The Supply of Loanable Funds: A Comment on the Misconception and Its Implications

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ABSTRACT

Recently Fields-Hart publish two articles on interest rate determination in this journal. In both articles, they analyze interest rates on the basis of an unconventional definition of the supply of loanable funds. In this note we argue that their concept of the supply of loanable funds based on "spillover from the money market" is a gross misunderstanding of the concept. Although Fields-Hart considered their concept as "critically important part of their story," the results in their first article are independent of this mistake. However, their second article continues this misconception and hence yields invalid results.

Introduction

Leading introductory macroeconomic textbooks typically present two approaches to interest rate determination –the Liquidity Preference (LP) approach[1] and the Loanable Funds (LF) approach.[2] In the LP approach, the equilibrium interest rate is determined in the money market where quantity of money demanded by the people equals the quantity of money supplied by the central bank. In the LF approach, the equilibrium interest rate equates the quantity supplied of LF, which consists of saving (s), with the quantity demanded for LF, which consists of investment (i) and bond financed government deficit (g – t). It is implicit in the textbooks that both the approaches lead to the same short-run and long-run equilibrium interest rates, and the results are independent of the choice of approach.

The IS-LM model for interest rate determination is introduced only in the upper level textbooks, and is widely used in the fields of applied economics. But that does not diminish the importance of LF model. In fact, in the field of public finance, LF model has distinct advantages over IS-LM model as "LF model highlights direct connection between federal borrowing and interest rate, whereas the IS-LM model only shows this connection indirectly."[3] Cebula (1997), Hoelscher (1983, 1986), Koch & Cebula (1994), Thomas & Abderrezak (1988), and Tran & Sawhney (1988) are only a few who used LF model to examine the effects of government borrowing on short-run and/or long-run interest rates. Cebula (1997), Koch & Cebula (1994), and Tran & Sawhney (1988) also used the extended open economy version of the LF model where capital flows are incorporated in the supply side of the loanable funds. A wide application of LF model in applied economics fields emphasizes the important of teaching the LF model correctly.

Recently Fields and Hart, hereafter F&H, published two articles in the Journal of Economics and Finance Education on the modeling of interest rate determination. The first article (2003) introduces an unconventional definition of the supply of LF and concludes that the interest rate in the immediate-run is determined either in the LF market or in the money market, but not both. In other words, in the immediate-run, if the interest rate is determined in the LF market, then the money market cannot be in equilibrium. However, if the interest rate equilibrates the money market, the LF market will no longer be in equilibrium in the immediate-run. Here, the immediate-run is defined as a situation where either the money or the LF (goods) market is in equilibrium *at constant output.* In both the articles, F&H refer to this situation as

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[1] Also known as the Keynesian theory of interest rate determination
[2] Also known as the classical theory of interest rate determination
[3] Hoelscher (1983), p. 321

short-run. It is important to note that F&H definition of short-run is different from that of a standard textbook definition, which necessitates the introduction of the concept 'immediate-run.'

In their second article, F&H (2005) introduce a constant-price IS-LM-LFM model in response to the Yang and Yanochik (2005) article that emphasizes a constant-price IS-LM model for short-run[4] interest rate determination. They also reaffirm their previous results of immediate-run interest rate determination. More significantly, however, the F&H (2005) article explains their preference for the LF approach over the LP approach with the notion that the "spillover from the money market" generates a LF market separate from the goods market.

In this paper, we begin with the F&H (2003) depiction of the supply of LF. We identify an error in their representation of the supply of LF, and demonstrate that when their misconception of the supply of LF is corrected, no distinction between the goods and the LF markets exists. The implications of correcting this misconception are then addressed by reexamining the three policy shocks F&H (2005) considered.

Supply of Loanable Funds According to F&H

When analyzing the immediate-run interest rate, F&H (2003) begin with standard textbook figures of the LP and the LF approaches. Following Gwartney, Stroup, Sobel, and Macpherson (2003), they present figures of these two approaches side by side to make the comparison easy to understand. To capture their understanding of the supply of LF through "spillover from the money market," we present the LP approach in Figure 1 where the real money supply, M/P, is independent of the interest rate and, hence, is vertical. In contrast, real money demand, k(r).y,[5] is a downward sloping curve representing the fact that the quantity of real money balance demanded rises as the opportunity cost of holding money falls.

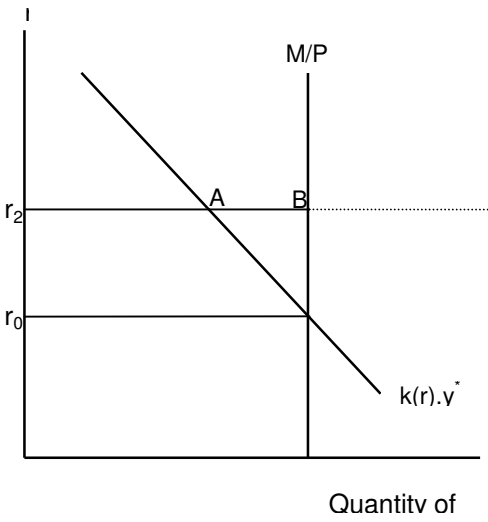

Figure 1

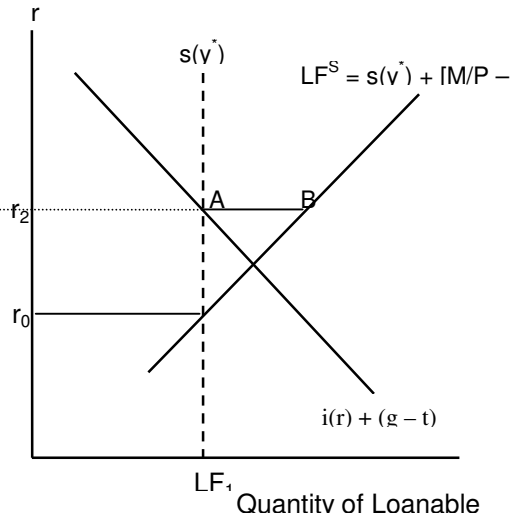

Figure 2

The LF approach is depicted in Figure 2. In the classical model, saving is taken to be a positive function of the interest rate. For simplicity, F&H (2003) assume that saving, s, depends only on income and not on the interest rate. As a result, the saving function is a vertical line denoted by s(y)* in Figure 2. Algebraically, they formulate the supply of LF curve as $LF^S = s + [M/P - k(r).y]$ where $[M/P - k(r).y]$ is the quantity of excess money supplied at a given interest rate. At r_0 in Figure 1, the quantity of real money demanded is the same as the quantity of real money supplied, which makes excess quantity of money supplied equal to zero.

[4] Short-run is defined as a situation where both the goods and the money markets are in equilibrium

[5] F&H's chosen representation of the real money demand is: $m^d = m^d(r, y)$. We prefer to write real money demand as k(r).y following the revised quantity theory of money.

The quantity of LF supplied in this case is the same as the amount of saving (see Figure 2). At a higher interest rate, r_2, the quantity of excess money supplied is positive. According to F&H (2003), this amount spills over into the LF market increasing the quantity of LF supplied by the amount of the excess money supply. In their words:

"Therefore, absent any spillover from the money market, the supply of loanable funds would be the (dashed) vertical line at LF_1, denoted s. However, the supply of loanable funds, ---- is upward sloping when plotted against the interest rate. The reason is that a (*ceteris paribus*) increase in the interest rate results in an excess supply in the money market that spills over into the market for loanable funds. The result is an increase in the loanable funds supplied as the interest rate increases. Similarly, a decrease in the interest rate lowers the quantity of loanable funds supplied as economic agents attempt to build up their real money balance."[6]

As the interest rate rises from r_0 to r_2, the quantity of excess money supplied is equal to the distance AB (Figure 1). According to F&H (2003), this quantity represented by the distance AB will spillover into the LF market increasing its quantity supplied of LF by the same amount; thereby, resulting in an upward sloping supply of LF curve.

Misconception about the Supply of Loanable Funds

Saving, which classical economists call the supply of LF, provides the demand for bonds. Saving is the amount of foregone current consumption for future consumption. Savers earn interest returns from bonds, which give them greater command over future consumption. But all saving need not go into bonds; saving is also held in the form of money. Since money does not earn interest, classical economists assume that savers will prefer bonds over money. However, people also hold some money as it provides liquidity and security. In other words, people usually save in two different forms – bonds and money, both of which are channeled into the supply of LF either directly through bonds market or indirectly through lending institutions. Mankiw (2007)[7] explains it eloquently:

"The supply of loanable funds comes from people who have some extra income they want to save and lend out. This lending can occur directly, such as when a household buys a bond from a firm, or it can occur indirectly, such as when a household makes a deposit in a bank, which in turn uses the funds to make loans. In both cases, *saving is the source of the supply of loanable funds*."

The composition of the supply of LF is determined by the interest rate. At a higher interest rate, people will hold more bonds and less money. The major misunderstanding on F&H's part is not to realize that as the interest rate increases people only change the composition of their saving (*ceteris paribus)*, and not the absolute amount of saving *when saving depends only on income*. Consequently, the saving function will still be equal to the supply of LF at all levels of interest rates.

We elaborate this point further in Figure 3 and 4. Saving is defined as the part of disposable income that is not consumed, and people allocate it between money (non interest-bearing assets) and bonds (interest-bearing assets). At the equilibrium interest rate r_0, people demand M/P quantity of money, which is the entire amount of money supplied as shown in Figure 3. However, this is only one part of saving because people also hold some bonds at this interest rate.

Suppose at interest rate r_0, the total value of bonds held by savers is B_0, so that the amount of saving at r_0 is $s_0 = M/P + B_0$. An increase in the interest rate from r_0 to r_2 increases the opportunity cost of holding money. Figure 3 shows that savers reduce their quantity of money holdings by the amount of the distance AB, and use that quantity of money to buy bonds. F&H (2003) explain how an increase in the interest rate results in an excess supply in the money market that spills over into the market for loanable funds, thereby increasing the supply of LF. In reality, a change in the interest rate changes only the *composition* of interest-bearing and non interest-bearing asset holdings, which keeps the quantity of saving, and by extension, the quantity of loanable funds supplied constant at s (y) in Figure 4. In other words, an increase in the interest rate results not in a spillover into the market for loanable funds but a spillover from money holding to bond holding within the supply of LF. The logic is as follows: since saving, s, does not depend on interest rate, a higher interest rate does not change the amount of saving and, hence, consumption. Given income at the potential level (y*), consumption and saving cannot change due to a higher interest rate because they depend only on income. The quantity of LF cannot increase unless saving increases, i.e.

[6] F&H (2003), p. 9
[7] Mankiw (2007), p. 208

consumption decreases for the same level of income. This confirms that saving is the only source of the supply of LF depicted in Figure 4.

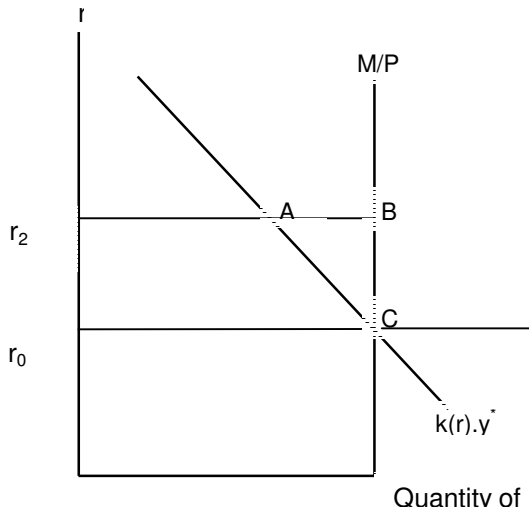

Figure3

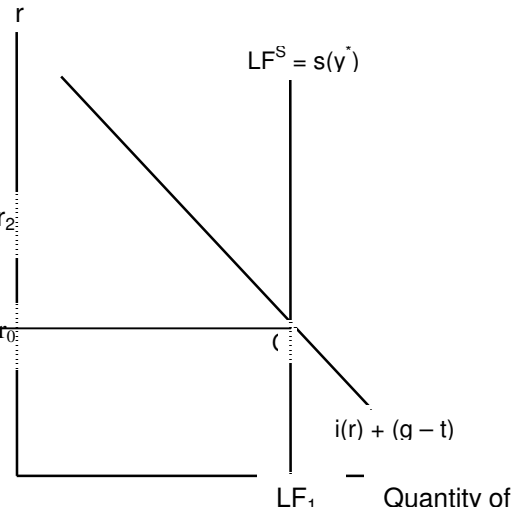

Figure4

Implications of the Misconception

F&H (2003) conclude that in the immediate-run, the interest rate can clear either the money market or the LF market and cannot simultaneously clear both the markets when the economy is out of equilibrium. Although F&H (2003) erred in defining the supply of LF, their main results remain valid with minor changes in the exposition. However, this is not the case with their second article. In a reply to the Yang and Yanochik (2005) article that emphasizes the constant-price IS-LM model, F&H (2005) introduce a constant-price IS-LM-LFM model for both short-run and immediate-run interest rate determination. Their LFM curve is unconventional and needs elaboration.

F&H (2005) use the standard IS and LM curves to represent goods and money markets equilibrium combinations of output and interest rate. However their LFM represents a third market that they call the "market for loanable funds." Equilibrium in this market "occurs when the supply of loanable funds, LF^S {i.e., desired saving, s(y - t), plus the excess supply of money, $[m^S_1 - m^d (y, r)]$}, equals the demand for loanable funds, LF^d [i.e., investment, i(r), plus the bond financed government deficit, (g - t)]. Algebraically, this equilibrium condition is: $s(y - t) + [m^S_1 - m^d (y, r)] = i(r) + [g - t]$."[8]

This equation determines their LFM curve. When the definition of the supply of LF is corrected where s(y) is the only source of the supply of LF, the equilibrium condition in the LF market reduces to:

$s(y - t) = i(r) + [g - t]$.

Substituting the value of $s(y - t)$[9] with $y – c(y – t)$, we get $y – c(y – t) = i(r) + [g – t]$

or $y = c(y – t) + i(r) + [g – t]$, which is the same as the goods market equilibrium condition (the IS curve).[10] In reality, F&H's (2005) LFM curve coincides with the IS curve which means the goods market can also be referred to as the LF market.

[8] F&H (2005), p. 14.
[9] Saving s(y) is defined as the amount of output (y) over consumption c(y – t)
[10] F&H (2005) also recognizes this fact, p. 13 footnote.

Implications of Correcting the Misconception

Our finding requires a reexamination of the F&H (2005) results. Following F&H (2005), we consider the effects of three policy shocks: (1) an increase in the money supply; (2) a bond-financed rise in government expenditures; and (3) a money-financed rise in government expenditures.

An Increase in the Money Supply

F&H (2005) conclude that the immediate-run impact of an increase in the money supply is a decrease in the interest rate (r). However, r has to decrease more to clear the money market than to clear the LF market. We show that r has to decrease to clear the money market but the LF market will still be in equilibrium at the original interest rate.

We start with an initial short-run equilibrium at point A in Figure 5 where the interest rate is r_3 and output is y*. An increase in the nominal money supply from M to M_2 will increase the real money supply from M/P to M_2/P. This increase in money supply will shift the LM curve right to LM_2 leaving the IS (LFM) curve unaffected. The new short-run equilibrium is at point D where the LM_2 and the IS curves intersect. In the immediate-run AB (the vertical shift in the LM curve) represents the amount the interest rate must fall to restore equilibrium in the money market. In Figure 5, immediate-run money market equilibrium is attained at r_0. However, contrary to the F&H (2005) conclusion, since the LF market (i.e. goods market) is independent of the increase in real money supply in the immediate-run, the interest rate r_3 will still clear the LF market at point A.

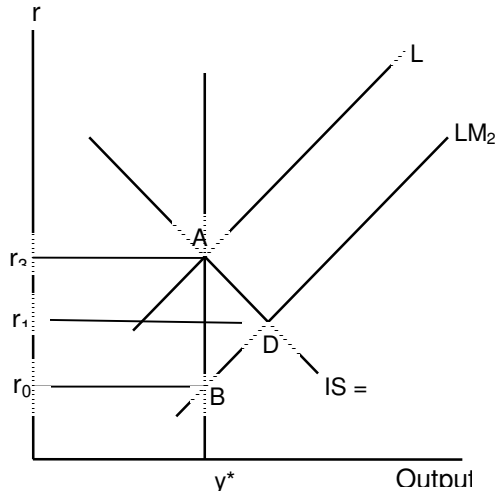

Figure 5

A Bond-Financed Rise in g

F&H (2005) show that a bond-financed rise in g increases r in the immediate-run. However, if r adjusts to clear the goods market, the interest rate rises more than if r clears the LF market. Their results are correct to the extent that r has to increase to clear the markets. However, since we have proven that there is no distinction between the goods market and the LF market, the question of two different interest rates does not arise.

We use Figure 6 to prove this point. We start with a short-run equilibrium at point A where interest rate is r_3 and output is y*. An increase in g shifts the IS curve rightward to IS_2 leaving the LM curve unaffected, and the new short-run equilibrium position is at point D. In this case, the distance AB represents the amount the interest rate must rise to restore immediate-run equilibrium in the LF (goods) market.

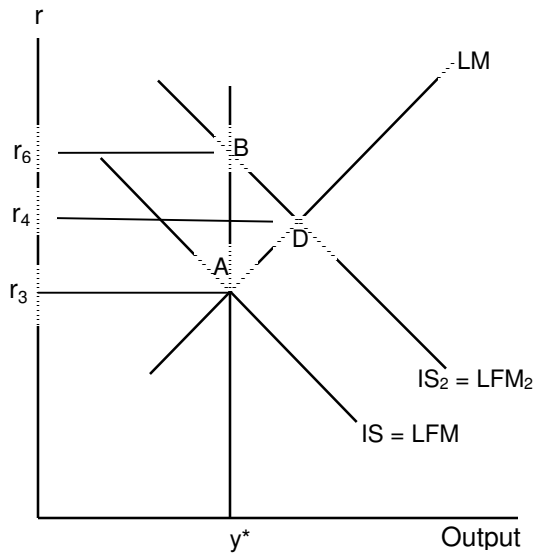

Figure 6

A Money-Financed Rise in g

Finally, a money-financed increase in government expenditures calls for an increase in the interest rate to restore immediate-run equilibrium in the LF (goods) market but a decrease in the interest rate to restore equilibrium in the money market. This invalidates F&H (2005) conclusion of no change in interest rate in the immediate-run if it is determined in the LF market.

This is shown in Figure 7 where the initial short-run equilibrium is at point A where the interest rate is r_3, and output is y*. A rise in government expenditures from g to g_2 financed by an increase in the real money supply will shift both the IS and LM curves to the right. The short-run equilibrium interest rate can be higher or lower than initial interest rate r_3 as recognized by F&H (2005). The vertical shifts in the IS and LM curves determine the change in the interest rate under alternative approaches to interest rate determination. If the interest rate adjusts to clear the money market, then the interest rate decreases from r_3 to r_0 (point A to point C). But if it adjusts to clear the LF (goods) market, the immediate-run impact will be an increase in the interest rate from r_3 to r_6 (point A to point B).

Conclusion

F&H (2003) introduce an unconventional definition and approach to supply of loanable funds determination. This paper identifies an error in their approach, thereby reestablishing the conventional definition of the supply of loanable funds. More significantly, this paper shows that the LFM curve of their IS-LM-LFM model coincides with the traditional IS curve when the correct supply of loanable funds concept is applied. As a result, the equilibrium condition of the market for loanable funds reduces to that of the goods market equilibrium condition. Recognition of this symmetry necessitates revision of the F&H (2005) results. These include:

1. An increase in money supply has no effect on the loanable funds market in the immediate-run.
2. A bond-financed rise in government expenditures does not require two different interest rates to equilibrate the goods and the loanable funds markets in the immediate-run as the two markets are synonymous.
3. A money-financed increase in government expenditures does not leave the interest rate unchanged in the immediate-run if it is determined in the market for loanable funds. The interest rate has to rise to clear the loanable funds market.

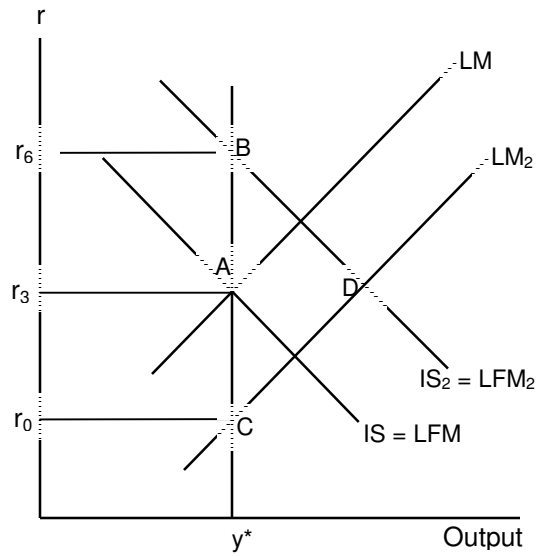

Figure 7

So far as the choice of the approach is concerned, F&H (2005) conclude:

"With the exception of a joint real-financial shock, the *direction* of the partial equilibrium impact on r is the same in both the Liquidity Preference and Loanable Funds approaches to interest rate determination. The magnitude of the impact on r does, however, differ in the two approaches. In particular, the Loanable Funds approach results in smaller fluctuations in the interest rate. However, when there is a joint real-financial shock, even the *direction* of the interest rate response is open to question in the approach suggested by Y&Y".

However their argument collapses when there is no spillover from the money market, which we have proven to be the case. We agree with F&H (2005) that jumping back and forth between the liquidity preference and loanable funds approaches in the immediate-run depending on the origin of the disturbance is not a good recipe for developing a coherent understanding of interest rate determination. Our suggestion is to maintain the status quo, where the short-run interest rate is jointly determined by the two approaches while the long-run interest rate is determined by the loanable funds approach. Choosing one approach over another for immediate-run interest rate determination does not move us forward as it fails to answer the question: what happens to the interest rate *in the real world* when a rise in government expenditures is financed by an increase in money supply? To us, the direction of the interest rate movement due to an external shock to both IS and LM curves can sometimes be unpredictable in the immediate-run, but the dynamics of the short-run adjustment mechanism will soon start taking place. The interest rate will move toward the short-run equilibrium, and we do not need to choose between approaches any more.

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