Week Two

EPA143A

NEOCLASSICAL MACROECONOMICS: ANSWERS

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Required readings:

- S. Storm. 2017. A critique of the loanable funds approach. (Posted on Brightspace)
- EPA143A LECTURE NOTE W-2.

Supplementary video:

- The market for loanable funds: https://www.youtube.com/watch?v=ztGksVnQahQ
- The market for loanable funds: https://www.youtube.com/watch?v=iaGjqkRIUSk

ANSWERS

EXERCISE **W-2.1**:

1. An increase in labour supply means that the curve for L^S shifts to the right. The labour demand curve does not change or shift. The real wage goes down → labour demand by firms increases → until $L^S = L^D$ again. Employment increase and full employment of labour is maintained through a flexible downward adjustment in the equilibrium real wage. The neoclassical circular flow of income continues to operate at full employment/ full capacity.

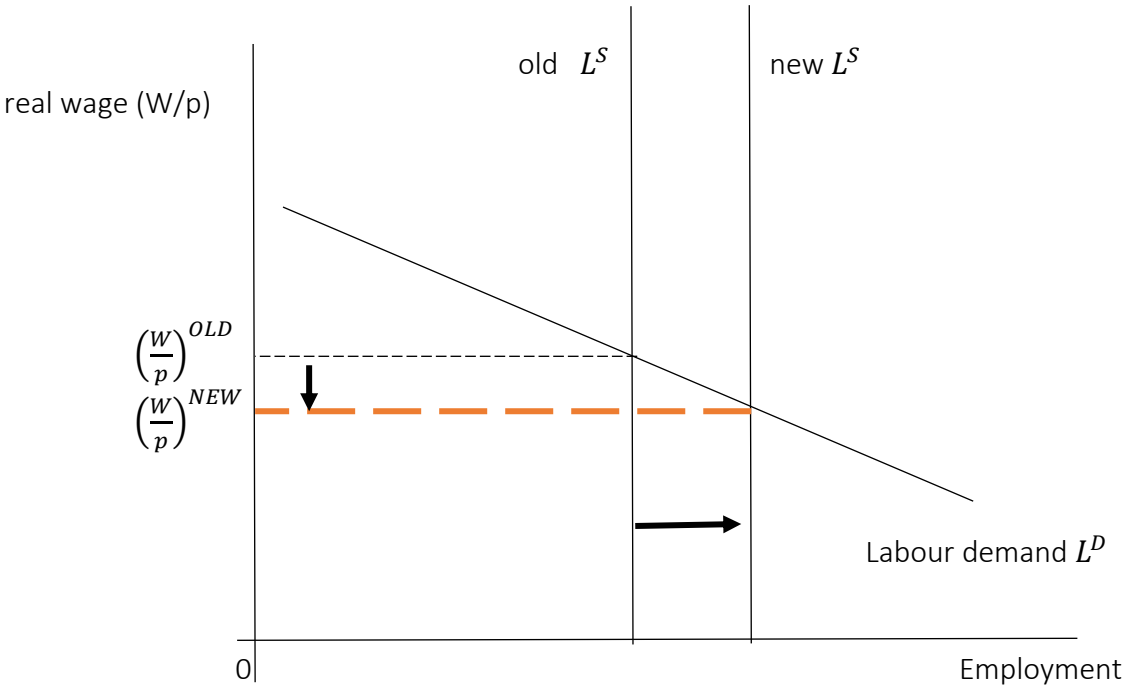


Figure 1: The Neoclassical Labour Market: increase in L^S

2. In this economy, the real wage is 'fixed' by centralized bargaining. It is no longer flexible and therefore no longer capable of 'clearing' the neoclassical labour market. Let us consider what happens. First, we can observe that $\left(\frac{W}{p}\right)^B > \left(\frac{W}{p}\right)^*$, the bargained real wage is higher than the equilibrium real wage. Firms must pay $\left(\frac{W}{p}\right)^B$ (and cannot undercut this wage); hence, L^D will be equal to L^{DB}. Labour supply does not change. Hence, labour supply is larger than labour demand and the difference $L^S - L^{DB} =$ unemployment (in millions of workers). Hence, wage bargaining in this economy led to a bargained real wage higher than the equilibrium real wage and thus created

unemployment. There are two ways to restore full employment: (A) abolish centralized wage bargaining and let the invisible hand generate a full-employment equilibrium at $\left(\frac{W}{p}\right)^*$; or (B) ensure that the wage bargaining process also takes (full) employment into consideration and produces a lower bargained wage $\left(\frac{W}{p}\right)^B = \left(\frac{W}{p}\right)^*$. Clearly, options (A) and (B) have the same outcome.

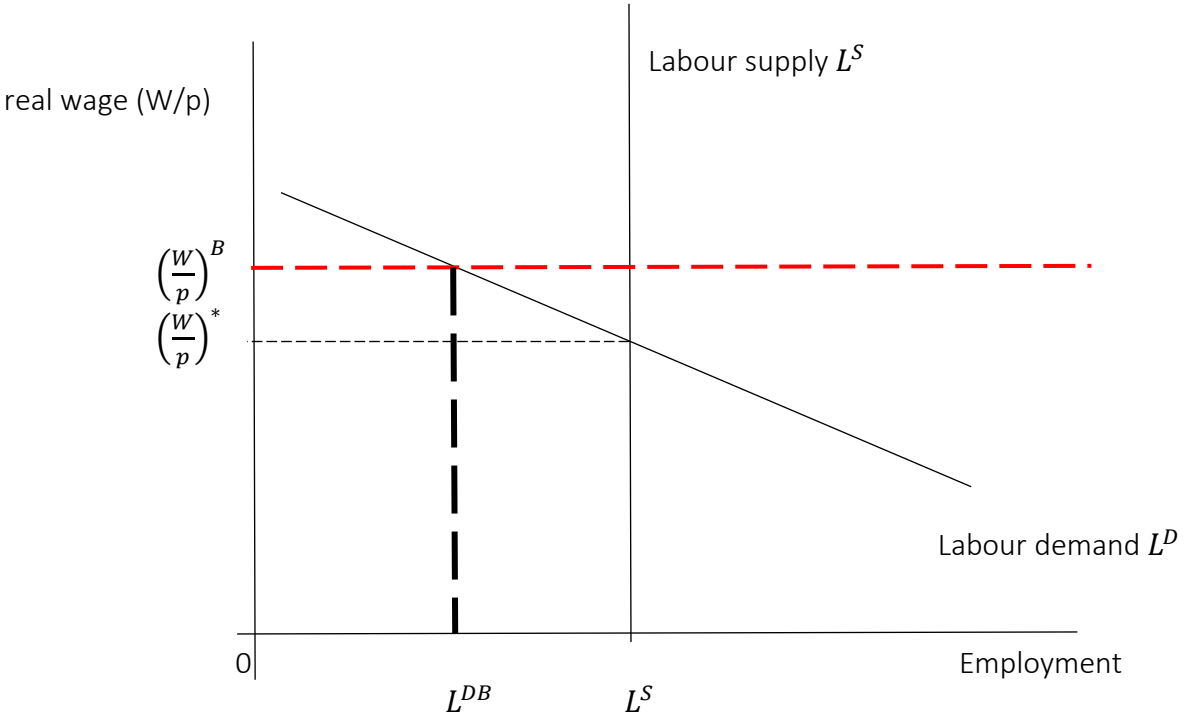


Figure 2: The Neoclassical Labour Market with Collective Wage Bargaining

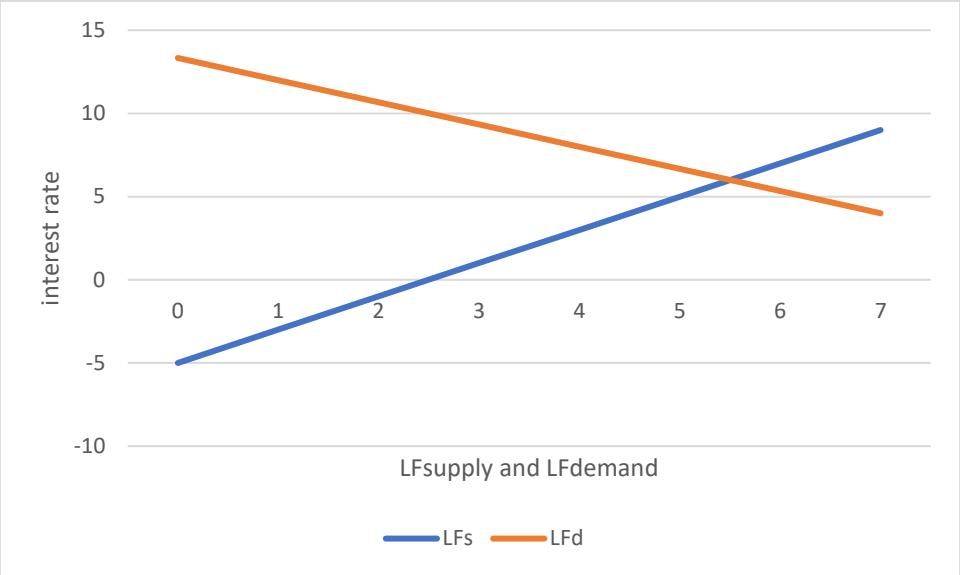
EXERCISE W-2.2:

1. We calculate the equilibrium interest rate *r** as follows:

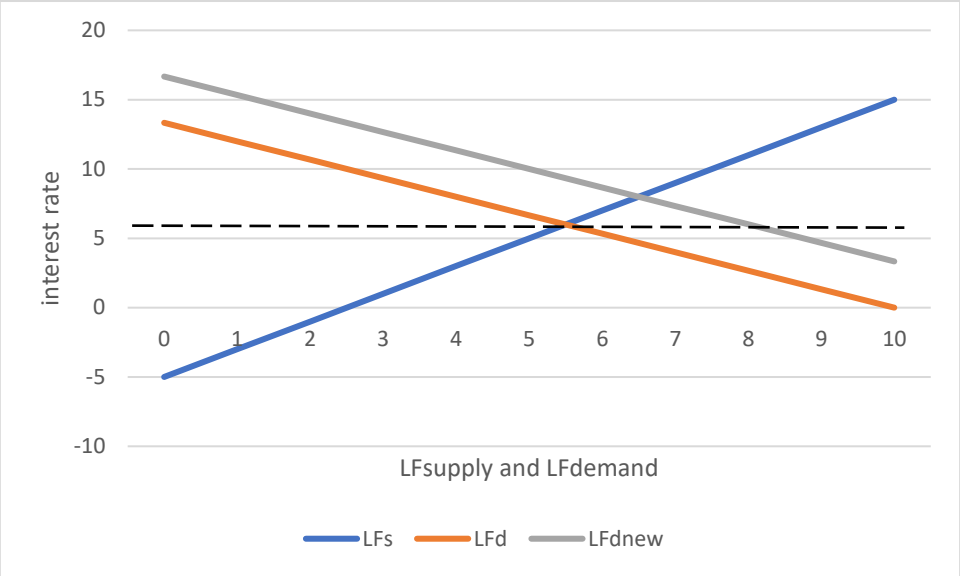
$LF^S = 2.5 + 0.50\,r = LF^D = 10 - 0.75\,r \rightarrow$

$1.25\,r = 7{,}5 \rightarrow r^* = 6.0\% \rightarrow LF^S = LF^D = 5.5$ billion euros.

This is the graph:

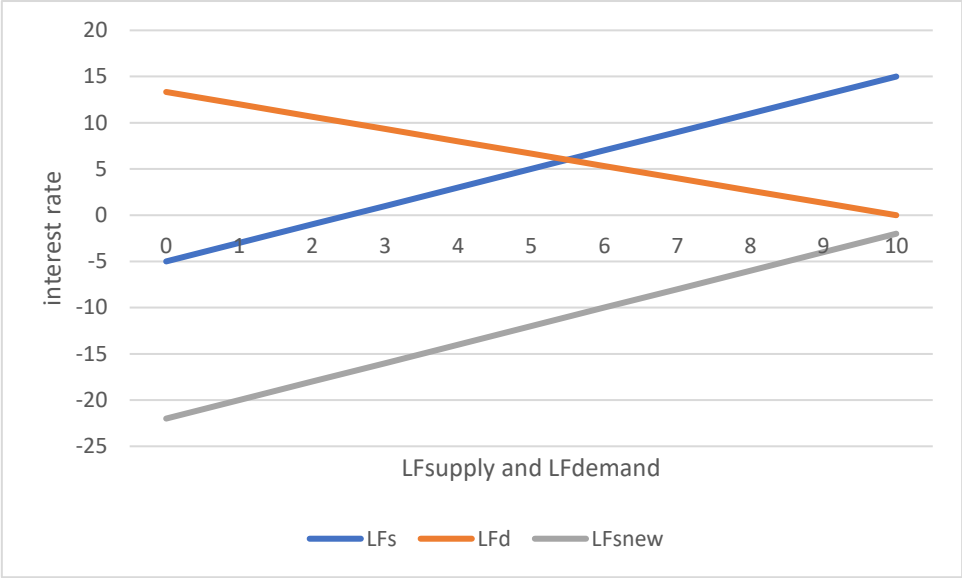


2. The LF-supply curve is upward-sloping, because savings (which is equal to the supply of loanable funds deposited in banks) are a positive function of the real interest rate. This means that households and firms will increase their savings in response to an increase in the real interest rate; the "return" to depositing savings in banks is higher → the propensity to save will be higher.
3. The LF-demand curve is downward-sloping, because business investment (which together with public investment makes up the demand for loanable funds, or bank loans) are a negative function of the real interest rate. This means that firms will reduce their investment (by postponing or cancelling their investment plans) in response to an increase in the real interest rate; the "cost" to borrow money from banks is higher → this negatively affects the expected returns from investment → investment is reduced.
4. The new function for the demand for loanable funds is $LF^D = 12.5 - 0.75\,r$. We can see that the "constant term" has increased from euro 10 billion to euro 12.5 billion. This means that the government has decided to increase public investment by euro 2.5 billion. Public investment is assumed to be non-sensitive to the real interest rate – and hence is included in the constant term.
5. The new equilibrium interest rate *r** is 8%. $LF^S = LF^D = 6.5$ billion euros. The new equilibrium interest rate is higher because the first impact of the increase in public investment is an increase in LF^D. The LF^D-curve shifts to the right – and becomes LF^{DNew} . In the old equilibrium, banks were <u>fully loaned up</u>, *i.e.* $LF^S = LF^D = 5.5$, and they cannot issue new loans. In response to the <u>excess demand for loanable funds</u> $LF^{DNew} > LF^S$, banks raise the (real) interest rate. The higher interest rate induces higher savings (*i.e.* we move up along the LF^S-curve.

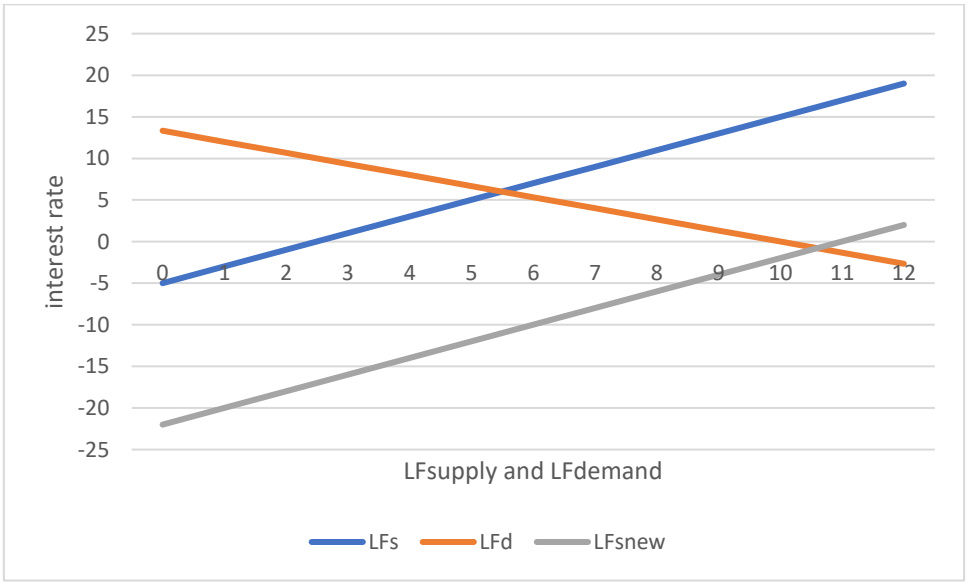


6. The fiscal stimulus did lead to <u>crowding out</u>. This can be seen in a straightforward manner. We know that public investment was raised by euro 2.5 billion (see question 4). Loanable funds demand (which was euro 5.5 billion) rises by euro 2.5 billion. We would expect new LF^D to equal euro 8 billion. But in the new equilibrium, $LF^S = LF^D = 6.5$ billions of euros. Hence, the difference of – 1.5 billion of euros must be due to crowding out. Crowding out happens, because banks are (assumed to be) fully loaned up and in response to the excess loan demand decide to increase the interest rate from 6% (before) to 8% (after the fiscal stimulus). The higher interest rate raises savings (or LF^S), but reduces business investment (or LF^D).

7. $LF^S = 10 + 0.50\,r$. The new equilibrium real interest rate r^*= 0%. Why is it lower than before? It is lower because the banks receive a large inflow of (foreign) loanable funds. The LF^S-curve shifts (far) to the right – see the graph below. Equilibrium in the loanable funds market is reached at the zero-lower bound.



8. Now the equilibrium real interest rate become negative. The real interest rate is equal to the difference between the nominal interest rate and the inflation rate. Let us assume that inflation is zero; this means that the real interest rate = the nominal interest rate. Let us further assume that the nominal interest rate can not be negative. In this case, the real interest rate cannot be negative, but remains stuck at 0%. Loanable funds demand (= investment) at 0% is euro 10 billion; loanable funds supply (= savings) at 0% is euro 11 billion. Savings > investment and hence there is a net leakage out of the circular flow of income. The neoclassical economy cannot and does not operate at full employment, but at a level of activity below full employment. There will be unemployment.



EXERCISE W-2.3

1. Keynes pointed out – correctly – that savings and investment do not just depend on the real interest rate, but also (and perhaps more strongly) on the level of income. The level of real income *y*, in turn, depends on investment: an exogenous rise in public or business investment will lead to an increase in real GDP and an increase in savings (households save a fixed proportion of their real incomes). In terms of the graph for the market of loanable funds, this would mean two changes. First, due to the exogenous increase in investment, the LF^D-curve will shift to the right. Second, because investment leads to higher real income and therefore higher savings, LF^S-curve will simultaneously shift to the right as well. According to Keynes, the two curves are inter-dependent – and there cannot be a shift in either the LF^S-curve or the LF^D-curve alone.

2. In the neoclassical model, banks are not money-creating institutions. Banks must first attract or mobilize deposits (= savings, deposited by households in their bank accounts) before they can give loans. Banks will try to attract additional savings by increasing the interest rate (in a situation in which there exists an excess demand for loanable funds). Banks are pure intermediaries – between 'savers' and 'investors'. This also means that investment is constrained by the availability of loanable funds or savings. In this sense, the neoclassical model is a savings-constrained model: higher savings will always lead to higher investment (via lower real interest rates), and higher investment will lead to higher growth (in future).

3. The Global Savings Glut Hypothesis: in the past 25 years or so, global savings have considerably increased for two reasons. First, savings increase due to the ageing of the population (more people save for their retirement). Second, global savings have increased especially because people in Asia (China) have become richer and are saving more (to pay for the education of their children and for retirement). A big part of these (Asian) savings has been deposited in U.S. banks and U.S. financial firms – in terms of the loanable funds market, this inflow of foreign savings, did constitute an enormous increase in LF^S – the LF^S-curve in the U.S. loanable funds market arguably has shifted far too the right. EXERCISE W-2.2. As a result, the U.S. real interest rate has fallen to the zero-lower bound (0%). This way, the Global Savings Glut Hypothesis has been invoked to explain why U.S. interest rates were low before the financial crash of 2007-08.

4. The graph shows that global investment as a proportion of global GDP has not really changed much during 1985-2014; global investment was around 24% of global GDP in the mid-1980s and declined to 21% or in 2014. Because global investment is equal to global savings, this means that there has been no increase in global savings as a proportion of global GDP. There is no evidence of a global savings glut. However, it can be seen that the global real rate of interest did decline: from 3.5% in 1985 to zero in 2014. This suggests that the real interest is not a variable determined in the loanable funds market.

EXERCISE W-2.4

1. The monetary policy rule is: $\widehat{M^S} = \hat{p} + \hat{y}$. The ECB must keep inflation $\hat{p} \leq 2\%$. If real GDP growth is 2.5% next year (scenario A), then we get: $\widehat{M^S} = \hat{p} + \hat{y} = 2\% + 2.5\% = 4.5\%$. Money supply should increase by no more than 4.5%. In scenario B, we get: $\widehat{M^S} = \hat{p} + \hat{y} = 2\% + 1.75\% = 3.75\%$. Money supply should increase by no more than 3.75%.

2. When the ECB engages in open-market operations, it buys or sells (government) bonds in the (secondary) bonds markets. Primary bonds are new bonds issued by government; the secondary bonds market is where one can sell the primary bonds one did buy earlier, or buy bonds from other bond investors. If the ECB buys bonds, it pays using newly created money; money supply increases. If the ECB sells bonds and we are buying those bonds, we pay money to the ECB; this money is taken out of circulation (and is placed on the ECB balance sheet); it is no longer part of money supply (= defined as money in circulation).

3. The classical dichotomy refers to the neat and complete separation that exists in neoclassical macro theory between the real sphere (the circular flow of production → income → demand → production) and the monetary sphere (the money market). In the neoclassical model, money is neutral, which means that the price level *p* (or the growth of the price level, inflation) does not have an impact on what happens and is decided in the real sphere. Intuitively, this can be understood as follows. The market-clearing price in the labour market is the real wage (*W/p*), which is a relative price; the market clearing price in the loanable funds market is the real interest rate; *etc*. Suppose *p* = 1 initially, but then doubles to *p* = 2. Clearly, the real wage (*W/p*) will be halved, and profit-maximising firms would hire more workers; labour demand goes up, but labour supply is exogenous and fixed; accordingly, the nominal wage *W* will rise (because there is an excess demand for labour), and hence the real wage will rise as well – until it is back at its initial level. The same process occurs in the loanable funds market. Suppose the price level increases by 10% to *p* = 1.1. The real interest rate will decline; LF-supply by savers will go down as a result, while LF-demand by firms will go up. There arises an excess demand for loanable funds, and hence, the nominal interest rate will rise, due to which the real interest rate will increase – until it is back at its initial level. Ergo: the level of *p* is immaterial to the real sphere of the economy. This is the classical dichotomy. Keynes rejected it (as we shall see): in his theory, money is always non-neutral; there is no dichotomy between real and monetary spheres.

4. According to the neoclassical approach, the macro-economy will converge to a full-employment equilibrium. This outcome will – in this theory – prevail in the long run (there can be deviations from full-employment in the short run, but in the long run, market forces will push the economy back to full employment). This would mean that the growth of real GDP $\hat{y}$ converges to a steady state. If we assume that this is the case,

then it follows from $\hat{p} = \widehat{M^S} - \hat{y}$ that if $\widehat{M^S}$ increases, $\hat{p}$ must increase as well, and *vice versa*. This is not what see in Figure A. In the 1980s, $\widehat{M^S}$ stays high, but $\hat{p}$ goes down; and during 1995-2003, $\widehat{M^S}$ goes up, but $\hat{p}$ stays down (at 2% or so). Graph A shows that there is no stable relationship between $\widehat{M^S}$ and $\hat{p}$. This is not consistent with neoclassical theory.