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Energy-Inflation-Recession

Most accounts of the deep recession and high inflation of the mid-1970s give a dominant role to the rapid escalation of energy prices in late 1973 and early 1974. According to a recent analysis by **Knut Anton Mork** of MIT and **Robert E. Hall** of Stanford University and NBER, the energy price shock depressed real output by 2 percent in 1974 and 5 percent in 1975, accounting for at least two-thirds of the total decline in real output that occurred in those years.

In **Energy Prices, Inflation, and Recession, 1974-1975**, *Working Paper No. 369*, Mork and Hall present a quantitative appraisal of the responses of real output, prices, and employment to the energy price shock. They consider both the substitution away from energy as an input to production that occurred because of the shock, and the monetary and general macroeconomic effects, including the adverse impact of higher energy prices on the permanent income of consumers and the reduction in investment brought about by higher interest rates. Their study is perhaps the first attempt to give a unified treatment to the issues associated with factor substitution on the one hand and macroeconomic aspects on the other.

In their analysis, Mork and Hall use a model of the U.S. economy that treats energy explicitly, includes a financial system, and incorporates the hypothesis of rational expectations, but treats money wages as predetermined in the short run. The model also distinguishes between expected and unexpected shocks.

Using their model, Mork and Hall first simulate a "base case," or what would have happened to the economy—output, inflation, and the like—in 1973-77 if all factors were normal and there was no abrupt increase in the price of energy. Then they inject an energy price shock of 68 percent in 1974 and 105 percent in 1975 into the base case, thereby estimating the impact of the shock alone. Finally, they compare these estimates to the actual performance of the economy in 1973-77 in order to determine how much

of the inflation or recession was due to the increased price of energy.

Mork and Hall find that consumption declined permanently by about 3 percent because of the decline in real income associated with increases in the price of imported energy. Investment fell by 4 percent in 1974 and 27 percent in 1975, recovering slowly thereafter. Unemployment increases of nearly 1 percentage point in 1974 and 1.7 percentage points in 1975 were attributable to the large and unanticipated changes in the price of energy. Prices also rose by 4 percentage points in 1974 and 2 more percentage points in 1975. The authors suggest that all of the enormous acceleration of inflation observed in 1974 could be explained by higher energy prices coupled with the removal of the last price controls of the economic stabilization program. Those factors, however, fall short of explaining the continued inflation in 1975.

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According to Mork and Hall, "the effects of the energy price shock on output, employment, and prices could have been altered by manipulation of macroeconomic policy instruments." Therefore, they appraise the effects of a variety of macroeconomic policy options that were available. For example, the deep recession of 1974-75 could have been offset or moderated by an announcement in 1974 of the Federal Reserve System's intention to expand the money supply by appropriate amounts in 1975 and 1976. A second option would have been to expand government spending by some $68 billion. This could have moderated the recession, but would have caused

nearly 20 percent inflation in 1974. A third option would have been to moderate the inflation through contractionary monetary policy, but that would have worsened the already serious recession. Finally, severe contraction in federal expenditures could have reduced the inflation, but such a policy was not practical. Consequently, the authors conclude that "any attempt to completely eliminate the increased inflation in this period would have been futile."

Although it seems likely that future oil price increases will be smaller (and more widely anticipated) than those that occurred in 1974, Mork and Hall point out that the aggregate cost share of energy is now larger in the United States than it was five years ago. This suggests the potential for even larger effects on the economy of future energy price increases.   JT

Bonds and Stabilization

Fiscal policy may have somewhat larger effects on the real economy, and monetary policy somewhat smaller effects, than conventional econometric models have shown, according to a new study by NBER Research Associate **Benjamin M. Friedman** of Harvard University. In **The Determination of Long-Term Interest Rates: Implications for Monetary and Fiscal Policies**, *Working Paper No. 366,* Friedman simulates how the economy would have performed with different fiscal and monetary policies during a ten-quarter period in the late 1960s. A novel feature of his simulations is the introduction of a new model of long-term interest rates into the MIT–Penn–SSRC (or MPS) model.

Long-term interest rates and related equity yields form a critical link between financial and nonfinancial markets, affecting the cost of capital (and therefore business investment) as well as the wealth of households (and therefore consumer spending). Yet most econometric models typically tie long-term interest rates directly to short-term rates through a simple term-structure relation that fails to capture adequately shifts in relative asset demands and supplies.

In contrast, Friedman models the forces affecting the supply of and demand for corporate bonds, and allows the bond yield to move to the level necessary to bring supply and demand into balance. The theory of portfolio behavior also provides a substantial base for modeling the bond market in this way.

To describe the demand side of the bond market, Friedman uses six equations representing net purchases of corporate bonds by life and casualty insurance companies, private- and public-sector pension funds, mutual savings banks, and households. The supply side separately represents net new issues of bonds by both financial and nonfinancial corporations.

Short-term yields and expected inflation play a large role in this bond market model, just as they do in the usual term-structure model. But other market forces that appear elsewhere in the overall econometric model, and have not previously been included in the modeling of long-term interest rates, also matter here in an important way. Among these added influences on the bond market are the business sector's external borrowing requirement (determined primarily by capital spending and profits), the investable cash flows of the various bond market investors, and effects on bond demand resulting from disintermediation, portfolio diversification, and risks associated with the relative variability of asset prices.

Friedman's first simulation examines the effect of a "pure" fiscal policy action—increasing federal purchases at a $10 billion annual rate (in 1972 dollars) without increasing the growth rate of the money supply. In a traditional econometric model, this addition to total spending raises the demand for money to finance the added transactions, thus driving up both short-and long-term interest rates (and equity yields) and thereby "crowding out" some mix of business capital formation and consumer and residential spending. Specifically, short-term interest rates rise by about 1.5 percent in the MPS model, and the term-structure equation translates that into a 0.5 percent rise in the bond yield. Higher bond yields draw investors into bonds and thus lower stock market values by almost 8 percent. Nominal income ends up $19 billion higher, but half of that is simply higher prices.

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By adding the supply-demand bond market model to the MPS simulation, Friedman obtains quite different results. The fiscal stimulus raises profits more than it does capital outlays, thus reducing the need for business to issue as many bonds. And bond buyers obtain more investable cash, increasing their demand for bonds. These forces would tend to depress bond yields, but a rise in short-term rates—2.25 percent in this simulation—pulls in the opposite direction by making it more attractive for businesses to raise funds in the bond market.

The net effect is that the corporate bond yield rises only slightly in response to the fiscal stimulus, equity values are less depressed, and crowding out of private spending is less significant than in the original model. The fiscal stimulus, with unchanged monetary policy,

ends up adding almost $6 billion more to real income than it does in the conventional MPS model—an effect two-thirds more powerful.

Simulations of other policy combinations show somewhat less difference between the standard MPS model and Friedman's version, which incorporates the supply-demand bond market model. A policy of accommodating the same $10 billion fiscal stimulus, by providing enough money to hold short-term rates on their historic path, produces more real income and more inflation in both models. A pure monetary action—increasing the rate of growth of the money stock at a 2 percent faster rate—raises the growth of nominal income by 3.4 percent in the unaltered MPS model, but only half as much in the combined model. Although half of the large nominal income gain is eaten up by inflation in the original MPS model, two-thirds of the smaller gain in the combined model represents added real growth. This difference occurs partly because the more modest gain in nominal income keeps the demand for money, and hence interest rates, from rising as much.

Finally, a contractionary policy of keeping short-term interest rates 1 percentage point higher than they historically were slows real growth and inflation in both models. But the bond yield ends up substantially higher in Friedman's version, in part because of a larger business external deficit and smaller household cash flow.

These comparative simulations confirm the importance of long-term asset yields in the relationships between financial and nonfinancial aspects of the economy. They also illustrate the sensitivity of a macroeconomic model, and the conclusions for monetary and fiscal policies generated from it, to the theory of long-term interest rate determination that it embodies.   AR

Inflation and Housing

Although inflation may be public enemy number one to many Americans, it has produced a bonanza for investors in owner occupied housing. Most homeowners have benefited enormously from the inflation induced rise in housing prices over the last fifteen years, and they may continue to benefit in the future. A new study by NBER Research Associate **Patric H. Hendershott** and **Sheng Cheng Hu** of Purdue University, **Inflation and the Benefits from Owner Occupied Housing**, *Working Paper No. 383,* provides some estimates of just how large the returns have been. The study also sets out an analytical framework that shows why homeowners may continue to benefit from inflation even if mortgage rates accurately reflect future price increases.

Inflation affects homeowners in several ways. Unanticipated inflation produces nominal returns on housing that are greater than the ones expected at the time of purchase. Some of the unexpected, or excess, returns constitute gains in real purchasing power if the purchase was partially financed with a mortgage and if the rise in housing prices is greater than the increase in the general price level. Moreover, the returns can be converted to gains that can be spent by taking out a second mortgage or reducing current saving. In addition, homeowners gain even if inflation is fully anticipated and housing prices rise at the same rate as prices in general. This happens because interest rates tend to rise one for one, or even less, with anticipated inflation. Given that interest payments are currently fully tax deductible, the real aftertax borrowing rate falls.

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Hendershott and Hu estimate the excess returns on housing for people in the 15-, 30-, and 45-percent marginal tax brackets by first formulating a model of expected returns and then comparing estimates of expected returns with estimates of realized ones. Returns take two forms: (1) capital gains when a home is sold and (2) imputed rental income (that is, the rental value of a dwelling) while it is occupied. Costs include mortgage interest, property taxes, brokerage fees, and the alternative income that could be earned on the equity invested.

Expected returns are a fraction of anticipated inflation, mortgage interest rates, and investors' tax brackets. Hendershott and Hu use past rates of general inflation and inflation in rents and home prices as proxies for expected inflation in order to compute expected nominal returns. They then use actual inflation rates to calculate realized returns. The difference between the two is the excess nominal return. The excess real return is the difference between excess nominal return and the amount of unanticipated inflation. For instance, assume an investor expects 5 percent inflation and an aftertax return on housing of 7 percent. If actual inflation is 7 percent and his return is 16 percent, the excess nominal return is 9 percent (16 minus 7). The excess real return is 7 percent (9 percent excess nominal return minus 2 percent unanticipated inflation).

By Hendershott and Hu's estimate, excess real returns have been phenomenal over the last decade and a half. For example, an investor in the 30-percent tax bracket had an excess real rate of return of 5.6 percent during the period from 1965 through 1978 and 7.3 per-

cent from 1973 through 1978. The most lucrative period was 1967 through 1972, when the excess rate of return was 8.5 percent. Investors in higher tax brackets fared somewhat better, but the differences were not large.

Nearly all of the excess return was due to mortgages. In the 1973 through 1978 period, for instance, only 0.8 of the 7.3 percent excess rate of return to homeowners in the 30-percent bracket was attributable to the fact that housing inflation exceeded general inflation. The balance—6.5 percent—resulted from the leverage effect of mortgages.

In the early 1970s, conventional wisdom held that inflation has a depressing effect on housing demand. The focus then was on inflation's impact on interest and monthly mortgage payments. Inflation "tilts" real payments upward, resulting in a sharp increase in the ratio of payments to current income for those newly acquiring mortgaged homes. The outcome, it was assumed, was inflation induced financial constraints that held demand for housing below its equilibrium level.

However, inflation also works to increase the equi-librium demand for housing because it decreases the user cost (or investment hurdle rate). Capital gains (generally) and imputed rental income are tax exempt, while mortgage interest is deductible. At the same time, inflation reduces the real aftertax returns on alternative investments. Hendershott and Hu estimate that rising inflation reduced the required expected rate of return on housing—the user cost of capital—for an investor in the 30-percent bracket from 11.4 percent in 1964 to 8.6 percent in 1978. For an investor in the 45-percent bracket, the required rate of return fell from 9.8 to only 5.4 percent.

The recent high level of housing starts and the remarkable rise in housing prices suggest that the tax effects of inflation outweigh the financial-constraint effects. (Hendershott and Hu note that the financial constraints probably present difficulties only to first-time buyers because those who already own houses are likely to have substantial gains on their homes that can be used for proportionately large down payments.) Thus, inflation has likely reduced aggregate welfare by shifting resources into housing and out of more productive investments.   AE

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