

MSC handout – Exchange Rate Determination 2: Consumption, Output, and the Current Account

Some Identities

Take an economy without capital or government. We can write the national income identity in two ways

$$\begin{aligned} Y &= C + X - M = C + TB \\ Y &= Cd + X \end{aligned} \tag{0.1}$$

where Y is output, C consumption, Cd consumption of domestically produced goods, X exports, M imports, and TB the trade balance. If consumers hold some real assets A that yield a real rate of return r^1 , then their budget constraint is

$$\Delta A = Y + rA - C \tag{0.2}$$

Substituting in (1.1) gives us

$$\Delta A = TB + rA \tag{0.3}$$

where the right hand side is the current account (which must be zero in steady state), and the left hand side the capital account. The dynamics of the current account are clearly linked to the dynamics of consumption relative to output.

Output in the long run

We have already noted that, in the long run, perfect capital mobility implies that domestic real interest rates equal overseas real interest rates. If labour supply is fixed, then this implies that domestic output per head is determined by technology and the world real interest rate in the long run.

This result is softened once we endogenise labour supply. Obstfeld and Rogoff (1995) endogenise labour supply in the standard way, and they show that labour supply will be increasing in world demand, but decreasing in domestic consumption. The latter result comes from the standard first order condition, while the former is because higher world demand raises both output prices and wages, so the consumer real wage increases, encouraging more labour supply.

The Link from Output to Consumption

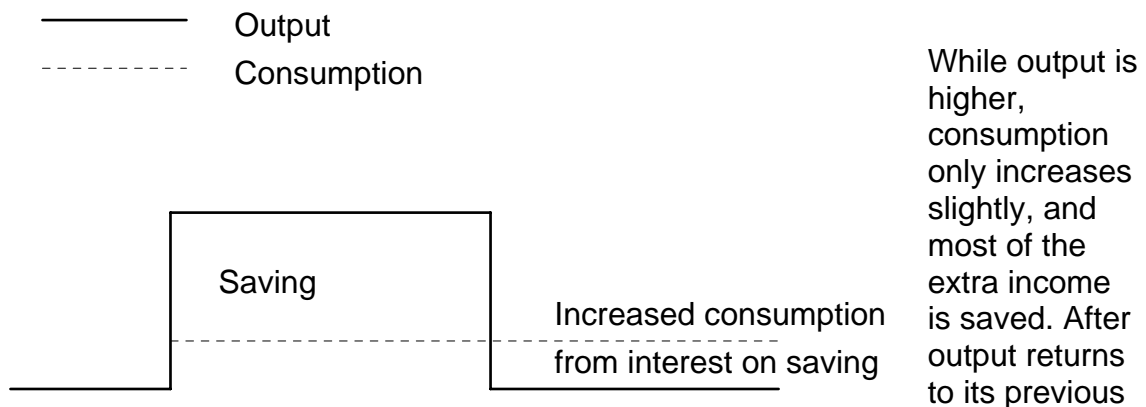
Suppose output increases, either because of the discovery of oil, or because of an increase in technical progress. We can look at three cases, which differ in the timing of the output increase and its type. In all cases we assume that consumers are intertemporal maximisers, and there are no constraints on borrowing. This example is discussed in Blanchard and

¹ For simplicity we assume these assets are denominated in domestic currency. If they were in overseas currency, we would need to allow for capital gains and losses following exchange rate movements.

Fischer, Ch 2.4. We assume that non-oil output is in the form of differentiated manufacturing goods, and some of this is exported, but some is consumed domestically.

1. The output increase is oil, is temporary, but is unanticipated

The profiles of output and consumption will look like this:

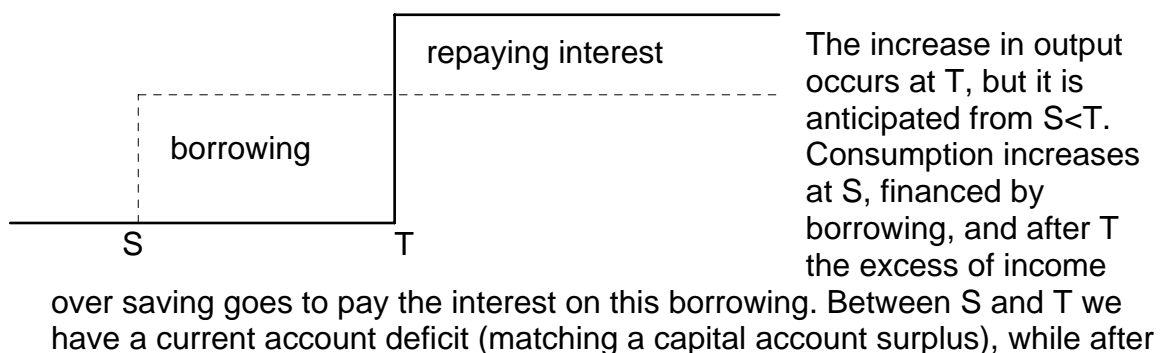


level, consumption remains at its slightly higher level (consumption smoothing), financed by the interest income from the earlier saving.

In the period that output is higher, the current account is in surplus. The surplus on the current account exactly matches the deficit on the capital account, a deficit generated by domestic consumers buying overseas assets in order to save. When output returns to its original level, there is a (small) trade deficit, because consumers are spending more, but this is matched by higher interest income from overseas assets, and so the current account returns to zero balance.

As the increase in output is oil, which is all exported at a given world price, then the net effect on the demand for non-oil domestic output is a small increase due to additional consumption. This extra demand for non-oil domestic goods, with no matching increase in supply, generates a real appreciation to choke off some exports. The appreciation occurs immediately the oil is produced, and is permanent.

2. The output increase is oil, is permanent, but is anticipated



T a zero current account is made up of a small trade surplus matched by interest payments overseas.

Between S and T the real exchange rate appreciates, because the demand for domestic output has increased with no change in supply. As the extra output is oil, then this appreciation persists.

Note that in both these cases, current account deficits or surpluses represent the optimal response of consumers to intertemporal movements in income streams.

3. The output increase is non-oil, is permanent, and is unanticipated

If we assume no new varieties of good are produced, the extra supply will require a real depreciation to sell some of the extra output overseas (see previous handout). However, as long as some domestic output is consumed domestically (because of non-traded goods, or home bias), then the extra income generated by the higher output will provide some of the extra demand.

Could the increase in domestic consumption provide all (or more) of the additional demand, so a depreciation is not needed? If consumers are infinitely lived, the answer is no, because at least some consumption is imported, and all of the extra income is immediately spent. However, we know in the model of perpetual youth that there is a relationship between income and wealth. If the permanent increase in income implies that consumers will increase their long run wealth position, then two things happen. First, in the short run consumers save some of their extra income, to build up their wealth. This saving will imply a current account surplus, as consumers invest overseas. Second, as this wealth builds up consumption will rise because of interest on this wealth. It is theoretically possible that in the new steady state the total increase in consumption could be enough to provide all and more of the required extra demand for domestic output, implying an appreciation rather than a depreciation, but this possibility is unlikely if the share of imported goods is small (see Giovannini, 1988).

The infinite life model in an open economy

Recall that this model implies the Keynes Ramsey rule, which in steady state links the real interest rate to the rate of time preference. This raises a problem in an open economy, where the steady state real interest rate is tied down to the world level. (See the discussion of UIP in steady state from the previous handout.) It implies that, for a steady state to be possible, the rate of time preference must be identical across consumers in each country.

The model also implies an interesting dynamic relationship between consumption growth between countries. This is clearest in the case of log utility, where (if we ignore population growth) the Keynes Ramsey rule implies

$$\dot{c}_t / c_t = r - \theta \quad (0.4)$$

Now UIP implies (assuming perfect foresight)

$$\dot{e}/e = r_w - r_d \quad (0.5)$$

i.e. a real appreciation must be counterbalanced by a lower domestic real interest rate relative to the rest of the world. As the rate of time preference must be equal for both sets of consumers, then this gives us a relationship between domestic consumption growth, world consumption growth, and the change in the real exchange rate.

In the infinite life model, a windfall gain in wealth results in consumption that increases by the interest on that windfall gain, but does not eat into the windfall gain itself. Suppose, therefore, that for some reason there is a transfer of wealth from the world economy to the domestic economy. This transfer will be permanent, in the sense that domestic wealth will be permanently higher, and domestic consumption permanently higher. To the extent that some of the additional consumption increases the demand for domestically produced manufactured goods sold under imperfect competition, then the real exchange rate will permanently appreciate.

This is an important result. We have already seen that the long run real exchange rate will be a function of domestic supply and international demand. We can now add a country's net asset position as an additional determinate.

Obstfeld and Rogoff (1995) use this property to generate an intriguing result. They use a similar model, but where the world consists of two economies, and prices are fixed for one period. Suppose that money increases in the 'domestic' economy. Consumer price PPP holds in their model, which means real interest rates (defined in terms of consumer prices) are equal for the two economies. This means that the exchange rate must jump to its new long run level immediately, which means a depreciation. This generates a current account surplus², which adds to domestic wealth (and hence domestic consumption) in the second period. As a result prices do not rise by as much as the increase in money even in the long run. Neutrality does not hold!

This result, which in any case is unlikely to be large (particularly compared to the non-neutrality in the first period when prices are fixed), would eventually die out if we replaced infinitely lived consumers by Blanchard/Yaari consumers. However it does illustrate an important point. Short run current account changes will lead to changes in net overseas assets which will have long lasting effects.

International Risk Sharing

We saw above that there is a relationship implied by UIP between relative, expected consumption growth and expected appreciations or depreciations. In one particular case, we can move from growth rates to levels, and link the level of the real exchange rate to the relative level of consumption. This is the rather idealised case of International Risk Sharing. Here, consumers in one country can insure themselves against any risk,

² It may seem odd that an increase in the money supply generates a current account surplus. Why don't consumers spend the tax cut (assuming this is where the money goes), raising imports? However prices will increase in the next period, and so the tax cut will be counterbalanced by an inflation tax in period 2.

including income risk, as long as that risk is country specific. In these circumstances, shocks to income in the domestic economy that do not occur in the world economy have no impact on domestic consumption relative to overseas consumption. In fact, the only factor that does influence relative consumption is the level of the real exchange rate, because it influences the price of consumption in one country relative to another.

This is a neat device, because we no longer need to worry about feedbacks from country specific changes in output to domestic income of the kind examined above. However it is clearly unrealistic, and just how unrealistic is the subject of a good deal of current research.

Fiscal Policy

The precise impact of fiscal policy on an open economy will be very specific to the model used. However opening up the economy is unlikely to make a radical difference from the general principles that applied to a closed economy. It remains sensible to distinguish balance budget changes in government spending on the one hand and taxation timing changes on the other, and an open economy in itself does not influence whether Ricardian Equivalence holds for the latter. With changes in government spending it is crucial to distinguish between temporary and permanent changes. This remains true in an open economy. For example, equation (1.1) becomes

$$Y = C + G + TB \quad (0.6)$$

where G is government spending. A temporary increase in G will imply a much smaller fall in C (because of smoothing), and the net increase in domestic demand for domestic goods will imply an appreciation.

One issue unique to government spending in an open economy is whether that spending is exclusively on home produced goods, or includes imported goods. In Obstfeld and Rogoff (1995), for example, the pattern of government spending is identical to private consumption, so a large proportion goes on goods produced overseas. Clearly the more orientated that spending is to domestically produced goods, the more likely an increase in spending will generate an appreciation.

With infinitely lived consumers, a tax cut accompanied by a build up of government debt will have no effect because of Ricardian Equivalence.³ In a Blanchard/Yaari model Ricardian Equivalence does not hold, so a tax cut will boost consumption initially. As some of this is spent abroad, the trade balance will deteriorate (move into deficit) and the extra spending on domestic goods will generate an appreciation. (Economists sometimes talk about the 'twin deficits': a budget deficit matched by a trade deficit.) However, if the tax cut is financed by a permanently higher stock of government debt, then what happens when the tax cut is over? Simply the reverse of the tax cut: the higher taxes required to pay the interest on the debt reduce consumption,

³ The current account must equal the sum of private sector saving and government saving. So with Ricardian Equivalence, a deficit is matched by higher private sector saving exactly, with no change in the current account. To the extent that private sector saving does not rise to match the deficit, a current account deficit will emerge.

which lowers the demand for domestically produced goods, implying a depreciation.

Monetary Policy

Once again the broad principles from the closed economy still apply. With the exception of the Obstfeld Rogoff paper cited above, we have neutrality with flexible prices. As the economy determines some real exchange rate, then neutrality also applies to the nominal exchange rate.

In the short run with nominal inertia, nominal interest rates have an influence on real interest rates and therefore the real exchange rate through UIP, so the transmission mechanism in an open economy has an important new element. Expectations of future monetary policy are crucial here, but they are also crucial in the other elements of the transmission mechanism from interest rates to demand and then prices.

The US Current Account Deficit and the Dollar

Probably the major talking point in international macroeconomics at the moment is the persistent and very large US current account deficit (over 6% of their GDP), coupled with a relatively strong US Dollar. This deficit appears to be the counterpart of large surpluses in East Asia, and attempts by some East Asian countries to keep their exchange rates 'undervalued' (notably China and Japan).

The US deficit is often associated with two other features of the recent US economy: rapid technological progress in the US over the last decade or so, and a large budget deficit (the Bush tax cuts combined with high military spending). Taking the first, we discussed above the impact of a technology shock. This could account for both a current account deficit and an appreciation *during the period in which it was anticipated* (but had not happened), but this seems unlikely to be the case today. Taking the second, we noted above that, if Ricardian Equivalence does not hold, then we may observe 'twin deficits', and furthermore this would be accompanied by an appreciation. However, few believe that the link is strong enough to explain the major part of the US deficit. Instead, the US deficit seems to be associated with strength in US private sector demand relative to income, coupled with a 'savings glut' in East Asia. A good deal of uncertainty remains about the exact causes of both.

Partly as a result, there is no clear view as to when the US current account deficit will come down, and by how much the US dollar needs to fall. There is a great deal about macroeconomic behaviour that we still do not know!