

# The Multiplier

By Keith Eubanks

June 28, 2010

<http://www.dynamicforecasting.com/>

---

In “The General Theory of Employment, Interest, and Money”, John Maynard Keynes introduces the concept of “The Multiplier”.<sup>1</sup> The basic idea of the multiplier as introduced by Keynes is that an incremental change in investment, I, will produce an incremental change in income, Y. In mathematical terms, the multiplier, k, equals the partial derivative of income with respect to investment.

$$k = \delta Y / \delta I$$

The multiplier equals the slope, or rate of change, of income with respect to investment. This is a straight forward concept. Investment leads to the accumulation of capital assets which drives production and hence income. A change in investment may lead to a change in income, and hence the partial should be discernable.

It is the modern interpretation of the multiplier that has gone awry. Today when the multiplier is discussed, the meaning is not the partial derivative of income with respect to investment but the partial derivative of income with respect to government spending:

$$k_g = \delta Y / \delta G$$

Countless hours of labor are spent combing historical data looking for this government multiplier,  $k_g$ . This is a colossal waste of time. This government multiplier can never be found from a statistical analysis of historical data. There are two main reasons for this: 1) income has many drivers all of which are changing at the same time and 2) government spending is not the primary driver of income. Let us look at this in more detail.

$$\text{Income} = f(\text{Production}, \text{Price})$$

Income is a function of production and price. The exchange of goods and services produced at some price within an economy generates income.

---

<sup>1</sup> Keynes, John Maynard. “The General Theory of Employment, Interest and Money”. (1936) Prometheus Books, NY, Chapter 10.

$$\text{Production} = f(\text{Capital Assets}, \text{Applied Labor}, \text{Technology})$$

Production is a function of capital assets and applied labor working at some technological productivity.

$$\text{Capital Assets} = f(\text{Capital Assets}_i, \text{Capital Consumption}, \text{Investment}, \text{Losses})$$

Capital Assets are a function of the starting value of capital assets, capital consumption, investment and losses.

$$\text{Investment}_c = f(\text{Investment}_m, \text{Asset Price})$$

Investment in terms of capital assets is a function of investment in terms of money and asset prices.

$$\text{Investment}_M = \text{Investment}_p + \text{Investment}_g$$

Investment in terms of money equals private investment plus government investment.

$$\text{Government Spending} = \text{Consumption}_g + \text{Investment}_g$$

Government spending equals consumption spending by government plus investment spending by government.

$$\text{Income} = \text{Consumption}_p + \text{Investment}_p + \text{Government Spending}$$

Income equals private consumption plus private investment plus government spending. Yet, income is explicitly tied to the quantity of goods and services produced and successfully exchanged – making income creation a function of price, applied labor, technology, capital assets, capital consumption, asset price, private investment, government investment and more. All of these inputs are changing all of the time. It will be very difficult, if not impossible, to isolate a consistent change in national income corresponding to a change in government spending. Most government spending is consumption spending and not investment and not all government investment will increase the nation's ability to produce, much will be replacement investment.

For example, creating the interstate highway system was a new investment that expanded the United States' transportation network. This increased the potential to produce, and many new businesses have developed as a result: transportation businesses, transportation support businesses, and of course businesses requiring transportation services. On the other hand, replacing a worn out bridge does not

increase the nation's production capability. This is simply replacing capital consumption; it maintains the current production level but does not add to it.

Furthermore, many other things may be changing: asset prices perhaps, making the value of each government dollar invested change over time. Private investment may change at the same time. Capital consumption may be changing. Losses associated with capital assets will vary over time. Technology productivity will change over time. Applied labor will be changing. Because all other things are not equal and because government spending is not the primary driver of income, it may be an impossible task to find a government multiplier in historical data. **The results would be effectively random.**

This does not mean that the partial derivative of income with respect to government spending does not exist, and a few observations can be made about this partial. The author is simply stating that it cannot be isolated in historical data.

It is possible to draw a few conclusions about the government multiplier -- or partial derivative of income with respect to government spending. First and foremost, government spending financed through borrowing (deficit spending) will most likely hinder economic growth: multiplier less than 1. Government spending is split between consumption spending and investment, with most modern governments leaning heavily toward consumption spending rather than investment. The savings that are borrowed by governments represent income that has been allocated toward the future: savings provide the pool of resources available for investment. Since the savings available for lending are limited, government borrowing displaces private borrowing. Government borrowing will likely displace private investment. Since most government spending is consumption oriented, government borrowing effectively lowers a nation's investment rate by shifting savings back toward consumption. Hence, it can be concluded that government borrowing generally exhibits a multiplier of less than 1: it slows economic growth.

Government spending from taxes would likely exhibit a more complex effect on investment, capital accumulation and economic growth. Private disposable income is also largely allocated toward consumption. Hence, taxes at moderate levels may have limited impact on economic growth. As the tax bite grows, this becomes more problematic. At some point, taxes will lower investment and slow economic growth. It will depend upon the magnitude and focus of the taxes. Taxes on savings and investment will likely have a greater impact than taxes on consumption. But either way, as the tax bite grows, it will eventually hinder investment.

This is not to say that government spending per se is harmful to economic growth. Some basic level of government services may be required to provide an environment for private investment and capital accumulation; let us call this the rule of law. But, this basic level of government services requires a small fraction of the nation's income.

The basic message is that capital accumulation drives economic growth and private investment drives capital accumulation. The more resources a government pulls away

