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## OIL SHOCKS: HOW DESTABILISING ARE THEY?

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ABSTRACT. This note examines Prabhat Patnaik's argument that the contemporary international financial system crucially requires the stability of oil prices in terms of the dollar. By comparing the macroeconomic impact of recent oil shocks to those of the 1970s, it argues that sharp changes in the dollar price of oil need not necessarily lead to instability.

One of the most striking conclusions reached in Prof. Prabhat Patnaik's recent book *The Value of Money* is that the world monetary system is still *de facto* a commodity money world, despite having broken all *de jure* links to the world of commodities after the collapse of the Bretton Woods system (Patnaik, 2008, Chapter 19).

Prof. Patnaik's argument proceeds in two steps. The necessity of the value of money being stable in terms of commodities—established earlier in the book for a single capitalist economy—takes the form of the necessity of the 'leading currency' maintaining a stable value in terms of commodities when the analysis moves to the setting of a world with many capitalist economies.

A threat to this stability can come from two main sources—autonomous increases in the price of labour power and increases in the price of primary commodities. Prof. Patnaik considers the former to be unlikely in the present deflationary regime imposed by finance capital. As for the latter, non-oil primary commodities do not pose a major threat to stability, most importantly because of their low share in the gross GDP of the advanced capitalist countries.

Thus, by elimination, the essential condition for the sustenance of the present world monetary regime with the dollar as the leading currency is the maintenance of a stable dollar price of oil—what Prof. Patnaik terms the *oil-dollar standard*—and it is in this sense that this regime is a *de facto* commodity money system.

This conclusion not only has far-reaching implications for the academic understanding of the international monetary system, it also provides a basis for an understanding of the recent tendencies of US imperialism.

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The converse of Prof. Patnaik's argument is that periods in which the dollar price of oil rises would, *ceteris paribus*, be periods of instability of the world capitalist system. This suggests the possibility of empirically testing, as it were, Prof. Patnaik's analysis of the contemporary international monetary system by looking precisely at such periods when the dollar price of oil has been rising.

It is our purpose in the present note to set the grounds for such a test by reviewing the existing evidence on the response of advanced capitalist economies to oil price shocks.

We are aware that any attempt at empirical verification on these lines is subject to a number of difficulties. First, there is no way to directly control for the violation of the *ceteris paribus* clause. Given that we only have a handful of episodes of large oil price increases over a number of decades during which the economies under study have changed drastically, there is no way to mechanically filter out the effects of our failure to control for 'other factors'. The best way forward seems to be to try to identify the most significant such factors for each episode and at least informally gauge the effect that they may have had.

The second difficulty in our exercise, common to all empirical macroeconomics, is our inability to observe expectations. As Prof. Patnaik points out, temporary fluctuations in oil prices do not pose any threat to the oil-dollar standard. Only secular increases, or more importantly, increases perceived to be secular increases do. However, we feel that by not looking at all changes in oil prices but limiting ourselves to oil price 'shocks', i.e. significant and sustained increases in oil prices, we address this difficulty to some extent.

## 1. THE EVIDENCE

Following the stagflation of the 1970s, it had till recently been the general opinion among macroeconomists that oil price shocks pose a serious threat to the stability of the world economy, including the advanced capitalist countries. As Hamilton pointed out in his pioneering study of the impact of oil price shocks on the US economy, Hamilton (1983): "All but one of the U.S. recessions since World War II have been preceded, typically with a lag of around three-fourths of a year, by a dramatic increase in the price of crude petroleum".

The twenty-first century has not been kind to this consensus. The increase in petroleum prices that have followed the US invasion of Iraq have cumulatively been as large as those of the 1970s. Yet, the advanced capitalist countries have not faced either recession or inflation comparable to those of the stagflation era, even though the latest episode of price increase extended much beyond Hamilton's lag of "three-fourths of a year". The fact that these economies are now in a recession precipitated by an international financial crisis does not offer

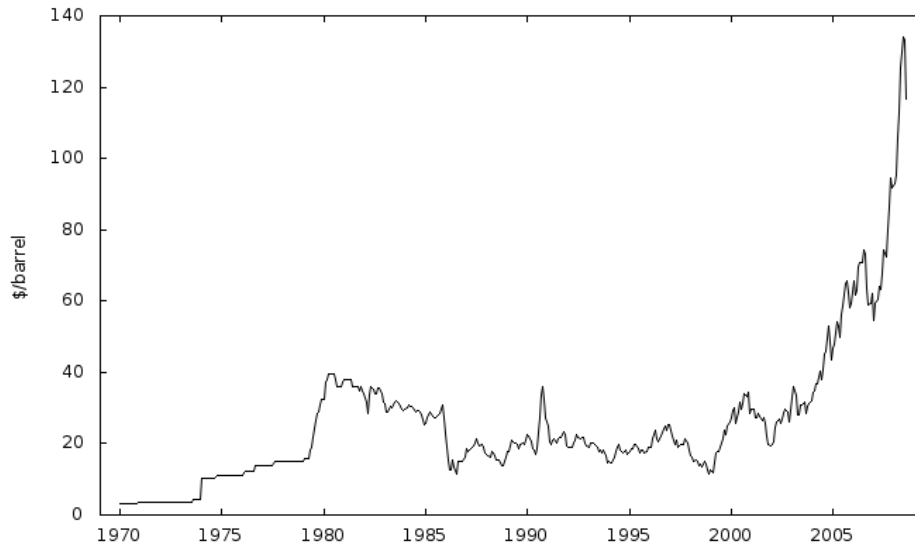


FIGURE 1. US Oil Prices—West Texas Intermediate  
[Source: FRED (Federal Reserve Economic Data)]

a resolution either. Even if a mechanism could be found whereby high oil prices would be a cause of the US housing bubble bursting, the long lag between the price increase and the slowdown would still cast doubts on any simple mechanisms connecting oil price increases to economic instability.

Such doubts had already started being voiced during the 1990s based on research which showed an apparent break in the relationship between oil prices and macroeconomic variables in the 1980s, with the relationship being much weaker in the later period. These observations led to three broad questions. Was there really a weakening in the oil-macro-economy relationship during the 1980s or was the apparent weakening a statistical artifact? If the relationship was weak during the 1980s, had it been strong even in the 1970s? If the relationship was strong during the 1970s and weak in the 80s and 90s, what had changed in between?

**1.1. Oil shocks.** Figure 1 plots the nominal US oil prices from 1970:1 to 2008:8.

Different methods have been suggested to identify and time ‘oil shock’ events from price series. Any such criteria will to some extent be arbitrary. For the sake of illustration we follow Blanchard and Galí (2008) who define a ‘large oil shock’ as “an episode involving a cumulative change in the (log) price of oil above 50 percent, sustained for

	run up period	50% rise date	max log change (\$)	max log change (real)
O1	1973:3–1974:1	1974:1	104%	96%
O2	1979:1–1980:2	1979:3	98%	85%
O3	1999:1–2000:4	1999:3	91%	87%
O4	2002:1–2007:3	2003:1	125%	110%

TABLE 1. Postwar Oil Shock Episodes. [Source: Blanchard and Galí (2008)]

	O1	O2	O3	O4	AVG(1,2)	AVG(3,4)
Canada	4.7	1.8	2.2	0.5	3.3	1.4
Germany	0.1	2.6	1.1	-0.2	1.4	0.4
France	5.4	3.1	1.3	0.5	4.2	0.9
U.K.	10.2	4.3	0.0	0.5	7.3	0.3
Italy	7.7	5.6	1.0	-0.1	6.6	0.4
Japan	7.9	1.0	-1.7	0.9	4.4	-0.4
U.S.	4.9	4.0	1.7	-0.2	4.5	0.7
G7	4.8	1.9	0.3	0.0	3.3	0.2
Euro12	4.3	2.7	1.3	-0.5	3.5	0.4
OECD	4.9	1.8	0.1	-0.5	3.4	-0.2

TABLE 2. Oil Shock Episodes: Change in Inflation. [Source: Blanchard and Galí (2008)]

	O1	O2	O3	O4	AVG(1,2)	AVG(3,4)
Canada	-8.3	-1.0	-1.5	3.2	-4.6	0.8
Germany	-9.6	-3.5	1.3	-2.5	-6.6	-0.6
France	-7.6	-4.4	0.6	1.2	-6.0	0.9
U.K.	-16.4	-9.2	0.4	2.5	-12.8	1.4
Italy	-8.6	0.4	3.0	-2.0	-4.1	0.5
Japan	-16.1	-4.4	7.6	3.3	-10.3	5.4
U.S.	-13.3	-11.8	-3.7	7.1	-12.5	1.7
G7	-12.6	-7.7	-0.2	3.9	-10.2	1.8
Euro12	-9.1	-2.9	1.0	-0.4	-6.0	0.3
OECD	-11.2	-6.5	0.1	4.1	-8.9	2.1

TABLE 3. Oil Shock Episodes: Cumulative Change in GDP.[Source: Blanchard and Galí (2008)]

more than four quarters”. Using this criteria they identify the episodes shown in Table 1.<sup>12</sup>

<sup>1</sup>Blanchard and Galí conclude their analysis at 2007:3. But it is evident from figure 1 that O4 is still continuing.

<sup>2</sup>Blanchard and Galí’s criteria does not identify the shock triggered by the first Gulf War since the price increase was reversed quickly

For the four episodes that they identify, Blanchard and Galí calculate the change in inflation and GDP for the individual G7 countries as well as a few aggregates of advanced countries. These are shown in Tables 2 and 3. With a few exceptions both these tables show the pattern referred to above. In the 1970s, oil price shocks clearly lead to stagflation. In the 1990s and 2000s, the effect is much less, if not non-existent.

Starting with Hamilton (1983), attempts have been made to look at the same relationship using the entire time series of oil prices and macroeconomic aggregates rather than individual shock episodes. Mork (1989), Hooker (1996), Hamilton (1996) are important contributions to this literature. Once we move away from looking only at oil price increases clearly associated with political/military events in the Middle East, two problems need solving. First, to what extent can we consider oil price changes as being exogenous to macroeconomic fluctuations. Second, we have to account for the possibility that the effect of oil price increases and oil price decreases may not be symmetric. The answer to these questions have an important bearing when evaluating alternative theoretical explanations of the oil-price economy relationship, but none of the adjustments needed to account for them overturn the basic conclusions in the tables above—oil-price increases had a large impact on output and inflation in the 1970s, the effect is much less in the 1990s and 2000s. The challenge for theory is to account for both these facts simultaneously.

## 2. RECESSIONS

**2.1. Large impact on output.** Any attempt to develop a theoretical understanding of the effect of oil price shocks on output and prices immediately comes up against the obstacle that simple models of the macroeconomy predict changes in output that are too small. While we would expect an increase in the price of oil to reduce the demand for oil and for directly or indirectly energy-intensive commodities like automobiles, it is not immediately clear why an oil price shock should create a downturn as sharp as those of the 1970s. This is a problem for both demand-side and supply-side theories.

The simplest supply-side mode is competitive market-clearing neo-classical model. In a model of that sort, output is most easily modelled as being produced jointly by labour, capital and energy by a production function:

$$Y = F(N, K, E) \tag{1}$$

If the price of energy is exogenously given, and a rise in energy prices causes other factors to be substituted for energy, this may cause output to fall. But a simple consequence of profit maximisation with production function (1) is that the elasticity of output with respect to a change in energy use equals the share of energy costs in total output.

For the U.S. economy a reasonable value for this share would be 4%, which would imply an output reduction of 0.4% for every 10% decrease in energy use, much smaller than what was observed during the 1970s.

A naive demand-side argument which sees an oil price increase as a tax which reduces the disposable income of oil buyers and increases the income of oil sellers would fare no better. Even if we assume that oil sellers do not consume any domestic goods out of their extra income, the relative income fall of oil buyers would at most be proportional to the share of oil in consumption expenditures, and that number would once again be too small to explain the recessions of the 1970s.

Given this, attempts have been made to explain the recessionary effects by bringing in secondary factors which may magnify the initial impact of oil price increases. Rothemberg and Woodford (1996) bring in imperfect competition and mark-up pricing, Finn (2000) introduces complementarity between energy and capital and variable capital utilisation and Hamilton (1988) introduces frictional employment arising out of the need to move labour out of industries which are directly or indirectly energy intensive (such as automobiles) to other industries. Apart from limited empirical support, a major problem for all these models is their inability to explain the weakening of the oil-price macroeconomic relationship in the last two decades.

## **2.2. Monetary policy and the bargaining power of workers.**

Given these difficulties in explaining the stagflation of the 1970s on the basis of purely private sector responses, one strand of literature starting with Bernanke et al. (1997) attributes the recession to incorrect monetary policy on the part of the Fed. Working in a vector auto-regression framework, Bernanke et al. (1997) tried to simulate the effects of a monetary policy that did not respond to oil price shocks and found that the reduction of output was lesser in their hypothetical regime. While the exact results of their analysis have been questioned on statistical grounds by Hamilton and Herrera (2004), it seems reasonable to assume that at least a part of the downturn of the 1970s must be attributed to recessionary monetary policies of that period. This would fit into a picture of an attempt to defend the oil-dollar standard by squeezing the real claims of the working class. But then, the question that follows is why such recessionary policies were not needed during later oil shocks?

A simple mechanism of explaining this discrepancy would be by invoking differences in expectation formation. The oil shocks of the 1970s were an unprecedented event and neither citizens nor policy-makers had any experience of dealing with such shocks and they had no way of predicting of what the shocks would imply for the trajectory of the economy. This brought greater uncertainty and a greater likelihood of the shocks being considered permanent and hence triggering off a

wage-price spiral. The later oil shocks were different both due to prior experience as well as due to the fact that in these later episodes there was a gradual increases in oil prices rather than a more abrupt jump. The last shock was also widely believed to have been caused by speculation. All of these might have led to a perception of the shocks as being transitory and hence might not have triggered off a wage-price spiral.

While there may be an element of truth in this argument based on expectations, it cannot negate the fact that the cumulative changes in oil prices were roughly comparable in the earlier and later episode. Therefore we would have expected a wage-price spiral to have been triggered off ultimately. The fact that it was not must therefore be attributed, in a conflicting-claims framework, to the flexibility of the claims of some strata. Two possible explanations stand out. One, a squeeze in the claims of domestic workers made easier by de-unionization and a reduction in the rights of workers in general. Two, a squeeze in the claim of foreign workers mediated through cheaper imports. The fact that one or both of these leads to a muting of the destabilizing effect of oil shocks is certainly not a cause for celebration, since this muting comes at the cost of growing inequality. However, such muting does increase the resilience of the world monetary system based on the dollar. And we expect that this muting would become easier as a declining energy intensity of output makes the required squeeze in real wages smaller over time.

### 3. CONCLUSION

The response of contemporary capitalist economies to oil price shocks has changed. Why, can only guess, and maybe the next oil shock will prove all predictions of fundamental change wrong. But what we do see is that at least in certain conjunctures large oil price increase do not automatically lead to a crisis for the system.

Does this demand a change in the analysis of the world monetary system presented in Prof. Patnaik's book? In essence, not at all. The fundamental impossibility of explaining the value of money through supply-and-demand and even the need for the leading currency of the time to maintain a stable value vis-a-vis commodities are conclusions that stand independently of the importance or otherwise of oil.

However, the idea of an 'oil-dollar standard' may indeed require re-examination. The evidence of recent years points to the possibility of oil joining other non-oil primary commodities in being quantitatively insignificant in determining the trajectory of the advanced capitalist countries.



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