Consumption and saving

By hypothesis, consumption (C) and saving (S) are functions of disposable income (DI). To keep matters simple—and reflecting empirical data—let's suppose the relationship between C and DI is linear, of the form $C = a + bDI$. Here we can see that a is the amount of consumption that would occur if DI were zero. It is sometimes called "autonomous consumption," that is, consumption that is independent of the level of disposable income. Likewise, b is the slope, $\Delta C/\Delta DI$, and goes by the name "marginal propensity to consume," or MPC. By assumption, $0 < b < 1$.

The "breakeven" level of DI occurs where C is equal to DI. Equating the two, we have $C = a + bDI = DI$. Solving this for DI we obtain the breakeven level of disposable income, $DI_{BE} = a/(1 - b)$, provided of course that b is not equal to 1. We are safe by our assumption that b is strictly less than one. (The example consumption schedule given in the text as Table 27.1 is built on the equation $C = 97.5 + .75DI$, so that autonomous consumption, a, is equal to \$97.5 billion and $b = .75$. Hence, the breakeven level of DI is found to be $97.5/(1 - .75)$ = \$390 billion.)

By definition, saving (S) is any part of disposable income not consumed: $S = DI - C$. Since $C = a + bDI$, we can substitute to find that $S = DI - (a + bDI) = -a + (1 - b)DI$. This is also a linear relationship with intercept equal to the minus of the consumption schedule intercept ($-a$) and slope equal to one minus the slope of the consumption schedule: $\Delta S/\Delta DI = (1 - b)$. This slope is known as the "marginal propensity to save," or MPS. Adding the MPC and the MPS we find $b + (1 - b) = 1$.

At the breakeven level of disposable income, $C = DI$. Since $C + S = DI$ at all levels of income, this implies that $S = 0$ at the break-even level. Setting $S = -a + (1 - b)DI = 0$ and solving for DI we obtain $DI_{BE} = a/(1 - b)$ as before.

The "average propensity to consume" or APC is defined as C/DI. Likewise, the average propensity to save is S/DI. First, consider the APC. The consumption schedule tells us that $C = a + bDI$, so that the APC is related to DI in the following way: APC = $C/DI = \frac{a + bDI}{DI} = \frac{a}{DI} + b$. Since a and b are positive by assumption, this tells us that the APC is positive for all values of DI. We can also note that the APC declines with increases in DI. Finally, we see that C/DI is greater than one if $\frac{a}{DI} + b > 1$. A little manipulation shows that this is equivalent to $DI > a/(1 - b)$. The term on the right is the break-even level of income, so that we find the APC is greater than one for income levels in excess of the breakeven; less than one but positive for DI less than the breakeven.

The APS is $S/DI = \frac{-a + (1 - b)DI}{DI} = \frac{-a}{DI} + (1 - b)$. Here we can see that the APS is <u>increasing</u> in DI by virtue of the negative first term that gets closer to zero as DI increases. Further, it can be seen that DI is less than zero for DI less than the breakeven, but positive for DI greater than the breakeven. Finally, we note that the sum of the APC and the APS equals $(\frac{a}{DI} + b) + (\frac{-a}{DI} + (1 - b)) = 1$.

There are non-income determinants of consumption and saving as well: Wealth (W), Expectations (E), the level of Household Borrowing (B), and real interest rates (i) all influence the levels of consumption and saving. However, these factors are assumed <u>not</u> to influence the value of the MPC or the MPS. That is, we note that their influence determines the value of a, but not b in the consumption and saving schedules. We may write $a = a(W, E, B, i)$ so that our consumption and saving schedules become: $C = a(W, E, B, i) + bDI$ and $S = -a(W, E, B, i) + (1 - b)DI$. By hypothesis, $\Delta a/W > 0$, $\Delta a/\Delta E > 0$, $\Delta a/\Delta B < 0$,and $\Delta a/\Delta i < 0$, so that increases in wealth or expectations, or decreases in household borrowing or real interest rates will increase consumption, but decrease saving.

Taxes also affect consumption and saving, but their influence arises by altering the level of disposable income, not by fundamentally changing the relationships between C, S, and DI. Define Y = real GDP and T = taxes. Then, $DI = Y - T$. Since $C = a + bDI$, we could also write $C = a + b(Y - T) =$

$a + bY - bT = (a - bT) + bY$. Suppose T is set at a specific value by the government, independent of GDP. This equation then tells us that, compared to the relationship between consumption and disposable income, the relationship between consumption and real GDP differs only by the constant term $-bT$. A similar process shows that $S = [-a - (1 - b)T] + (1 - b)Y$. Comparing this to the relationship between saving and disposable income, we see again that this relationship differs only by a constant term. In particular, an increase in taxes will shift both the consumption and the saving functions downward—the former by an amount equal to bT, the latter by an amount equal to $(1 - bT)$. Finally, we can note that saving, consumption, and taxes all add up to real GDP:

$C + S + T = (a - bT) + bY + [-a - (1 - b)T] + (1 - b)Y + T = Y$.