Intertemporal Consumption – the power of expectations

The handout 'Solving the Infinite Horizon Consumption Problem' shows how to derive the Keynes/Ramsey rule, which tells us how consumption varies over time. It also shows, in the special case of log utility, that we can write in continuous time

$$c_0 = \theta[a_0 + \int_{t=0}^{\infty} w_t e^{-(r-n)t} dt]$$

where 'a' is wealth, 'w' is expected labour income, r is the real rate of interest (assumed constant here), n is the population growth rate, and θ is the rate of time preference. The final term is 'human capital'. (Compare this expression with the two period case – see exercise.)

We could write a discrete time version of this as

$$c_0 = \theta \sum_{t=0}^{\infty} (w_0 + \delta w_1 + \delta^2 w_2 + ...)$$

where a_0=0, and δ is a discount factor that is related to r-n. Now suppose agents' expectations of their future income are naïve, and simply involve some constant growth rate g, so that $w_1=(1+g)w_0$, $w_2=(1+g)^2 w_0$ etc. Consumption can then be written as

$$c_0 = \theta w \sum_{t=0}^{\infty} (1 + \delta(1+g) + \delta^2 (1+g)^2 + ...)$$

Using the expression for an infinite sum[1] (assuming $\delta(1+g)<1$) this becomes

$$c_0 = \frac{\theta w}{1-\delta(1+g)}$$

Suppose δ=0.9, and g rises from 3% to 4%. Even if current income (w) is unchanged, current consumption will rise by about 14%. (If δ was nearer 1, the effect would be larger still.) Consumers anticipate higher future income, and want to enjoy its benefits now by smoothing consumption. Of course, to do this they must either dissave, or be able to borrow.

Some economists argue that can explain the UK consumer boom in the late 1980s, because consumers began to believe the 'Thatcher miracle' i.e. that the long term growth rate of the economy had increased. Others point to the growth in the availability of credit at the time: previously credit constrained consumers were able to borrow more, raising aggregate consumption. (A third possible explanation was that consumers felt wealthier because of a housing price boom, although whether consumers should spend more if house prices rise is debatable.) We can use the same analysis to see why credit availability could be important.

In the intertemporal model, there are no constraints on borrowing. This is an unrealistic consequence of neglecting uncertainty. Even if agents are

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[1] $1+a+a^2+a^3+\ldots=1/(1-a)$ if a<1

certain about their own future income, lenders to them are unlikely to have the same degree of certainty. We have a problem of *asymmetric information*. One response to asymmetric information in credit markets is rationing: agents may not be able to borrow all they need. In this situation we say that agents are *credit constrained*.[2]

From a life cycle perspective, young agents are particularly likely to be subject to credit constraints. We can use the above example to illustrate the impact of this constraint. Suppose the agent expects their income top grow by 4%, but the lender is more cautious, and is only prepared to lend on the basis of 3% income growth. In the example above, this left current consumption 14% below the desired (optimal) level.

In this situation, any relaxation in the lending constraint will lead to an immediate increase in borrowing and consumption by these agents. For this type of credit constrained agent, the marginal propensity to consume out of any extra income is unity. So changes in the availability of credit, if it is associated with a reduction in credit rationing, could lead to a significant increase in the consumption of credit constrained individuals. If the proportion of credit constrained individuals in the economy was large, the impact on aggregate consumption could also be large.

[2] It is important to stress that the situation here is one where agents want to borrow to be on their optimum consumption path, which is consistent with their budget constraint. They are not violating their (expected) budget constraints, as in ‘Ponzi games’.