

STUDY QUESTIONS

Here are some questions posed in an email from a student in ECO342, with responses.

- (1) This was a somewhat unclear question about the Zha model, trying to understand how precautionary saving interacts with “ b ”, the amount of wealth that a bankrupt borrower gets to keep.

Precautionary saving in this model can only take the form of accumulating large values of total wealth, which must correspond to large values of the capital stock. People may in the absence of borrowing and lending accumulate large amounts of wealth to “self-insure”, limiting the probability of very low consumption values. Lending in Zha’s model increases with b , then decreases, because at very low levels of b people don’t want to borrow because the consequences of bankruptcy are so high, and at very high levels of b the bank is willing to lend only small amounts, because the risk of default is otherwise so high. Values of b that maximize the total amount of lending generally don’t maximize aggregate capital, because increased lending increases insurance, thus reduces the incentive to self-insure, while at the same time it improves the allocation of capital, thereby making it easier to accumulate wealth. With these two offsetting effects, it’s not clear whether lending peaks at a higher or lower value of b than does capital. Note that the biggest insurance effect of the loan market, for the rich, is the fact that they can lend risk-free instead of making risky purchase of capital themselves. So an increase in b to levels so high that lending falls may increase the incentive for the rich to self-insure.

- (2) We briefly covered what happens with seignorage in continuous time. The formulas from this part aren’t incredibly clear to me, but what I gather is that in continuous time, there is no upper bound on seignorage revenue, because the CB chooses the period of inflation/when it increases the money supply. Thus it can make however much revenue it wants. Is that correct? Further, there was also an expression showing that in some case, there was no lower bound on $M/P = m$. Was this for the continuous time case? Is there more I should know about continuous-time seignorage?

In discrete time, nominal seignorage is ΔM_t . The real value of this, $\Delta M_t/P_t$, could be arbitrarily large if P_t remained constant while ΔM_t became larger. But we usually think that if anything real balances $m_t = M_t/P_t$ will shrink as inflation increases. If that is true, the real value of seignorage cannot exceed

$m_{t-1}(1 - P_{t-1}/P_t)$, which in turn cannot exceed m_{t-1} itself. But the time unit is artificial. If the government can only generate seignorage of m_t per period, it can split the year into n periods and generate nm in seignorage over the year, with n as big as it likes. Of course m will decrease as the inflation rate increases, so there still may be a bound on revenue from seignorage, but one cannot get a bound just by looking at the level of m_t , as is possible in discrete time. If there is a lower bound on m — that is if no matter how high R and the inflation rate go people will hold at least m in real balances — then there is no upper bound on seignorage revenue in continuous time.

(3) In terms of the lectures on the ECB, there are a few points about which I am unclear.

(a) Is it currently true that the ECB tells banks that they can count government debt as risk free, or is this a rule that you believe would be beneficial if implemented?

Bank regulations require banks to maintain capital in a certain ratio to their risky assets. It was true that government debt was treated as non-risky in the sense that there were no capital requirements against it in the euro area. I believe from newspaper stories that capital requirements against holdings of government debt that has low agency ratings are now in place, or at least planned for future implementation.

(b) It is also suggested that the ECB cannot buy government debt; however, after some internet searching, I discovered that the ECB often does buy government bonds on the open market, just not from the governments themselves. Does this mean that the ECB can have an indirect fiscal function? Is this a recent development?

At the start of the euro, most signers of the Maastricht treat thought that it implied that the ECB could not buy government debt, period. From the start, though, the ECB allowed banks to borrow from it with government debt as collateral, in repurchase agreements. They rationalized this by saying that they never owned the government debt — their asset was the repo loan, which was owed to them by the private bank on the other side of the repo. Any risk in the value of the collateral was taken by the repo borrower, except in the unlikely event that the repo defaulted. The idea that the borrowing bank and the government debt collateral would default at the same time was treated as nearly impossible. It no longer seems so impossible.

As you note, recently the ECB has bought Euro-area government debt on the open market, just not directly from governments. Obviously this makes the constraint vacuous. Some of the parties to the original treaty,

particularly Germany, object to this. To the extent that the ECB does this, its balance sheet starts to depend on the value of the government debt it holds, and this generates the same sort of monetary-fiscal interactions we see in other countries, except that the ECB interacts with many Treasuries, not one.

- (c) The ECB's website also says that it will take government bonds as collateral. Is this a recent development?

It has been taking government bonds as collateral in repurchase agreements from the beginning.

- (d) How may inflation result from the ECB putting a floor on government debt?

- (e) It would "put a floor" on Euro area government debt by standing ready to buy arbitrary amounts of it for euros, at some reasonable interest rate (i.e. bond price). Possibly this would immediately stop the panic, bring down interest rates, and not require much in the way of purchases by the ECB. But if instead the market was not calmed, the ECB could end up holding most of the government debt, and in the process greatly expanding its reserve balance liabilities. Again, this might not be inflationary if the ECB paid interest on reserve deposits and the governments paid all, or nearly all, of what they owed in interest on the bonds to the ECB. But if it turned out that Italy and Spain were really insolvent, so that they could not pay interest at market rates on all the debt held by the ECB, while the ECB to avoid inflation needed to pay market interest rates on reserve deposits, the ECB could be in balance sheet trouble. Then, in the absence of fiscal backing, it might need to lower the rates it paid on reserves and, because its assets would have lost value, it might have limited ability to contract reserves by selling off assets. Then inflation could result: holders of the low-interest reserve balances would be trying to lend them out, thereby stimulating economic activity and ultimately inflation.

- (4) How would suspending convertibility manifest itself in the $b_t = E [\sum \tau_{t+s} / (1 + \rho)^s]$ equation?

Suppose we were on the gold standard and in equilibrium with

$$b_t = \sum_{s=1}^{\infty} \frac{\tau_{t+s}}{(1 + \rho)^s}.$$

We now run into trouble — a war or earthquake, say — that means τ_t will have to be lower at $\tau_{t+s}^* < \tau_{t+s}$ for k years, but then can go back to its previous level. The discounted present value formula then means the current debt will have a lower real value from now until $t + k + 1$, but after that will revert to its previous

value, at which point convertibility can be restored. In the meantime, the debt will trade at a discount. To understand how this works in the bond market, we have to introduce Q_t , the price of the government paper in terms of gold during the period of suspension. The bonds will trade at a discount, because of their inconvertibility. The market value of the bonds at t will be $Q_t b_t$, where b_t is now the face value of the newly issued bonds in terms of gold. The valuation formula will be

$$Q_t b_t = \sum_{s=1}^{\infty} \frac{\tau_{t+s}}{(1+\rho)^s},$$

consistent with the budget constraint in terms of gold,

$$Q_t b_t = R_{t-1} \frac{Q_t}{Q_{t-1}} Q_{t-1} b_{t-1} - \tau_t.$$

Assuming perfect foresight, as the date of restored convertibility approaches, Q_t increases toward one. This means that those who buy the bonds at a discount are getting capital gains, in addition to interest. Under perfect foresight the real rate of return on bonds has to be $1 + \rho = R_t Q_{t+1} / Q_t$, so the government will offer the bonds at rates $R_t < 1 + \rho$ during the period of inconvertibility. The face value of the bonds therefore grows no faster than it would have under convertibility, even though τ_t^* is lower, so by the time of restoration of convertibility, b_{t+k} is back to being the discounted present value of primary surpluses, measured in gold.

- (5) There was an additional question, asking for more explanation in precept of the Leeper active/passive fiscal policy setup, and we will be doing that.