The Savings Function

The Savings Function is the relationship between YD and aggregate household savings. We know that disposable income is either consumed or saved:

\[ YD = C + S \]

So,

\[ S = YD - C = YD - (a + b*YD) = -a + (1-b)*YD \]

The graph of the savings function (See Fig. 10.1, Panel b, Parkin, Ch.10, Pg. 231):

If we graph the savings function seen above, with S on the vertical axis & YD on the horizontal axis, then we get a straight line with the following features:

1. It has a negative intercept \( a \) on the vertical axis (logical, given that if households indulge in that amount of consumption even when they earn nothing, they must be having negative savings, i.e. borrowings, to finance that consumption).
2. It has a positive slope of \( (1 - b) \). This follows from the fact that \( 0 < b < 1 \). Thus, \( 0 < (1-b) < 1 \). \( (1-b) \) is called the marginal propensity to save (MPS) and is defined as the amount that is saved out of every dollar’s worth of additional disposable income.

Note the following:

1. \[ S = - a + (1-b)*YD \]
   Thus, \( \frac{\Delta S}{\Delta YD} = (1-b) = MPS = \text{change in savings due to a marginal change in disposable income} \] (alternate definition of MPS, supporting the one seen earlier).
2. \[ MPC + MPS = 1 \]

Why?

We know, \( YD = C + S \)

So, \( \frac{\Delta YD}{\Delta YD} = \frac{\Delta C}{\Delta YD} + \frac{\Delta S}{\Delta YD} \)

So, \( 1 = MPC + MPS \)

Planned Consumption as a function of Real GDP

We know that the consumption function is:

\[ C = a + b*YD \]

\[ = a + b(Y - T - t*Y + r) \]
\[ a + bY - bT + bt^*Y + b\tau \]
\[ a + b(1-t)Y - bT + b\tau \]
\[ (a - bT + b\tau) + b(1-t)Y \]
\[ a + BY, \text{ where } a > 0, \text{ and } 0 < B < 1. \]

In this model, as prices are fixed, nominal & real income is the same. Further, by the Income method of national income accounting we know that factor incomes equal a country’s GDP. Hence the \( Y \) we see in the above equation is nothing but the Real GDP. Hence, we have found a relationship between planned consumption expenditure and RGDP.

(See class notes for the related diagram.)

*Note that when we draw this diagram, we assume that the price level, tax rates, tax/transfers, wealth/inheritance, tastes & preferences of households, and the real interest rate of the economy are constant. So a change in \( Y \) implies a change only in the level of goods & services produced in the economy.*

**Questions:** What factors would cause \( \alpha \) to change? What factors would cause \( B \) to change? How would the diagram of the consumption function change for a change in \( \alpha \), in \( B \), and in both?

**In-class question:** We have lump-sum taxes and income tax in this model, but what about sales taxes?

*Ans.* Sales taxes are included within the price level in the goods & services market (which is constant in the fixed prices model). We do not see them in the consumption function, since though the consumption plan has been made after looking at the price level, here we are keeping the latter fixed and looking at the dependence of \( C \) on income (and income is not affected by sales taxes). A change in sales taxes would work its way into this model by changing the price level. The change in the price level would change one of the factors we assume to be constant while drawing the consumption function, so the latter will shift accordingly.

**Planned Aggregate Expenditure as a function of RGDP**

I am not going to write ‘planned’ before AE, C, G, and (X-M) from now on. If I do not mention anything, it means I am talking about the respective expenditure plans. When I need to distinguish between plans & actual (what I mean by this will become clearer in
the next lecture), I will mention it specifically. Note however, that in the analysis seen below RGDP is always an ‘actual’ amount: there is nothing called ‘planned RGDP’.

\[ AE = C + I + G + (X - M) \]

Further, let the amount of real goods & services that a country imports from abroad depend on its income, i.e. RGDP level:

\[ M = mY, \] where \( m = \Delta M/\Delta Y \) is the ‘marginal propensity to import’, and is defined as the amount that is spent on imports out of every dollar’s worth of additional RGDP.

\[ AE = C + I + G + (X - M) \]
\[ = \alpha + BY + I + G + X - mY \]
\[ = \alpha + (B - m)Y + I + G + X \]
\[ = \alpha + I + G + X + (B - m)Y \]
\[ = A + (B - m)Y, \] where we assume \( B > m \).

We can think of \( A \) as autonomous planned expenditure, and \( (B - m)Y \) as expenditure planned out of real income (i.e., RGDP).

(See Fig. 10.5, Parkin, page 236)

Questions: What factors would cause \( A \) to change? What factors would cause \( (B - m) \) to change? How would the diagram of the aggregate expenditure function change for a change in \( A \), in \( (B - m) \), and in both at once?