnitude. Intuitively, since the unemployed spend all benefits on consumption, the tax paid by the employed returns to them, which makes their disposable income unchanged. Thus, the employed do not change consumption while the unemployed increase consumption. Total income expands by the magnitude of the transfer and utility of the unemployed increases while utility of the employed is unchanged. A reverse redistribution, such as an income tax cut financed by a reduction in unemployment benefits, results in

$$\frac{\mathrm{d}C}{\mathrm{d}(G_2 - T_2)} = -1, \quad \frac{\mathrm{d}C_1}{\mathrm{d}(G_2 - T_2)} = -1, \quad \frac{\mathrm{d}C_2}{\mathrm{d}(G_2 - T_2)} = 0, \quad \frac{\mathrm{d}Y}{\mathrm{d}(G_2 - T_2)} = -1. \tag{13}$$

In this case the unemployed are worse off while utility of the employed is unchanged.

If the revenue is used for public works spending or government purchases instead of a transfer, from (4) the effect on accounting national income is larger by the magnitude of the spending than the effect of the transfer. Thus, if the government spends it on public works and hires the unemployed, from the last equation of (12),

$$\frac{\mathrm{d}Y}{\mathrm{d}(G_1 - T_1)} = 2. \tag{14}$$

If the government cuts unemployment benefits and increases purchases of commodities from the market, from the last equation of (13),

$$\frac{\mathrm{d}Y}{\mathrm{d}(G_2 - T_2)} = 0. \tag{15}$$

The welfare effect depends on who receives utility from the public works or the government purchases. This utility is added to the welfare effect due to a change in consumption given in (12) or (13). Thus, if the government purchases considered in (15) are of no use, from (13) the

government purchases completely crowd out consumption of the unemployed and make them worse off while neither consumption nor utility of the employed is changed.

From (12)-(15), the estimated income multiplier can be positive, zero or negative. This may be why the effects on GDP of various fiscal expenditures are found to be significantly different in the literature, depending on the composition of fiscal spending.[5]

3. Conclusion and Some Extensions

In the absence of fiscal illusion, Ricardian equivalence holds and disposable income Y^d must be calculated on a permanent basis, implying that $T = G$ in (1). From the second equation of (5), the transfer effect (except for the redistribution effect shown by (10)) is null and only the government demand effect arises, whether under a balanced budget or a loan budget. Therefore, from (3), (4) and (6),

$$dY/dG = 1 \text{ and } dB/dG = \theta \text{ in the case of government purchases,}$$

$$dY/dG = 0 \text{ and } dB/dG = 0 \text{ in the case of transfers.}$$

The effect of government purchases on accounting national income is 1, but the national benefit of such purchases consists entirely of the direct benefit, which is zero under useless public works.

In the presence of fiscal illusion, the transfer effect, dC/dG, is given by the first equation of (5) under a loan budget. In this case, however, the fiscal deficit must be redeemed in the future and then a negative transfer effect that has the same present-value magnitude arises. Thus, after cancelling out the costs and benefits intertemporally we come to a quite simple conclusion:

"The net national benefit of fiscal spending consists of its direct benefit and the redistribution effect only, regardless of the budget system or the type of fiscal spending."

Transfer payments and useless public works yield only a redistribution effect.

The redistribution effect can be positive, zero or negative. In particular, if unemployed people spend all transfer receipts on consumption, a transfer from the employed to the

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[5] Gupta et al. (2005) give an extensive survey of the literature on this issue. There are also researches on the effect of fiscal spending that focusses on the supply-side efficiency. Aschauer (1989) shows that public expenditures on nonmilitary public capital contribute to productivity significantly more than those on military capital. Devarajan, Swaroop and Zou (1996) find that in developing countries current expenditures stimulate growth more than capital expenditures and conclude that those countries may spend too much on public capital.

unemployed raises consumption of the unemployed without affecting disposable income of the employed. Thus, the unemployed are better off while utility of the employed is unchanged.

There are still some aspects that are ignored here. If there is some disutility of working, useless public works are inferior to transfers.[6] Another difference arises through the inflation effect. Public works create new labor demand and reduce the deflationary gap in the labor market while transfers do not. The reduction in deflation makes it less advantageous to hold money, and hence stimulates consumption.[7] These factors are not taken into account in the conventional Keynesian framework.

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[6] Keynes (p.128, 1936) states that labor may have a positive utility for people who have been long unemployed, which makes public works superior to transfers.

[7] See Ono (1994, 2001) for this effect of public works spending in the steady state with persistent stagnation. Ono (2010) applies this mechanism to analyze effects of fiscal policies under Japan's long-run stagnation.

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