

9A APPENDIX: EXPLAINING RECESSIONS WITH THE IS/LM MODEL

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A. Why This Appendix?

The tools of the *IS/LM* model are well suited to understanding some aspects of the current macroeconomic situation. This appendix attempts to apply the model to the economic downturn that began in 2007, with comparisons to other recessionary episodes in the United States and elsewhere.

The United States has had a turbulent macroeconomic history. After the repeated panics, recessions, and depressions of the pre-World War I period, the economy was buffeted in the first half of the twentieth century by two world wars and the Great Depression. Although things were quite stable in the 1950s and early 1960s, inflation was building and, when the Arab oil embargo and subsequent price increase hit in 1973, culminated in the “stagflation” of the mid-1970s: a period of high unemployment combined with the highest sustained U.S. inflation ever experienced outside of wartime. Anti-inflationary monetary policy triggered a major recession in 1982 while bringing the inflation rate back down to acceptable levels.

After all this excitement, the economy settled into a stable, low-inflation growth path after the 1982–83 recession. Macroeconomists have dubbed the period from 1984–2007 as the “Great Moderation,” though some may decide to revisit that appellation in light of the rather immoderate downturn that has followed it. Whether the Great Moderation followed from the absence of major shocks or the effective neutralization of shocks by policy authorities is a matter of some debate, but both factors

probably contributed.¹ The Great Moderation allowed macroeconomists to turn their attention away from traditional business cycles and the *IS/LM* framework of analysis received little attention. High on the macroeconomic agenda during the period were development of endogenous-growth models, exploration and testing of real-business-cycle models, and the further development of microfoundations of new Keynesian models based on rational price stickiness. We have or will study these models in considerable detail.

However, the economic and financial crisis of 2008–09 has provided a new imperative for macroeconomists, once again focusing attention on demand-driven business cycles. The *IS/LM* model provides a useful tool to begin such analysis, which is the task we undertake in this appendix. The current recession looks more like the Great Depression, for which the *IS/LM* framework was developed, than any business cycle since the 1930s.

B. The Setting

The mild U.S. macroeconomic fluctuations of the Great Moderation period were misleading because lurking under the serene surface of stable GDP growth were large and persistent, but ultimately unsustainable, imbalances. The United States throughout this period had an extremely low (and in some years actually negative) saving rate. In order to finance domestic investment spending (and at times a large government deficit) with a dearth of domestic saving, the U.S. has run a persistent current-account deficit (and capital-account surplus) leading to large accumulations of U.S. debt in Asian countries.

One explanation for the low measured saving rate is that households' wealth was growing rapidly through appreciation in the value of housing and financial assets. Such capital gains do not show up in personal income measured by the GDP accounts because they do not reflect current production. To see how this can lead to a very low saving rate, consider the following hypothetical example. Suppose during 1999 that the Allen family earned \$70,000 after taxes from current "output." The value of their house also increased in value by \$20,000 and their stock portfolio rose in value by \$10,000. Their "augmented" personal income, including appreciation in asset values, would be \$100,000. Perhaps they choose to save 30% of this, which is

¹ The term "Great Moderation" seems to have been introduced by Stock and Watson (2002), who find important roles for both reduced shocks and better monetary policy. For more recent research, see the papers presented at the Federal Reserve Bank of San Francisco conference on "Recent Trends in Economic Volatility," November 2007, available online at <http://www.frbsf.org/economics/conferences/0711/>.

actually a rather high saving rate. Their consumption would exactly match their measured disposable income of \$70,000, so their measured saving rate would be zero. Nonetheless, they actually provided considerably for their future by leaving the \$30,000 of capital gains in place for the future.

Based on this example, it is easy to see how households could have negative saving rates. By selling the appreciated stocks and/or using a home-equity loan to pull money out of their assets, they could easily spend more than \$70,000.

Very high levels of consumption spending helped to stimulate the U.S. economy by keeping the *IS* curve pushed out to the right. Much of the consumption was on imports, which were not balanced by high levels of exports. However, dollar-denominated, government-backed assets are viewed as extremely safe and liquid, making them very attractive to foreign savers. China and other Asian countries had very high saving rates (often induced by government policies) and were willing to accumulate large volumes of U.S. assets, especially government securities. For two decades (and actually since the 1960s) the persistent U.S. trade deficit pumped dollar assets into Asian central banks.

Because of the high level of foreign saving, the United States was able to achieve substantial levels of domestic real investment despite the very low levels of domestic private saving and negative government saving. The large capital inflows largely mitigated the potential crowding out of the government deficit that might otherwise have occurred and provided a much larger domestic capital stock than could have been achieved based only on domestic saving.

It is obvious that these imbalances could not persist indefinitely. At some point, the appreciation of U.S. assets was bound to slow or reverse, despite the wave of technological innovation that led some observers to wax confidently about a “New Economy,” in which firms could sustain rapid productivity growth (and high profits) forever. A gradual slowing of asset appreciation might have allowed the economy to return smoothly to a higher-saving equilibrium (a “soft landing”), but asset prices often bounce hard off the ceiling rather than flattening out smoothly, especially when excess optimism (Keynes’s “animal spirits”) has led to a speculative bubble.

Moreover, the willingness of foreign investors to acquire U.S. dollar assets must also have a limit. Although the U.S. government is highly unlikely to default formally on its bonds and bills, the upward pressure on U.S. interest rates that would result from a lessening of foreign saving would likely trigger expansionary monetary policy, which could inflate away much of these assets’ value. The recent concerns expressed by China suggest that the limit of foreigners’ confidence may be near at hand.²

² See China Concerned for U.S. Investments (2009).

C. The Downturn

The financial elements of the downturn are discussed in Coursebook Chapter 8. As noted there, the first danger signs came from the housing market, where home prices began to turn downward in late 2006 as demand failed to keep pace with the stock of available houses. The decline in housing prices lowered households' wealth and reduced their consumption spending as they recalibrated their now-greater need to save. New-home builders who make their living by building and selling houses saw their profit margins fall and their inventory of unsold homes rise, leading them to slow the pace of home building.

All of these first-round reductions in spending were subject to the usual Keynesian multiplier as those who were unable to sell their products to these first-round buyers suffered losses in income. The declines in demand were steepest for the industries that are traditionally the most cyclically sensitive: those producing durable goods. The auto industry was particularly hard hit in this recession because its effect was combined with that of the recent spike in oil prices. Even though oil prices declined in late 2008, customers remained uncertain what cars would be best suited to the next decade and many have postponed decisions until the pattern of future oil prices becomes clearer.

As declining income lowered demand in more and more industries, firms in these industries reduced their projected needs for capital and curtailed investment projects. This exacerbated the already substantial decline in the construction industry and deepened the slide in industries producing durable investment goods.

Reductions in spending shifted the *IS* curve to the left, pushing equilibrium levels of both output and the interest rate downward. At the same time that spending was falling, the financial sector was encountering severe problems. The opacity of nested financial derivatives led to worries about the health of major commercial banks, investment banks, and insurance companies. Because potential lenders could not be sure that the counterparties to their transactions would repay even very short-term loans, institutional lending markets such as federal funds, commercial paper, and asset-backed securities became illiquid. These problems translated into severe short-term credit shortages that interrupted firms' production processes and shriveled the supply of lending for purchases of homes, cars, and other consumer durables. Although these problems are not readily modeled as *LM* shifts, they had a depressing effect on aggregate demand that further compounded the downward spiral already underway.³

³ See Bernanke and Gertler (1995) for a discussion of the "credit channel" of monetary policy transmission. Although the 2008 problems were not caused by monetary policy, they had

D. Liquidity Trap

At its December 15–16, 2008 meeting, the Federal Open Market Committee reduced its target federal funds interest rate to a range of 0 – 0.25 percent. Nominal interest rates cannot fall to or below zero because no one will lend when they can hold money, which is perfectly safe (in nominal terms) and liquid at a zero nominal return. In the *IS/LM* framework, monetary policy stimulates aggregate demand by lowering interest rates, so with the federal funds rate essentially at zero, the Fed's quiver seems to be empty.

Because the nominal interest rate cannot fall below zero, the *LM* curve flattens out when it reaches a zero nominal rate. Figure 1 shows how an economy can fall into a liquidity trap. Suppose that the initial equilibrium is at the intersection of *IS* and *LM* with output Y_0 near full employment. Now suppose that spending falls dramatically as shown by the IS' curve, which drives the equilibrium interest rate to zero.⁴

With the economy at Y_1 , a severe recession is underway. How can the economy recover? Traditionally, the prescriptions for recovery would work through increases in the real money supply. These could occur either through naturally occurring declines in prices or through expansionary monetary policy. However, increases in the real money supply shift the *LM* curve to the right as shown by LM' in Figure 1. These fail to stimulate the economy in a liquidity trap because the interest rate cannot be pushed down.

Thus, the liquidity trap situation appears to be a serious conundrum for an *IS/LM* economy. Neither self-correction through prices nor expansionary monetary policy will bring the economy back toward full employment. The only apparent way back to Y_0 is an increase in spending such as through fiscal policy expansion or restoration of investor confidence in future demand. This was the policy prescription that Keynes offered for the Great Depression: expand government spending and lower taxes to push the *IS* curve to the right and restore full employment. Note that when the *LM* curve is horizontal there is no crowding out of increased government spending. The full power of the Keynesian multiplier is unleashed.

some of the same symptoms of credit rationing and disruption of bank lending that are discussed in the credit-channel literature. See also Bernanke (1983) for a discussion of credit-market disruption in deepening the Great Depression.

⁴ Assume that the expected inflation rate is zero, which is approximately correct in the current situation. This allows the interest rate on the vertical axis to be both the nominal and the real rate.

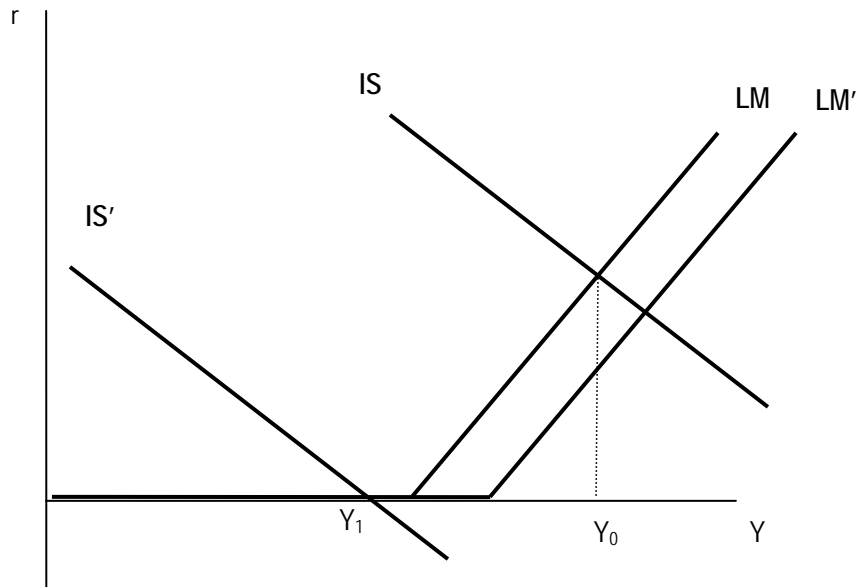


Figure 1. IS/LM in liquidity trap

E. Policy Choices

In response to the severe downturn in late 2008, the Bernanke Fed and the Obama Administration have pulled out all the stops to stimulate the economy with monetary and fiscal policy. This is in marked contrast to the Great Depression, when the money supply actually fell dramatically from 1929 to 1932 as the Fed adhered to gold standard norms of policymaking and the Hoover Administration stuck to traditional wisdom about balancing the federal budget.

Figure 1 seems to suggest that monetary policy cannot be helpful in a liquidity trap, but there are several ways in which the Fed is currently trying to use instruments other than the interest rate to stimulate demand. First, many of the “targeted-lending programs” that the Fed has undertaken have been designed to thaw frozen credit markets more than to expand the money supply *per se*. They have purchased commercial paper to try to get that market operating again and have recently done the same with new, prime mortgage-backed securities. The Fed has auctioned huge volumes of reserves to banks to make sure that the massive jump in their demand for reserves did not come at the expense of lending.

Second, the Fed has begun purchasing longer-term and somewhat riskier securities in an attempt to alter the structure of interest rates. Even when the short-term

Treasury bill rate is near zero, the rates on longer-term bonds and on private-sector bonds can be substantially positive. This is because during times of uncertainty, there is a “flight to quality” as everyone abandons these less safe and less liquid assets. Because these longer-term and riskier interest rates are the ones that affect investment, anything that the Fed can do to push these rates down could have a substantial stimulative effect on demand.⁵

Third, the Fed is closely involved with the Obama Administration’s attempt to restore the health of the banking system. Getting credit moving again is a key element of restoring aggregate demand, albeit one that is not easily visualized on the *IS/LM* axes. With banks that are unable to lend due to impaired capital and toxic assets, the financial system cannot facilitate whatever demand exists for investment goods and consumer durables.

Finally, the Fed can continue to increase the money supply—so-called “quantitative easing”—to try to assure that deflation doesn’t occur. Anticipated deflation compounds the problem of the liquidity trap by shifting the *LM* curve upward so that the horizontal section (with a zero nominal interest rate) occurs at a positive real interest rate. This just pushes the economy further back along the *IS* curve. By signaling its intent to expand the money supply rapidly for a long time, the Fed may keep inflationary expectations positive, allowing real interest rates to be negative (at the zero nominal rate) and buoying aggregate demand.

Fiscal policy is the obvious policy alternative in the liquidity trap, which is the motivation behind the Obama Administration’s “fiscal stimulus.” The ideal fiscal stimulus would target spending increases and tax cuts on maximizing the immediate impact on spending, especially spending on depressed durable goods. Lower-income households tend to spend more of an increase in income, so the economy will respond more strongly to tax cuts targeted toward them. Spending elements can be most effective if they can be spent quickly. Grants to financially strapped state and local government work well because they prevent cuts that would otherwise be necessary at these levels. However, these grants merely restore spending that would have already occurred had there not been a recession, so they do not provide net stimulus.

Most macroeconomists agree that the policies that have been enacted in response to the current crisis move in the right direction. The bulk of the disagreement is over the amount—many prominent economists have argued that the fiscal stimulus and the bank recovery package will need to be much larger—and the details.

⁵ As I am writing this on March 18, 2009, the Fed has announced plans to buy \$300b of longer-term Treasury securities, causing the yield on Treasury bonds to fall immediately by nearly one-half point.

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