

Wealth Effects, Government Budget Constraints, and Ben Bernanke

EC6012 Lecture 8

Stephen Kinsella*

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1 Introduction

This lecture extends and expands on the IS-LM approach derived in lectures 1 and 2, showing interesting and simple extensions to the IS-LM framework to try to understand what we're seeing in the current macroeconomic situation.

1.1 Quick recap

Recall the IS-LM setup from lecture 1. The IS curve describes the goods market equilibrium. The LM Curve shows choices between liquid assets and illiquid assets [Turnovsky, 1995], [Hicks, 1937]. We assume the money supply is supplied by Central Bank, and that the level of M is exogenously given. The simple IS-LM is shown in Figure 1.

2 Bernanke-Blinder Model

Bernanke and Blinder [1988] build a variant of the IS-LM model. Their model is simple, elegant, and has relevance for the stagflation we might be seeing in the US and EU economies today.

2.1 Setup of the BB model

Recall what the LM curve is supposed to do: it defines a portfolio balance condition for a two asset world, where asset holders have to choose between liquid money and interest bearing assets like bonds. The Bernanke-Blinder (BB) model extends the simple IS-LM world by considering convertibility of money, bonds, and loans.

The loan market is built by assuming borrowers and lenders choose between bonds and loan according to an interest rate differential on the two instruments, so if ρ is the interest rate on loans and i is the interest rate on bonds, then loan demand will be

$$L^D = L(\rho, i, y). \tag{1}$$

*Department of Economics, Kemmy Business School, University of Limerick, Ireland. Email: stephen.kinsella@ul.ie, www.stephenkinsella.net

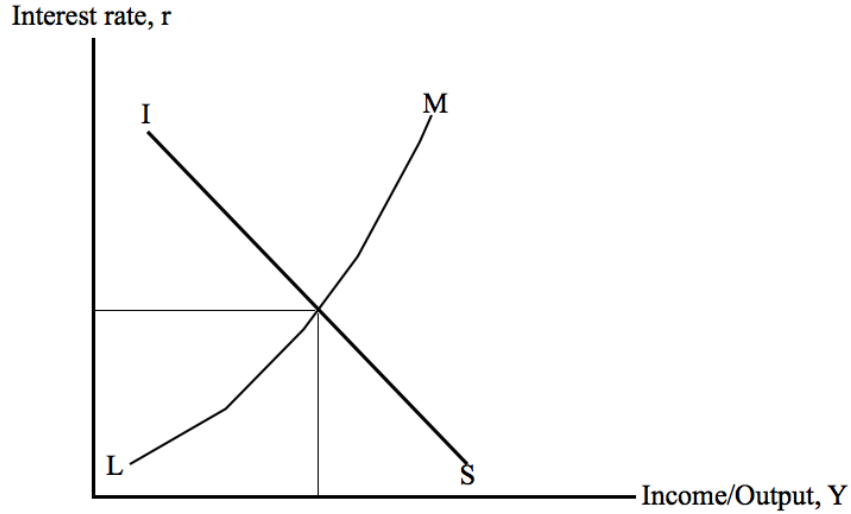


Figure 1: Equilibrium in the IS-LM model

The condition for clearing the market for loans will be

$$L(\rho, i, y) = \lambda(\rho, i)D(i - \tau), \quad (2)$$

Where τ is the reserve ratio. τD is the level of required reserves. If R is the level of actual reserves in the system, then the supply of deposits must equal the stock of bank reserves, $Rm(i)$, where $m(i) = [\epsilon(i)D(1 - \tau)]$. All of this is captured in equation 3 below:

$$D(i, y) = m(i)R \quad (3)$$

Finally, the goods market is the standard IS curve, which Bernanke and Blinder write as

$$y = Y(i, \rho) \quad (4)$$

2.2 BB Solution

Substitute equation 3 into 2 to replace $D(1 - \tau)$ with $(1 - \tau)m(i)R$. Now solve for ρ as a function of i, y and R to get

$$\rho = \theta(i, y, R) \quad (5)$$

Now substitute 5 into 4 to get

$$y = Y(i, \theta(i, y, R)). \quad (6)$$

Equation 6 is called the CC curve. Graphically it looks like figure 2 below.

The BB model is affected in the following ways by different shocks:

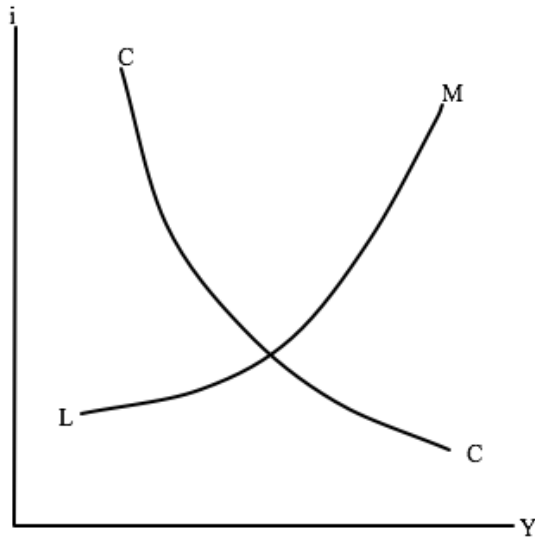


Figure 2: Bernanke-Blinder Model Equilibrium.

Rise in	Income	Money	Credit	Interest Rate on bonds
Bank Reserves	+	+	+	-
Money Demand	-	+	-	+
Credit Supply	+	+	+	+
Credit Demand	-	-	+	-
Commodity Demand	+	+	+	+

Table 1: Effects of Shocks on Observable Variables. [Bernanke and Blinder, 1988, pg. 438.]

Exercise 1 (Manipulating the BB model) Suppose a central bank engages in open market operations and decreases the level of bank reserves R . Show graphically how this affects output Y . Give an intuitive explanation, making sure to distinguish between the interest rate channel and the bank lending channel.

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3 Wealth Effects and the Government Budget Constraint: SILLY ABCD

Conventional wisdom holds that stimulative fiscal policy is ineffective unless it's accompanied by an increase in the money supply, which is inflationary. The financing of the government's expansion must either come from printing money, raising taxes, or borrowing. The government deficit, we assume, will be financed by issuance of bonds to the private sector, thus raising the private sector's

wealth. The demand for money is an increasing function of wealth, so demand will expand, assuming a fixed money supply. The rate of interest will rise for all income levels, counteracting the spending stimulus. There will be a new equilibrium level of income, Y , but at higher interest rates, i . All very logical, unfortunately, wrong.

Here's a simple model, called the SILLY ABCD model, from ?, pp. 477–483 which contradicts the logic of the preceding paragraph.

3.1 Setup

The Keynesian IS-LM model in linear form is given by:

$$S = a + bY + ci, \quad a > 0, \quad b, c > 0 \quad (7)$$

$$I = d + eY + fi, \quad d, e >, \quad f < 0 \quad (8)$$

$$L = \alpha + \beta Y + \gamma i, \quad \alpha, \beta > 0, \quad \gamma < 0 \quad (9)$$

Let i_T be the minimum or liquidity trap level of the interest rate, let i_e be the equilibrium level of the interest rate. Let Y_F be the full employment level of income, and Y_e the equilibrium level of income.

The equilibrium conditions are $I = S$, and $L = M$, where M is fixed. The interpretation of the coefficients are pretty standard: a is dissaving at zero income; d is autonomous investment; b and e are marginal propensities to save and invest; c and f show the influence of interest rates on saving and investment. α is autonomous demand for money; β is the transactions demand for money; and γ is the speculative demand for money.

3.2 Solution

We need to find the goods market equilibrium, so solve for i in terms of Y to produce

$$i_{is} = \frac{d - a}{c - f} + \left(\frac{e - b}{c - f} \right) Y. \quad (10)$$

The LM curve can be solved for by holding the money stock constant, as:

$$i_{LM} = \frac{M - \alpha}{\gamma} - \frac{\beta}{\gamma} Y. \quad (11)$$

The equilibrium conditions are then given by

$$Y_e = \frac{(c - f)(M - \alpha) - \gamma(d - a)}{\gamma(e - b) + \beta(c - f)} \leq Y_F \quad (12)$$

and

$$i_e = \frac{(b - e)(M - \alpha) - \beta(d - a)}{\beta(f - c) + \gamma(b - e)} \geq i_T \quad (13)$$

Assuming $b > e$, the equilibrium looks like figure ??.

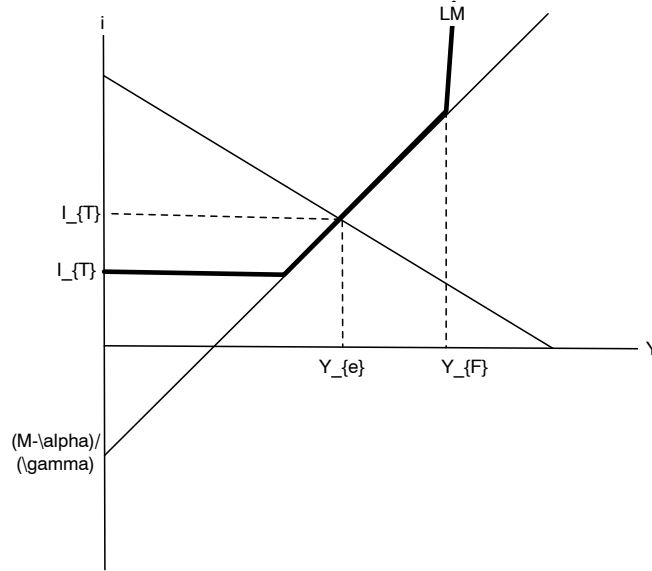


Figure 3: Nell's ISLM.

Now let's get a little funky. The introduction of a government should make things more interesting, and allow us to say things about the current situation in Ireland.

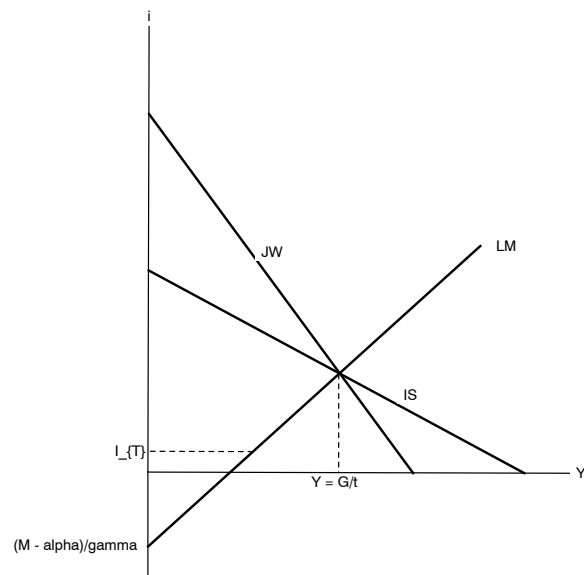
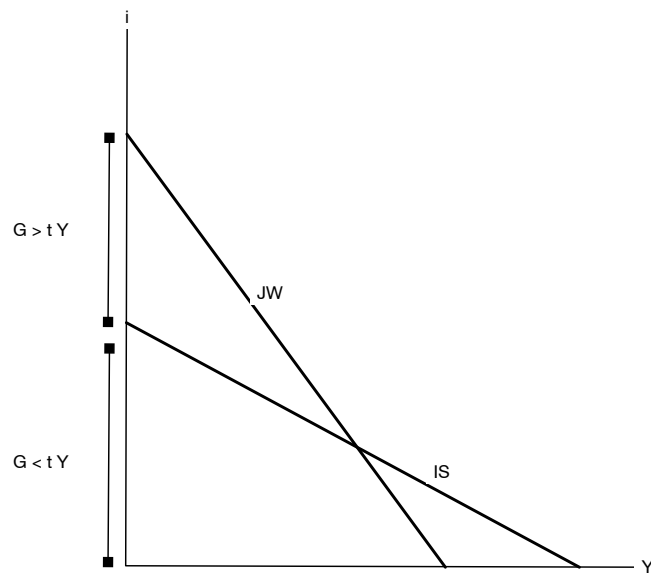
Introducing a government sector via government expenditure implies including G in our equations. Now how is this government to be financed? The government here takes its taxes from income, Y in a fixed rate, t . The government thus 'injects' and 'withdraws' capital from the system at different times. We can define the JW equation as

$$i_{JW} = \frac{G - tY}{c - f} + \frac{d - a}{c - f} + \left(\frac{e - b - t}{c - f} \right) Y. \quad (14)$$

The relationship between the injection withdrawal equation is really cool, as figure 3.2 shows.

The figure shows the interaction of the IS curve and the JW curve. At the locus, when $G = tY$, $i_{JW} = i_{IS}$ and $Y_{JW} = Y_{IS}$. When $G > tY$, the government has a deficit but the private sector has a surplus, and vice versa. Plugging in the LM curve again shows us that the government deficit/surplus has nothing to do with the choice of interest rate, and we find equilibrium at one point only, as shown in figure 3.2.

Exercise 3 (Shifts in JW-LM) *Suppose an exogenous disturbance causes the LM curve to shift out and down. A surplus will emerge. The Instead of borrowing, the government will be lending in the open market. By symmetry, this lending, which is buying bonds, will reduce private sector wealth, and will reduce the private sector's demand for money. What way will the LM will shift now, and why?*



References

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