Building the Aggregate Expenditures Model



Introduction-What Determines GDP?

- This chapter and the next focus 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.
- As explained in this chapter's Last Word, the model originated with John Maynard Keynes (Pronounced Canes).
- The focus is on the relationship between income and consumption and savings.
- Investment spending, an important part of aggregate expenditures, is also examined.
- Finally, these spending categories are combined to explain the equilibrium levels output and employment in a private (no government), domestic (no foreign sector) economy. Therefore, GDP=NI=PI=DI in this very simple model.

Simplifying Assumptions for this Chapter

- We assume a "closed economy" with no international trade.
- Government is ignored; focus is on private sector markets until next chapter.
- Although both households and businesses save, we assume here that all saving is personal.
- Depreciation and net foreign income are assumed to be zero for simplicity.
- There are two reminders concerning these assumptions.
 - 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.
 - With no government or foreign trade, GDP,national income (NI), personal income (PI), and disposable income (DI) are all the same.

Tools of Aggregate Expenditures Theory: Consumption and Saving

- 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.
- Consumption and saving: Since consumption is the largest component of aggregate spending, we analyze its determinants.
 - Disposable income is the most important determinant of consumer spending (see Figure 9-1 in text which presents historical evidence).
 - What is not spent is called saving.
 - Therefore, DI C = S or C + I = DI
 - In Figure 9-1 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 1980-2000.
 - 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.
 - Look at 1996 where consumption was \$5238 billion and disposable income was \$5678 billion. Hence, saving was \$440 billion.
 - The graph illustrates that as disposable income increases both consumption and saving increase.
 - Some conclusions can be drawn:
 - Households consume a large portion of their disposable income.
 - Both consumption and saving are directly related to the level of income.
- The consumption schedule:
 - The dots in Figure 9-1 represent actual historical data.
 - A hypothetical consumption schedule (Table 9-1 and Key Graph 9-2a) shows that households spend a larger proportion of a small income than of a large income.
 - A hypothetical saving schedule (Table 1, column 3) is illustrated in Key Graph 9-2b.
 - 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.
- Average and marginal propensities to consume and save:
 - Define average propensity to consume (APC) as the fraction or %of income consumed(APC = consumption/income).See Column 4 in Table 9-1.
 - Define average propensity to save (APS) as a the fraction or % of income saved(APS = saving/income).See Column 5 in Table 9-1.
 - Global Perspective 9-1 shows the APCs for several nations in 1999.Note the high APC for both U.S. and Canada.
 - 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 9-1.
 - 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 9-1.

- Note that APC + APS = 1 and MPC + MPS = 1.
- Note that Figure 9-3 illustrates that MPC is the slope of the consumption schedule, and MPS is the slope of the saving schedule.
- Test Yourself:Try the Self-Quiz below Key Graph 9-2.
- Nonincome 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.
 - 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.
 - Expectations: Changes in expected inflation or future wealth can affect consumption spending today.
 - Household debt:Lower debt levels shift consumption schedule up and saving schedule down.
 - Taxation:Lower taxes will shift both schedules up since taxation affects both spending and saving, and vice versa for higher taxes.
- Shifts and stability:See Figure 9-4.
 - 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 schedule.
 - Schedule shifts:Consumption and saving schedules will always shift in opposite directions unless a shift is caused by a tax change.
 - Stability:Economists believe that consumption and saving schedules are generally stable unless deliberately shifted by government action.
- Review these aggregate expenditures concepts with Quick Review 9-1.

Investment

- Investment, the second component of private spending, consists of spending on new plants, capital equipment, machinery, inventories, construction, etc.
 - The investment decision weighs marginal benefits and marginal costs.
 - The expected rate of return is the marginal benefit and the interest rate represents the marginal cost.
- Expected rate of return 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.
- The real interest rate, i (nominal rate corrected for expected inflation), is the cost of investment.
 - Interest rate is either the cost of borrowed funds or the cost of investing your own funds, which is income forgone.
 - If real interest rate exceeds the expected rate of return, the investment should not be made.
- Investment demand schedule, or curve, shows an inverse relationship between the interest rate and amount of investment.

- As long as expected return exceeds interest rate, the investment is expected to be profitable (see Table 9-2 example).
- Key Graph 9-5 shows the relationship when the investment rule is followed.Fewerprojects are expected to provide high return, so less will be invested if interest rates are high.
- Test yourself with Quick Quiz 9-5.
- Shifts in investment demand occur when any determinant apart from the interest rate changes.
 - Greater expected returns create more investment demand; shift curve to right. The reverse causes a leftward shift.
 - Acquisition, maintenance, and operating costs of capital goods may change.
 - Business taxes may change.
 - Technology may change.
 - Stock of capital goods on hand will affect new investment.
 - Expectations can change the view of expected profits.
- In addition to the investment demand schedule, economists also define an investment schedule that shows the amounts business firms collectively intend to invest at each possible level of GDP or DI.
 - \circ In developing the investment schedule, it is assumed that investment is independent of the current income. The line I_g (gross investment) in Figure 9-7b shows this graphically related to the level determined by Figure 9-7a.
 - The assumption that investment is independent of income is a simplification, but will be used here.
 - Table 9-3 shows the investment schedule from GDP levels given in Table 9-1.
- Investment is a very unstable type of spending; I is more volatile than GDP(See Figure 9-8).
 - Capital goods are durable, so spending can be postponed or not. This is unpredictable.
 - Innovation occurs irregularly.
 - Profits vary considerably.
 - Expectations can be easily changed.

Equilibrium GDP: Expenditures-Output Approach

- Look at Table 9-4, which combines data of Tables 9-1 and 9-3.
- 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.
- 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.
 - Recall that consumption level is directly related to the level of income and that here income is equal to output level.

- Investment is independent of income here and is planned or intended regardless of the current income situation.
- 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.
 - In Table 9-4, this occurs only at \$470 billion.
 - 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.
 - 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.
- Graphical analysis is shown in Figure 9-9 (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.
 - 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.
 - A part of every increase in disposable income will not be spent but will be saved.
 - Test yourself with Quick Quiz 9-9.

Two Other Features of Equilibrium GDP

- Savings and planned investment are equal.
 - It is important to note that in our analysis above we spoke of "planned" investment. At GDP = \$470 billion in Table 9-4, both saving and planned investment are \$20 billion.
 - Saving represents a "leakage" from spending stream and causes C to be less than GDP.
 - Some of output is planned for business investment and not consumption, so this investment spending can replace the leakage due to saving.
 - If aggregate spending is less than equilibrium GDP as it is in Table 9-4, 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.
 - 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.

- In equilibrium there are no unplanned changes in inventory.
 - Consider row 7 of Table 9-4 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.
 - Consider row 5, Table 9-4.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.
- Quick Review:Equilibrium GDP is where aggregate expenditures equal real domestic output.(C + planned Ig = GDP)
 - A difference between saving and planned investment causes a difference between the production and spending plans of the economy as a whole.
 - This difference between production and spending plans leads to unintended inventory investment or unintended decline in inventories.
 - As long as unplanned changes in inventories occur, businesses will revise their production plans upward or downward until the investment in inventory is equal to what they planned. This will occur at the point that household saving is equal to planned investment.
 - Only where planned investment and saving are equal will there be no unintended investment or disinvestment in inventories to drive the GDP down or up.

Last Word: Say's Law, The Great Depression, and Keynes

- Until the Great Depression of the 1930, most economists going back to Adam Smith had believed that a market system would ensure full employment of the economy's resources except for temporary, short-term upheavals.
- If there were deviations, they would be self-correcting. A slump in output and employment would reduce prices, which would increase consumer spending; would lower wages, which would increase employment again; and would lower interest rates, which would expand investment spending.
- Say's law, attributed to the French economist J. B. Say in the early 1800s, summarized the view in a few words:"Supply creates its own demand."
- Say's law is easiest to understand in terms of barter. The woodworker produces furniture in order to trade for other needed products and services. All the products would be traded for something, or else there would be no need to make them. Thus, supply creates its own demand.
- Reformulated versions of these classical views are still prevalent among some modern economists today.
- The Great Depression of the 1930s was worldwide.GDP fell by 40 percent in U.S. and the unemployment rate rose to nearly 25 percent (when most families had only one

breadwinner). The Depression seemed to refute the classical idea that markets were selfcorrecting and would provide full employment.

- John Maynard Keynes in 1936 in his *General Theory of Employment, Interest, and Money,* provided an alternative to classical theory, which helped explain periods of recession.
 - Not all income is always spent, contrary to Say's law.
 - Producers may respond to unsold inventories by reducing output rather than cutting prices.
 - A recession or depression could follow this decline in employment and incomes.
- The modern aggregate expenditures model is based on Keynesian economics or the ideas that have arisen from Keynes and his followers since. It is based on the idea that saving and investment decisions may not be coordinated, and prices and wages are not very flexible downward. Internal market forces can therefore cause depressions and government should play an active role in stabilizing the economy.