Comments on “Do We Really Know that Oil Caused the Great Stagflation? A Monetary Alternative”, by Robert Barsky and Lutz Kilian

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Revisionist history is always fun. But it is not always convincing. I have enjoyed thinking about the thesis developed by Barsky and Kilian. But I am not convinced.

1 The non controversial part. The role of money in the early 1970s

Not all of the paper is revisionist; indeed some of it is less so than it sounds: There is, I believe, wide agreement that money played a major part in what happened in the early to mid 1970s. Most observers would in particular agree to the following propositions (Much of what follows can, for example, be found in the book by Michael Bruno and Jeffrey Sachs on the “Economics of Stagflation”, published in 1985):

- Expansionary monetary policy was an important factor in stimulating growth and reducing unemployment in the United States after the 1970 recession. By 1973, the unemployment rate was 4.9%, down from 6.0% in 1971.

- U.S. inflation came down until 1972, and then started increasing in 1973, suggesting that the unemployment rate was then close to the
natural rate. It is therefore likely that, had the output expansion continued at the same rate after 1973, inflation would have further increased, even absent any changes in the relative price of oil.

- Expansionary monetary policy in the United States, and the attempts by foreign central banks to maintain the value of the dollar, led to large induced monetary expansions abroad. Growth in the other major OECD countries—countries, which in contrast to the United States, had not had a recession in 1970—continued to be high. Unemployment continued to be very low. Inflation in the EEC steadily increased, nearly doubling between 1970 and 1973. There again, a slowdown in activity was clearly needed, and would have come, even absent the increase in the price of oil.

- This world monetary expansion was associated with low nominal interest rates, and even lower real interest rates. This, combined with strong world demand, was more than enough to trigger an increase in the price of commodities and raw materials some time before the increase in the price of oil.

In short, even absent the increase in the price of oil, 1974 and 1975 would have seen either increasing inflation and/or a slowdown in growth. Most likely, given the attitude of central banks from 1973 on, the outcome would have involved monetary tightening and a slowdown in growth.

2 Controversial point 1. One can explain stagflation within a model with only monetary shocks

Let me start with what looks like a semantic issue, but is in fact more.

- Barsky and Kilian define “stagflation” as the coincidence of “low or negative output growth” and “high inflation” (i.e. $\Delta u > 0, \pi$ high).
They argue—rightly—that this is easy to generate in a model with nominal rigidities. In effect, we know that inflation builds up slowly after a monetary expansion. At some point, high inflation leads to a decrease in real money, which in turn leads to a decrease in output growth; at that point there is indeed high inflation and low, possibly negative, output growth.

- A more conventional definition of “stagflation” however is the coincidence of “high unemployment” and “increasing inflation” (i.e. $u$ high, and $\Delta \pi > 0$).

Why does this semantic discussion matter? Because: (1) What was observed in the 1970s was indeed a combination of high unemployment and increasing inflation, i.e. stagflation according to the second definition; (2) This combination is very hard to generate in response to only changes in money growth. Let me develop both points:

On the empirical evidence: The average unemployment rate from 1973 to 1975 was 6.4%, substantially higher than what the natural rate of unemployment had been until then. And, over the same period, the increase in inflation was around 5 percentage points. The period was one of high unemployment, and increasing inflation.

On the theoretical proposition. Go back to a conventional Phillips curve relation:

$$\pi_t - \pi_t^e = -a(u_t - \bar{u})$$

Inflation minus expected inflation is a decreasing function of the distance between the actual unemployment rate and the natural unemployment rate. In the absence of supply shocks, $\bar{u}$ is a constant.

Stagflation (according to the second definition, and the 1973-1975 facts) implies the coincidence of increasing inflation:
Barsky and Kilian

\[ \pi_t - \pi_{t-1} > 0 \]

and of unemployment above the natural rate: \( u_t - \bar{u} > 0 \), so that, by implication:

\[ \pi_t - \pi^e_t < 0 \]

These two conditions can be rewritten as:

\[ \pi^e_t - \pi_{t-1} > \pi_t - \pi_{t-1} > 0 \]

In words, the expected increase in inflation must exceed the actual increase in inflation, and this at a time at which inflation is increasing. It is difficult to think of expectation formation mechanisms which will naturally deliver this result. The learning model presented by Barsky and Kilian does not. In general, learning does not seem promising here: It seems more likely to lead to the opposite inequality, with the expected increase in inflation lagging behind the actual increase.

So, how can one generate stagflation? By having an increase in the natural rate \( \bar{u} \), or equivalently for our purposes, a positive disturbance to the Phillips curve relation. A natural candidate is an increase in the price of oil, which generates an increase in \( \bar{u} \), or equivalently for our purposes, a positive disturbance in the Phillips curve relation. Thus, the traditional focus on supply shocks to explain the 1970s.

This argument however suggests one way out for proponents of the monetary policy explanation. Barsky and Kilian do not push it explicitly, but clearly they could, as it is in the spirit of their paper. If expansionary monetary policy leads to an increase in the relative price of oil, then one indeed can in principle generate stagflation just from monetary shocks. This leads to the second major issue, the degree to which one can think of the large
increases in the price of oil in the 1970s as endogenous, and triggered by monetary policy.

3 **Controversial point 2. The increase in the price of oil in the 1970s was an endogenous response to a money-driven world boom.**

Here, theory is on the side of Barsky and Kilian. Oil is a natural resource. Current or anticipated increases in demand or decreases in the real interest rate should both lead to an increase in the current price. And, indeed, the early 1970s were a period of high demand and low real rates.

The problem is empirical. I am no expert on the oil market. But from my reading of the literature, I have the strong feeling that most experts agree: The two increases in the price of oil were not the natural, if delayed, response to demand and interest rates, but were mostly the result of successful cartelization.

Agreement among experts is surely no proof. But the endogenous increase in the price of oil hypothesis runs into a number of obvious problems: (My—very limited—knowledge on these issues is largely based on M.A. Adelman’s writings, in particular Adelman [1993])

- The degree to which the price of a good depends on the interest rate depends on the degree to which it is a fixed rather than a renewable resource. And here, the evidence seems to be that oil behaves more like the second than the first. The amount of so called “proven resources” has consistently increased over time, despite the steady extraction of oil from the ground.

- The degree to which the price depends on current and anticipated demand depends on the slope of the marginal cost curve, relating the cost of extraction to the flow of extraction. Evidence suggests that,
in the 1970s, the marginal cost curve was rather flat, that there were a large number of fields from which oil could be extracted at close to the same cost per barrel—a cost far below the price which prevailed from 1974 on.

- The increase in prices in the mid 1970s was associated with a decrease in production—not what you would expect to see in response to a shift in demand. The issue is taken up by Barsky and Kilian, who provide a creative, if not totally convincing answer. But there is another empirical problem along the same lines: The increase in prices in the mid 1970s was associated with a decrease in production for the low-cost OPEC countries, and an increase in the production for the high-cost non OPEC countries. This is hard to explain without giving some central role to OPEC in the story.

- With the world recession of the mid 1970s, the high demand conditions, which might have justified the high price of oil earlier, largely vanished. And later on in the decade, tighter monetary policy led to much higher real rates. Yet the price of oil remained high. The paper—and the literature—invoke “ratchet effects” (in the form of higher excise taxes, imposed by the oil producing countries on oil companies); but this begs the question: Why not invoke the same mechanisms for the initial increase in the price of oil?

4 Controversial point 3. The recession of the mid 1970s was due to a contraction in money

Here, the problem is again empirical and obvious. The way monetary contraction is supposed to work is through high interest rates. Nominal interest rates increased substantially in 1974 and 1975. This is shown in Figure 1, which plots short-, medium- and long-term interest rates from the mid-
Nominal interest rates, short, medium and long
United States, 1966 to 1992

Graph showing the trends of nominal interest rates over time from 1966 to 1992 for short, medium, and long-term periods.
Real interest rates, short, medium and long

United States, 1966 to 1992

Percent

Year: 66 68 70 72 74 76 78 80 82 84 86 88 90 92

SHORT_REAL  MEDIUM_REAL  LONG_REAL
1960 to the early 1990s. But inflation increased by more, and, based on forecasts of inflation as of the time, so did expected inflation. This is shown in Figure 2, which plots short-, medium-, and long-term real interest rates, using inflation forecasts as of the time, for the same period. Real interest rates were lowest in 1974 and 1975; indeed, in both years, the short real rate was negative, the longer real rates very close to zero. (The numbers are taken from Blanchard [1993]; the construction of the real rates is described in that paper.)

Can the monetary contraction story survive Figure 2? Yes, if there is a role for the nominal interest rate, for a given real interest rate. And, based on the research on the interaction between inflation, taxation, and intermediation, we can think of a number channels through which nominal rather than real rates might matter. One may however doubt that the rather modest increase in nominal rates could have been enough to offset the effects of low real rates and generate a recession of the size observed in the mid 1970s. The burden of the proof is on the authors on this one.

5 Controversial point 4. An increase in the price of oil should have no effect on the GDP deflator. Yet, the GDP deflator increased substantially in the mid 1970s

The argument that the price of oil should not affect the price of value added—the GDP deflator—is perfectly valid as far as it goes, that is, in partial equilibrium. The general equilibrium closure offered by Barsky and Kilian, with fixed nominal money and fixed employment, is not convincing. Once one uses a more standard macroeconomic closure, the evidence on inflation appears quite consistent with theory.

Let me use the standard toy model here. Assume that consumers consume a bundle composed of a produced good and energy. The produced good is produced using labor. Call $p_v$ the (log) price of the produced good
(the GDP deflator), $x$ is the (log) relative price of energy, and $p$ is the (log) consumption price index (the CPI). Then assume:

$$
p = (1 - \theta)p_v + \theta(p + x)
$$

$$
p_v = w
$$

$$
w = \alpha p + (1 - \alpha)p(-1) + ay
$$

$$
y = m - p
$$

$$
m = bp \quad b < \text{ or } = 1
$$

The first equation states that the consumption price index is a weighted average of the price of the produced good and the price of energy, with $\theta$ as the share of energy in consumption. The second states that the price of the produced good is equal to the nominal wage (the constant terms are unimportant here, so I set them equal to zero).

The third equation states that the consumption wage depends on the output gap $y$. It introduces nominal wage rigidity in the form of a dependence of the wage on both the current and the lagged consumer price index. The fourth equation is a reduced form aggregate demand equation giving the demand for the produced good as a function of real money balances. The last equation is a money rule.

Solving the model is straightforward. For simplicity, let me just look here at the limit case where $b = 1$, so there is full accommodation by the central bank, and $y$ remains constant (the difference with Barsky and Kilian is that constancy of output is the result of monetary accommodation, so the nominal money stock is not constant but endogenous). In this case, inflation is given by:

$$
\Delta p = \frac{\theta x}{(1 - \theta)(1 - \alpha)}
$$
\[ \Delta p_v = \Delta w = \alpha \Delta p + (1 - \alpha) \Delta p(-1) \]

- An increase in the relative price of energy leads to positive inflation, measured using either the CPI or the GDP deflator.

- Even if the share of energy in consumption is small, the effect of the relative price increase on inflation can be large. (For example, if \( \theta = 0.05 \), and \( \alpha = 0.5 \), then a 50\% increase in the relative price of energy leads to an increase in inflation of 5\%)

- Inflation measured using the GDP deflator lags inflation measured using the CPI.

This is very much what was observed in the mid 1970s. The mechanism behind the increase in inflation is straightforward. Given the wage, the increase in the price of oil increases the CPI. But the implied decrease in consumption wages leads workers to ask for an increase in nominal wages, which leads in turn to an increase in the GDP deflator. Under the convenient assumption of full accommodation made here, inflation goes on forever. Under the more realistic assumption of partial accommodation, lower output eventually puts an end to these price and wage increases, and inflation eventually stops. But the results that inflation lasts for some time, can be quite large relative to the shock, and CPI inflation leads inflation using the GDP deflator all remain.

6 Conclusions

I have argued that money cannot be the main culprit for what happened in the mid 1970s. It cannot explain stagflation. The behavior of interest rates does not fit. And most of the movements in the price of oil had little to do with monetary policy.
Does this mean that there are no mysteries left? The answer is an emphatic no. There is plenty we do not understand about what happened in the 1970s, and more generally about the price of oil and economic activity. The list of puzzles is well known, from the surprising finding by Hamilton that most U.S. post war recessions have been preceded by an increase in the price of oil (a finding which may turn to be true once more in the near future), to the apparent asymmetry between the effects of increases and decreases in the price of oil, and to the sheer size of the two recessions of the 1970s. I thank the two authors for putting the issues back on the research agenda.

References
