Lecture 6 and 7:
The Aggregate Expenditures Model
Reference - Chapter 7

LEARNING OBJECTIVES

7.1 The factors that determine consumption expenditure and saving.

7.2 The factors that determine investment spending.

7.3 How equilibrium GDP is determined in a closed economy without a government sector.

7.4 What the multiplier is and its effects on changes in equilibrium GDP.

7.5 How adding international trade affects equilibrium output.

7.6 How adding the public sector affects equilibrium output.

7.7 The distinction between equilibrium versus full-employment GDP.

I. Introduction

A. This chapter focuses on the aggregate expenditures model. We use the definitions and facts from previous chapters to shift our study to the analysis of economic performance. The aggregate expenditures model is one tool in this analysis. Recall that "aggregate" means total.

B. As explained in this chapter's Last Word, the model originated with John Maynard Keynes (Pronounced Canes).

II. Simplifying Assumptions for the Simple Model

A. We assume a "closed economy" with no international trade.

B. No Government.

C. Although both households and businesses save, we assume here that all saving is personal.

D. Depreciation and net foreign income are assumed to be zero for simplicity.

E. There are two reminders concerning these assumptions.
   1. They leave out two key components of aggregate demand (government spending and foreign trade), because they are largely affected by influences outside the domestic market system.

   2. With no government or foreign trade, GDP, personal income (PI), and disposable income (DI) are all the same.

III. The Aggregate Expenditures Model: Consumption and Saving

A. The theory assumes that the level of output and employment depend directly on the level of aggregate expenditures. Changes in output reflect changes in aggregate spending.

B. *Consumption and saving*: Since consumption is the largest component of aggregate spending, we analyze its determinants.

1. *Disposable income* is the most important determinant of consumer spending (see Figure 7-1 in text which presents historical evidence).

   a. What is not spent is called *saving*.
   b. Therefore, **DI – C = S** or
   C + I = DI

2. In Figure 7-1 we see a 45-degree line which represents all points where consumer spending is equal to disposable income; other points represent actual C, DI relationships for each year from 1980-2002.

3. If the actual graph of the relationship between consumption and income is below the 45-degree line, then the difference must represent the amount of income that is saved.

4. The graph illustrates that as disposable income increases both consumption and saving increase.

5. Some conclusions can be drawn:
   a. Households consume a large portion of their disposable income.

b. Both consumption and saving are directly related to the level of income.

C. *The consumption schedule*:

1. The dots in Figure 7-1 represent actual historical data.
2. A hypothetical consumption schedule (Table 7-1 and Key Graph 7-2a) shows that households spend a larger proportion of a small income than of a large income.
3. A hypothetical saving schedule (Table 1, column 3) is illustrated in Key Graph 7-2b.
4. Note that *dissaving* occurs at low levels of disposable income, where consumption exceeds income and households must borrow or use up some of their wealth.

D. *Average and marginal propensities to consume and save*:

1. Define *average propensity to consume (APC)* as the fraction or % of income consumed (APC = consumption/income). See Column 4 in Table 7-1.

2. Define *average propensity to save (APS)* as a the fraction or % of income saved (APS = saving/income). See Column 5 in Table 7-1.

3. Global Perspective 7-1 shows the APCs for several nations in 2000. Note the high APC for both U.S. (0.97) and Canada (0.955).

4. *Marginal propensity to consume (MPC)* is the fraction or proportion of any change in income that is consumed. (MPC = change in consumption/change in income.) See Column 6 in Table 7-1.

5. *Marginal propensity to save (MPS)* is the fraction or proportion of any change in income that is saved. (MPS = change in saving/change in income.) See Column 7 in Table 7-1.

6. Note that APC + APS = 1 and MPC + MPS = 1.

7. Note that Figure 7-3 illustrates that MPC is the slope of the consumption schedule, and MPS is the slope of the saving schedule.

8. APC and APS can illustrated as the slope of rays from the origins to the consumption curve and savings curve, respectively.

E. *Non-income determinants* of consumption and saving can cause people to spend or save more or less at various income levels, although the level of income is the basic determinant.

1. *Wealth:* An increase in wealth shifts the consumption schedule up and saving schedule down. In recent years major fluctuations in stock market values have increased the importance of this wealth effect.

2. *Expectations:* Changes in expected inflation or future income can affect consumption spending today.

   a) Higher expected inflation may trigger more spending and less saving today. Thus, the consumption schedule shifts up and the current saving schedule shifts down.

   b) Expectations of lower future income may result in less

consumption and more saving today. So, the consumption schedule shifts down and saving schedule shifts up.

3. *Real interest rates*: Declining interest rates increase the incentive to borrow and consume, and reduce the incentive to save. Because many household expenditures are not interest sensitive – groceries, etc. – the effect of interest rate changes on spending are modest.

4. *Household debt*: Lower debt levels shift consumption schedule up and saving schedule down.

5. *Taxation*: Lower taxes will shift both schedules up since taxation affects both spending and saving, and vice versa for higher taxes.

F. Terminology, Shifts and stability: (See Figure 7-4)

1. *Terminology:* Movement from one point to another on a given schedule is called *a change in amount consumed*; a shift in the schedule is called *a change in consumption*. A shift in the consumption schedule is caused by changes in any one or more of the five *non-income determinants*.

2. *Schedule shifts*: Consumption and saving schedules will always shift in opposite directions unless a shift is caused by a tax change.

3. *Stability*: Economists believe that consumption and saving schedules are generally stable unless deliberately shifted by government action.

IV. Investment

A. Investment, the second component of private spending, consists of spending on new plants, capital equipment, machinery, inventories, construction, etc.

   1. The investment decision weighs marginal benefits and marginal costs.

   2. The _expected rate of return_ is the marginal benefit and the _interest rate_ represents the marginal cost.

B. _Expected rate of return_, **r**, is found by comparing the expected economic profit (total revenue minus total cost) to cost of investment to get expected rate of return. The text's example gives $100 expected profit, $1000 investment for a 10% expected rate of return. Thus, the business would not want to pay more than 10% interest rate on investment.

C. The _real interest rate_, **i** (nominal rate corrected for expected inflation), is the cost of investment.

   1. Interest rate is either the cost of borrowed funds or the cost of investing your own funds, which is income forgone.

   2. If real interest rate exceeds the expected rate of return, the investment should not be made. The firm invests up to the point where

     $r = i$.

D. _Investment demand curve_, shows an inverse relationship between the interest rate and amount of investment.

   1. As long as expected return exceeds interest rate, the investment is expected to be profitable (see Table 7-2 example).

2. Key Graph 7-5 shows the relationship when the investment rule is followed. Fewer projects are expected to provide high return, so less will be invested if interest rates are high.

E. *Shifts in investment demand* occur when any determinant apart from the interest rate changes.

    1. Greater expected returns create more investment demand; shifts curve to right. The reverse causes a leftward shift.

        a. *Acquisition, maintenance, and operating costs of capital goods* may change. When costs fall, the expected rate of return from prospective investment projects rises, shifting the investment demand curve to the right.

b. *Business taxes* may change. When govt. is considered, firms look to *expected returns after taxes* in making their investment decisions.

c. *Technology* may change. A rapid rate of technological progress (more efficient machine, profitable new products) shifts the investment demand curve to the right.

d. *Stock of capital goods on hand* will affect new investment. When the economy is overstocked with production facilities and when firms have excessive inventories of finished goods, the expected rate of return on new investment declines.

e.*Expectations* can change the view of expected profits/returns which affect the business investment decision. If business executives become more optimistic about future sales, costs, and profits, the investment demand curve will shift to the right; a pessimistic outlook will shift it to the left.

F. In addition to the *investment demand curve*, economists also define an *investment schedule* that shows the amounts business firms collectively intend or plan to invest at each possible level of GDP or DI.

1. In developing the *investment schedule*, it is assumed that the *planned investment* (the amount that firms plan or intend to invest) is independent of the current disposable income or real output.

2. The *investment schedule* I_g (horizontal line) in Figure 7-7b relates the amount of investment ($20 billion) determined in Figure 7-7a to the various levels of GDP.

3. The assumption that investment is independent of income is a simplification, but will be used here.

4. Table 7-3 shows the investment schedule from GDP levels given in Table 7-1.

G. Unlike consumption, investment is a very unstable type of spending; I_g is more volatile than GDP (See Figure 7-8).

1. Because of the _durability_ of capital goods are, spending on it can be postponed or not depending the business prospects

2. *Irregularity of Innovation*
3. *Variability of Profits*
4. *Variability of Expectations*

H. For all of the above reasons, changes in investment cause many of the fluctuations in output and employment. We would represent volatility of investment as occasional and substantial shifts in the investment demand curve.

V. Equilibrium GDP: Expenditures-Output Approach

A. Look at Table 7-4, which combines data of Tables 7-1 and 7-3.

B. Real domestic output in column 2 shows ten possible levels that producers are willing to offer, assuming their sales would meet the

output planned. In other words, they will produce $370 billion of output if they expect to receive $370 billion in revenue.

C. Ten levels of aggregate expenditures are shown in column 6. The column shows the amount of consumption and planned gross investment spending ($C + I_g$) forthcoming at each output level.

   1. Recall that consumption level is directly related to the level of income and that here income is equal to output level.

   2. Investment is independent of income here and is planned or intended regardless of the current income situation.

D. *Equilibrium GDP* is the level of output whose production will create total spending just sufficient to purchase that output. Otherwise there will be a disequilibrium situation.

1. The *equilibrium condition*:

Real GDP (Income) = Agg. Expenditures

In Table 7-4, this occurs only at $470 billion.
2. At $410 billion GDP level, total expenditures (C + I$_g$) would be $425 = $405(C) + $20 (I$_g$) and businesses will adjust to this excess demand by stepping up production. They will expand production at any level of GDP less than the $470 billion equilibrium.
3. At levels of GDP above $470 billion, such as $510 billion, aggregate expenditures will be less than GDP. At $510 billion level, C + I$_g$ = $500 billion. Businesses will have unsold, unplanned inventory investment and will cut back on the rate of production. As GDP

declines, the number of jobs and total income will also decline, but eventually the GDP and aggregate spending will be in equilibrium at $470 billion.

E. Graphical analysis is shown in Figure 7-9 (Key Graph). At $470 billion it shows the C + I$_g$ schedule intersecting the 45-degree line which is where output = aggregate expenditures, or the equilibrium position.

1. Observe that the aggregate expenditures line rises with output and income, but not as much as income, due to the marginal propensity to consume (the slope) being less than 1.

2. A part of every increase in disposable income will not be spent but will be saved.

VI. Two Other Features of Equilibrium GDP

A. *Savings and planned investment are equal.*

1. It is important to note that in our analysis above we spoke of "planned" investment. At GDP = $470 billion in Table 7-4, both saving and planned investment are $20 billion.

2. Saving represents a *leakage* from spending stream and causes C to be less than GDP. (A *leakage* is defined as a withdrawal of potential spending from income-expenditures stream via saving, tax payments, or imports)

3. Some of output is planned for business investment and not for consumption, so this investment spending can replace the leakage due to saving. So, investment can therefore be thought of as *injection* of spending into the income-

expenditures stream. (An *injection* is defined as an addition of spending to the income-expenditure stream.)

a. If aggregate spending is less than equilibrium GDP as it is in Table 7-4, line 8 when GDP is $510 billion, then businesses will find themselves with *unplanned inventory investment* on top of what was already planned. This unplanned portion is reflected as a business expenditure, even though the business may not have desired it, because the total output has a value that belongs to someone—either as a planned purchase or as an unplanned inventory.
(*Unplanned inventory investment* is the changes in inventories that firms did not anticipate.)

b. If aggregate expenditures exceed GDP, then there will be less inventory investment than businesses planned as businesses sell more than they expected. This is reflected as a negative amount of unplanned investment in inventory. For example, at $450 billion GDP, there will be $435 billion of consumer spending, $20 billion of planned investment, so businesses must have experienced a $5 billion unplanned decline in inventory because sales exceed that expected.

B. *In equilibrium there are no unplanned changes in inventory*.

1. Consider row 7 of Table 7-4 where GDP is $490 billion, here C + Ig is only $485 billion and will be less than output by $5 billion. Firms retain the extra $5 billion as unplanned inventory investment.

Actual investment is $25 billion or more than $20 billion planned. So $490 billion is an above-equilibrium output level. (*Actual investment* is the amount that firms do invest; equal to planned investment plus unplanned investment).

2. Consider row 5, Table 7-4. Here $450 billion is a below-equilibrium output level because actual investment will be $5 billion less than planned. Inventories decline below what was planned. GDP will rise to $470 billion.

3. When planned changes in inventories are considered, *investment and savings are always equal*, regardless of the level of GDP.