Chapter 6: Aggregate Expenditures

Preamble

- Recall from chapter 3 that:
  - GDP and national income (Y) are conceptually the same thing and thus are always equal to each other. (Chapter 6 uses the term national income, though GDP could be substituted just as easily.)
  - \( GDP = Y = AE \) at equilibrium and \( AE = C + I + G + X_N \)
- National income flows to individuals, who then use it to consume goods and services (domestically produced and imported), pay taxes, and put away as savings.
- These actions, which include three leakages and one component of aggregate expenditure, in turn lead to all of components of the aggregate expenditure formula:
  - Consuming domestic goods is consumption
  - Paying taxes helps finance government spending
  - Saving money helps finance investment
  - Consuming imports is weighed against exports (from which income originates from outside the economy) to derive net exports
- Remember, however, that aggregate expenditures do not always equal national income.
  - \( AE = Y \) only at expenditure equilibrium
  - Expenditure equilibrium is the income at which the value of production (Y) and aggregate expenditures are equal.

6.1 The Expenditures Model

The Basics

- AE can exceed income, and it even can exist when income equals zero.
- **Autonomous spending** is the portion of total spending that is independent of the level of income, and it occurs when income is zero.
  - *Autonomous* means “independent of”, so autonomous spending does not depend on the level of income.
- **Induced spending** is that portion of spending that depends on the level of income.
  - Income and aggregate expenditures have a positive (or direct) relationship because higher incomes induce higher levels of spending.
- A new formula for aggregate expenditures thus can be derived:
  - \( AE = \text{autonomous expenditures} + \text{induced expenditures} \)
- How can an economy be spending more than it earns (particularly when there is no income at all)? People, businesses, or governments must be borrowing.
  - Therefore, the source of autonomous spending is past savings (from lenders within or outside the country).
  - The source of induced spending is current income since aggregate expenditures increase as income increases.
- The **marginal propensity to expend** is the ratio of the change in expenditures that results from a change in income (i.e. it shows the relationship between the two).
  - The term propensity (like demand) includes the idea of both willingness and ability to spend.
  - \( MPE = \frac{\Delta \text{aggregate expenditures}}{\Delta \text{national income}} \)
  - E.g. In the country of Karinia: \( MPE = \frac{100}{200} = 0.50 \)
  - The answer tells us that for every additional dollar of income earned, there is an additional X dollars ($0.50 in Karinia’s case) of induced spending that results.
  - The other $0.50 is leaked into taxes, savings, and imports.

Note: \( \Delta \) means “change in”. It is the difference between two numbers (for example, \( Y_2 - Y_1 \))
• The amount of each extra dollar of national income not spent on domestic products is referred to as the **marginal leakage rate** (MLR).
  - \[ \text{MLR} = \frac{\Delta \text{total leakages}}{\Delta \text{national income}} \]
  - Or: \[ \text{MLR} = (1 - \text{MPE}), \] since all income is either spent or is part of a leakage
• Thus: \[ \text{AE} = \text{autonomous expenditures} + (\text{MPE} \times Y) \] (where \( Y \) is national income)
  - In the case of Karinia: \( \text{AE} = 800 + 0.5Y \)
  - This formula can be used to calculate \( \text{AE} \) for any income by simply substituting the income in for \( Y \).
    - E.g. When \( Y = 1000 \), then \( \text{AE} = 800 + 0.5(1000) = $1300 \)

**The Tax Function**
• Taxes are a leakage.
• Autonomous taxes, like property taxes, users fees, etc., do not depend on the level of income.
• The majority of taxes, however, are induced taxes and are related to income levels (examples include personal income tax, corporate taxes, and sales taxes).
• Therefore: \[ \text{Total taxes} = \text{autonomous taxes} + \text{induced taxes} \]
• Some tax revenue that goes to the government is given back via transfer payments (like welfare, pensions, and unemployment insurance).
• Disposable income increases with income, but at a slower rate.
  - Disposable income \( (Y_D) = \text{Income} (Y) - \text{Tax} (T) \)

**The Consumption Function**
• Consumption has a direct relationship with income and consists of both autonomous and induced elements.
• **Total consumption = autonomous consumption + induced consumption**
• **Autonomous spending** is the portion of consumer spending that is independent of the level of income.
• **Induced consumption** is the portion of consumer spending that is dependent on the level of income.
• **Marginal propensity to consume** represents the relationship between the increase in consumption and the increase in income
  - \[ \text{MPC} = \frac{\Delta \text{consumption} (C)}{\Delta \text{income} (Y)} \]
• MPC can be used to calculate the value of consumption for any level of income:
  - \( \text{C} = \text{autonomous consumption} + (\text{MPC} \times Y) \) (where \( Y \) is national income)

**The Saving Function**
• Savings are a leakage.
• Saving is the portion of disposable income \( (Y_D) \) that is not consumed:
  - \( S = Y_D - C \) or \( Y_D = C + S \)
• At low levels of disposable income, saving can be negative (called dissaving), since at zero income individuals still must spend some autonomous tax and autonomous consumption.
  - Doing so can only be done by borrowing or using past accumulated savings, causing them to decrease.
• Marginal propensity to save defines the relationship between a change in income and a corresponding change in saving, so:
  - \[ \text{MPS} = \frac{\Delta \text{saving} (S)}{\Delta \text{income} (Y)} \]
• MPS can be used to calculate the value of savings for any level of income:
  - \( S = \text{dissaving} \) (when \( Y \) is zero) + \( (\text{MPC} \times Y) \) (where \( Y \) is national income)
Consumption and Saving Depicted Graphically
- Both are upward sloping since they increase as GDP increases.
- Slope of consumption = MPC (higher value, steeper line)
- Slope of saving = MPS

The Investment Function
- Investment spending is autonomous and has no direct relationship with income levels.
- Income levels could increase profits and thus could increase investment, but there is no strong, unarguable link.

The Government Spending Function
- Government spending is also autonomous and operates independently of income levels.
- While governments depend on taxes, which in turn depend on income levels, they will spend whatever is necessary to support the economy.

Exports, Imports, and the Net Export Function
- Exports are autonomous and do not rely on our country’s income level; they do, however, rely on the income levels of other countries.
- Recall that an increase in income leads to an increase in consumption, and consumption can be on domestic or imported goods and services—so the level of imports has a direct relationship to the level of income
- Marginal propensity to import is the ratio of the change in imports that results from a change in income
  - MPM = \( \frac{\Delta \text{ imports (IM)}}{\Delta \text{ income (Y)}} \)
- Some level of imports can be autonomous since even at zero income, a country will need to import things it simply cannot produce domestically but require to function
- The import function equation thus has an autonomous and induced component:
  - \( \text{IM} = \text{autonomous imports} + (\text{MPM} \times Y) \) (where \( Y \) is national income)
- Net exports, also called the balance of trade, is the value of a country’s export of goods and services less the value of imports, and can be positive (greater exports) or negative (greater imports).
- Net exports are positive and highest when income is lowest because autonomous exports are held constant (resulting in a trade surplus).
- Since imports are largely induced, they rise as income rises (thus higher income leads to a reduction in the trade surplus and/or an increase in the trade deficit).
  - \( X_N = \text{autonomous exports} – \text{IM} \) [where \( IM = \text{autonomous imports} + (\text{MPM} \times Y) \)], so \( X_N = \text{autonomous exports} – \text{autonomous imports} + (\text{MPM} \times Y) \)

Net Exports Depicted Graphically
- Since imports increase as income levels increase, the curve is upward sloping and begins at the level of autonomous spending.
- Since exports are autonomous and remain constant, the curve is horizontal.
- The net export function will begin at the level that represents the difference between autonomous exports and autonomous imports \( (X_N = X – IM) \).
- The net export curve is downward sloping because while imports rise with income levels, exports remain constant, thus leading to a decline in net exports (i.e. the trade surplus).
- The balance of trade is zero at the point where the export curve and import curve intersect.