



Fiscal Policy: Managing Aggregate Demand

Introduction

Over the past 200 years, output and income have grown tremendously in the capitalist economies of the west. This growth, however, has been characterized by large fluctuations around the long-term trendline.¹ Prior to the 1930s, governments generally considered these fluctuations inevitable and self-correcting, and so took few actions to counteract the business cycle. This hands-off attitude changed in the 1930s, when the capitalist economies all entered a deep and extended depression. It was during this period that British economist John Maynard Keynes proposed a new, more active approach to national economic management. He argued

If our poverty were due to famine or earthquake or war—if we lacked material things and the resources to produce them, we could not expect to find the means to prosperity except in hard work, abstinence, and invention. In fact, our predicament is notoriously of another kind. It comes from some failure in the material devices of the mind. . .to put in movement the resources and technical means we already have. . . The paradox is to be found in 250,000 building operatives out of work in Great Britain, when more houses are our greatest material need.²

In other words, the nation had ample productive resources (workers and factories), but these resources were not being used to their full potential. Keynes went on to suggest that economic fluctuations were not always self-correcting, but that governments' taxing and spending decisions could be used to moderate the business cycle. Such active use of fiscal policy has been widely used by governments around the world.

This note introduces four important concepts. First, we discuss how aggregate supply adjusts to the level of aggregate demand in a simplified national economy. Second, we introduce the consumption function to help understand how aggregate demand is determined. Next, we discuss the income multiplier. Fourth, we introduce the government sector and discuss how government fiscal policy can be used to manage aggregate demand. The note concludes

¹ Between 1820 and 1990 per capita income grew by a factor of about ten in Great Britain, 15 in Germany, 18 in the United States, and 25 in Japan. Source: "Champions: The Dynamics of Capitalist Revolutions," Harvard Business School case N1-796-100.

The United States' GDP saw abrupt declines in output in 1876, 1885, 1894, and 1908 (of 14.8%, 6.0%, 15.9% respectively). France experienced recessions in 1885, 1893, 1895, and 1902 (with declines of 10.6%, 3.4%, 4.4%, and 7.9%). *Dynamic Forces in Capitalist Development: A Long-Run Comparative View*, Angus Maddison, (Oxford: Oxford University Press), table 4.4, pages 98-99.

² *The Means to Prosperity*, John Maynard Keynes, (1933). Quoted from *Macroeconomic Decision Making in the World Economy*, Micheal G. Rukstad, (New York: Dryden, p. 221-222).

Assistant Professor Robert E. Kennedy prepared this note as the basis for class discussion.

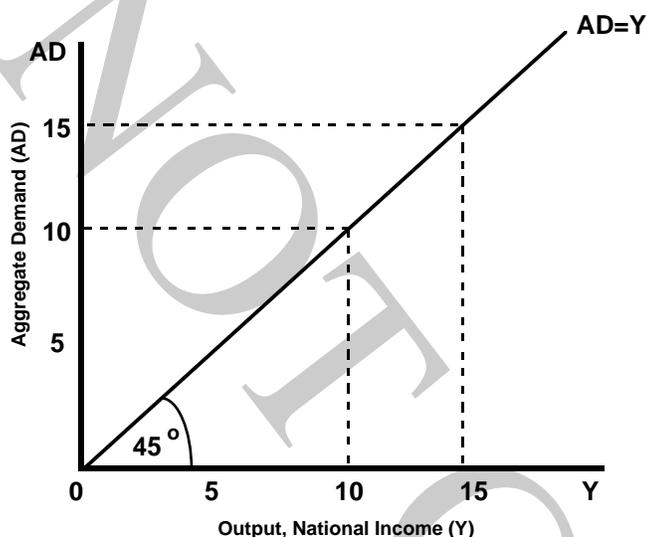
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with brief discussions of the GDP gap and governments' use of fiscal policy to manage the business cycle. The discussion assumes that the reader is familiar with national income accounting.³

Aggregate Supply and Demand

Start with a simple model of the economy in which there are only two types of participants, consumers and producers. The economy is said to be in *equilibrium* if the total amount of goods and services produced is equal to the total amount of goods and services demanded. If we chart output and demand together (see Figure #1) a 45° line indicates combinations where output is equal to aggregate demand.

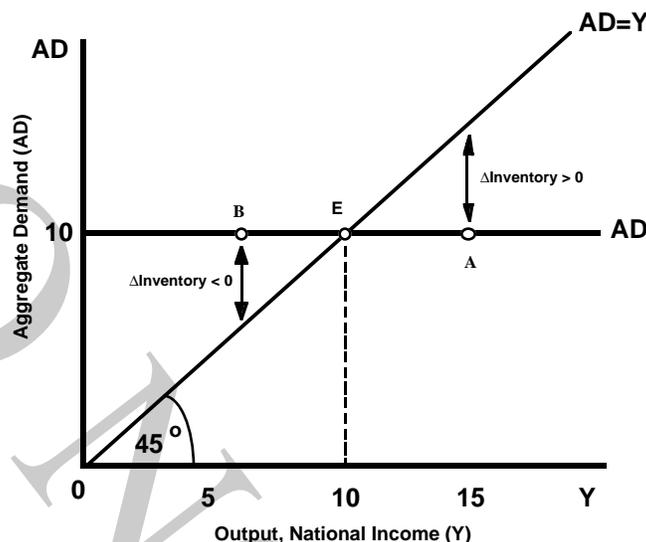
Figure #1



Producers in this economy attempt to produce for current demand but hold some target level of inventory in case their production forecasts are incorrect. For the moment, assume that the level of aggregate demand is fixed and equal to 10 (shown by the horizontal line in Figure #2). If total output is 10, supply and demand would be in equilibrium (point E). If output is greater than 10 (e.g. point A), sales will be less than production and inventory levels will increase. In the next period, producers would reduce their production so as to draw down inventories. If output is less than 10 (point B), sales will exceed production and inventories will be drawn down, leading producers to increase production in the next period.

³ See the accompanying note "National Income Accounting," Harvard Business School case N9-797-075

Figure #2



While greatly simplified, this example illustrates one process by which supply and demand tend toward equilibrium.

The Consumption Function: A First Cut at Determining Aggregate Demand

We now turn to the issue of how the level of aggregate demand is determined. Personal consumption expenditures are by far the largest component of aggregate demand, so we will start there—assuming, for the moment, that investment, government spending, and foreign trade are all zero.

We know the demand for personal consumption goods is not constant over time, or across individuals. Consumption increases with income (professional basketball players generally consume more than minimum wage workers), but some minimum level of consumption is always required for survival. One way to illustrate these characteristics is with an equation, which we will term the *consumption function*:

$$C = \bar{C} + cY \quad (1)$$

In equation (1), C represents the level of consumption and Y represents income. \bar{C} is the level of consumption when income is zero (financed by borrowing, drawing down savings or transfer payments). c is the amount that consumption increases with each additional dollar of income—a ratio called the *marginal propensity to consume* (MPC). The portion of income not consumed ($1 - c$) is assumed to be saved. $(1 - c)$ is referred to as the *marginal propensity to save* (MPS).

Figure #3

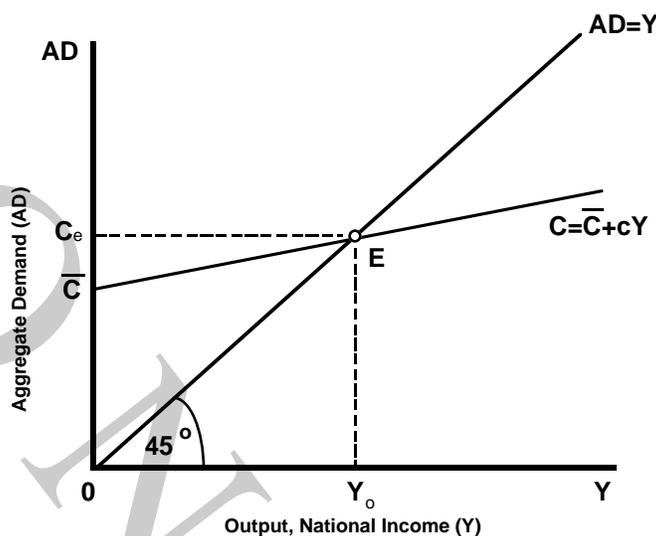


Figure #3 charts the level of consumption against income. This can be thought of as representing either an individual's consumption or aggregate consumption for the entire economy. The consumption function shows the level of consumption for any level of income (output). Each additional dollar of income leads to c dollars of increased consumption (the slope of the consumption function is c). Consumption is equal to aggregate output at point E (again, along the equilibrium 45° line). This is an equilibrium because output will adjust toward E . At points on the consumption function to the left of E , demand (financed through borrowing or transfers) exceeds output. This leads to an increase in output and movement back toward E (recall the discussion of inventory adjustments above). At points on the consumption function to the right of E , output exceeds demand, causing both inventories and savings to pile up. This leads to decreases in output and adjustment back toward E .

We now have a model which represents both sides of the market. Aggregate demand is determined by the level of income and aggregate supply is determined by aggregate demand.

The Income Multiplier

Consider the following question: if aggregate demand increased by \$100, how much would national income increase? Since we know that national income is equal to aggregate demand, the obvious answer would seem to be \$100. It turns out, however, that national income increases by more than \$100, because this direct effect is *multiplied* through the economy. The extent of this multiplier effect depends on the marginal propensity to consume.

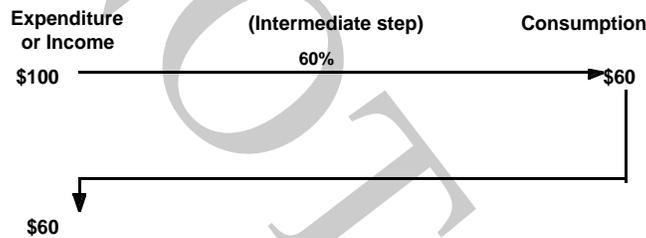
Why would the direct effect be multiplied? Because every increase in national output represents income to someone. Therefore, a \$100 autonomous increase leads directly to a \$100 increase in national income; this increase in income will have its own (secondary) effect on consumption as the first recipient spends a portion of his/her additional income—specifically, they increase consumption by the MPC (say 80%), or \$80. The secondary increase in demand spawns a tertiary effect ($0.8 * \$80 = \64), and so on. This multiplier continues indefinitely, becoming smaller with each cycle. Because this is a well-behaved series, some simple algebra tells us that the total effect is just equal to the direct effect times $1/(1-MPC)$.

$$\begin{aligned}
 \text{Total } \Delta \text{ AD} &= \$100 + (\text{MPC} * 100) + (\text{MPC}^2 * 100) + (\text{MPC}^3 * 100) + \dots, \text{ or} \\
 &= \$100 * (1 + \text{MPC} + \text{MPC}^2 + \text{MPC}^3 + \text{MPC}^4 + \dots) \\
 &= \$100 * \{ 1 / (1 - \text{MPC}) \}
 \end{aligned}$$

In this scenario, the portion of the increase in income which is not consumed is referred to as *leakage*. One type of leakage is savings (money in the bank, under a mattress, etc.). As the MPS increases, the MPC and the multiplier decrease. In addition to savings, the multiplier is reduced by several other types of leakage. These include taxes, inflation, and imports. Taxes and inflation lower the multiplier because they decrease the impact of increased income on consumption. The portion of income paid as taxes is not available to be consumed. Similarly, if additional income leads to inflation, but not to a *real* increase in the amount consumed, the *real* multiplier is reduced. Finally, if increased consumption is satisfied with imports rather than domestic production, the link between consumption spending and production (income) is weakened, reducing the multiplier.

We can illustrate the multiplier process with a diagram. We assume here that total leakage is equal to 40% (e.g. 20% to savings and 20% to other leakages).

Figure #4



downturn. If wages (prices) did not adjust to a slump, demand would not recover, and the adjustment process would not get started. Keynes focused specifically on investment demand which, he believed, was prone to wide fluctuations. In Keynes's words:

the facts of the existing situation enter, in a sense disproportionately, into the formation of our long-term expectations. . . Day-to-day fluctuations in the profits of existing investments, which are generally of an ephemeral and non-significant nature, tend to have an altogether excessive, and even an absurd, influence on the market. . . . A large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation. . . . [and] can only be taken as a result of animal spirits. . . . Thus if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die. . . . This means, unfortunately, that slumps and depressions are exaggerated in degree. [Keynes, p.148-162]

Thus, investment reenters the picture. Keynes suggests that investment behavior is at the center of the business cycle. When businesspeople respond to temporary fluctuations in output by dramatically revising their views of the future, investment plummets, suppressing aggregate demand, and setting off a negative multiplier process. Adjustment back toward the equilibrium level might be slow because of sticky wages and prices.

The Government Sector

The discussion above has abstracted from the role that government plays in the economy. Keynes suggested that there was no reason to wait for an "autonomous" increase in demand to reverse a slump. The government could provide the stimulus through tax reductions or deficit spending.

When we reintroduce the government sector, we must now remember that consumption is a function of disposable income—income net of taxes and transfers. This means that equation (1) could be rewritten as:

$$C = \bar{C} + c (Y + TR - TA) \quad \text{or} \quad C = \bar{C} + c TR + c (1 - t) Y \quad (2)$$

where: \bar{C} = minimum consumption; TR = transfers;
 Y = national income; TA = taxes;
 c = MPC; t = the tax rate.

The government sector affects the level of demand in at least three ways. It purchases a large amount of goods and services; it makes transfer payments to individuals, and it taxes income. The government can affect aggregate demand by adjusting its behavior along any of these dimensions. If the government increases the amount of goods and services it purchases (G), national income is increased directly⁴ and the multiplier effect is set in motion. An increase in transfer payments leads to increased private consumption at the rate of the MPC. Finally, if taxes are lowered, disposable income, and therefore consumption, will increase. In a recession, Keynes believed that the government should increase spending, increase transfers, or reduce taxes in order to boost demand and move the economy back toward equilibrium. Similarly, if demand was excessive, the government should reduce purchases, reduce transfer payments, or raise taxes in order to reduce aggregate demand. Thus, the government should run a deficit when there exists a demand shortfall and a surplus when aggregate demand exceeds supply.

⁴ We know, from the national income accounting equation { $Y = C + I + G + (X - M)$ }, that G directly increases national income (Y)

The GDP Gap: Fiscal Policy in Practice

While the concepts discussed above are fairly straightforward when analyzing charts, the policymaker's task is much more difficult when faced with analyzing a real, complex economy. To simplify this task, economists often use a concept known as the *GDP Gap*. The GDP gap measures the difference between actual output and *potential output*—the output the economy could produce if all factors of production were fully employed.

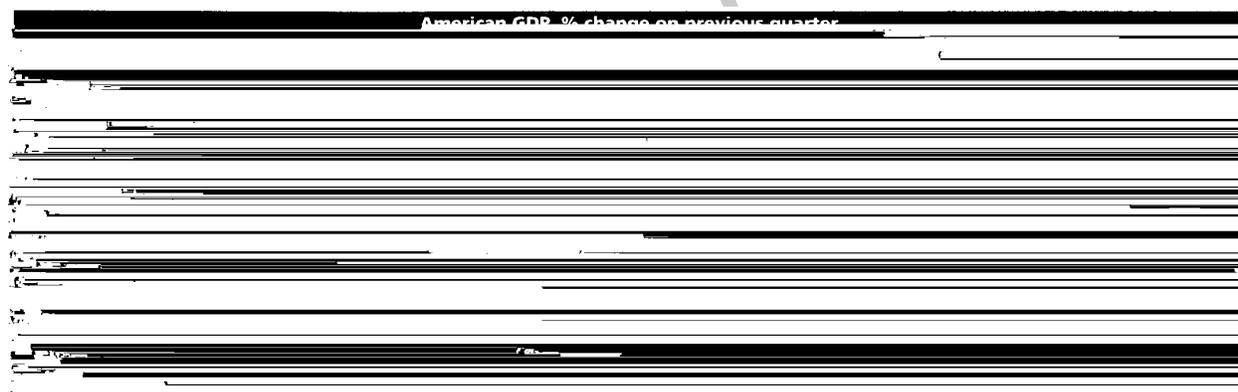
Potential output tends to increase fairly steadily over time as more resources become available for use in production—population increases, firms invest in plants and equipment, and the stock of knowledge increases. In the short run, however, actual output fluctuates around its potential level, hence the business cycle. The GDP gap grows during recessions and shrinks during expansions. Government economists often use the estimated GDP gap as a guide to fiscal policy. The 1962 *Economic Report of the President* summarizes this view:

Insufficient demand means unemployment, idle capacity, and lost production. Excessive demand means inflation—general increases in prices and money incomes, bringing forth little or no gains in output and real income. The objective of stabilization policies is to minimize these deviations, i.e. to keep overall demand in step with the basic production potential of the economy.

Fiscal Policy as Demand Management

In the years following World War II, governments around the world adopted Keynesian demand management strategies. Deficit spending became the standard prescription to combat economic downturns. By many measures, these policies worked. While the business cycle did not disappear, the fluctuations following 1940 were much smaller than those which preceded it (see Figure #5). In 1971, Richard Nixon declared “we’re all Keynesians now.” Yet, the political problems associated with trying to manage demand through fiscal policies have proved extremely difficult—so difficult in recent decades that fiscal policy has lost a great deal of its attraction as a tool for managing the economy.

Figure #5



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Sources: *The General Theory of Employment, Interest, and Money*, John Maynard Keynes, (London: Harcourt Brace Jovanovich, 1953).
The Means to Prosperity, John Maynard Keynes, from *The Collected Works of John Maynard Keynes*, Volume IX (London: Macmillan, St. Martin's Press for the Royal Econometric Society, 1972).
Economic Report of the President, 1962.