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Discussions about Energy and Our Future

Further Evidence of the Influence of Energy on the U.S. Economy

Posted by [David Murphy](#) on April 16, 2009 - 11:11am in [The Oil Drum: Net Energy](#)
Topic: [Economics/Finance](#)

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[Gail, Jeff Rubin](#) , and now [James Hamilton \(warning- pdf\)](#) of the University of California – San Diego have produced literature correlating either this financial collapse or recessions more generally with peak oil and oil prices. The take-away message of their work is that oil prices played a fundamental role in causing the current recession and many previous recessions. In this post I, along with Steve Balogh, a fellow researcher here at the EROI Institute at SUNY-ESF, will add to this discourse.

In his recent report, James Hamilton states that:

With hindsight, it is hard to deny that the price rose too high in July 2008, and that this miscalculation was influenced in part by the flow of investment dollars into commodity futures contracts. It is worth emphasizing, however, that the two key ingredients needed to make such a story coherent— a low price elasticity of demand, and the failure of physical production to increase— are the same key elements of a fundamentals-based explanation of the same phenomenon. I therefore conclude that these two factors, rather than speculation per se, should be construed as the primary cause of the oil shock of 2007-08.

Hamilton continues:

At a minimum it is clear that something other than housing deteriorated to turn slow growth into a recession. That something, in my mind, includes the collapse in automobile purchases, slowdown in overall consumption spending, and deteriorating consumer sentiment, in which the oil shock was indisputably a contributing factor...Eventually, the declines in income and house prices set mortgage delinquency rates beyond a threshold at which the overall solvency of the financial system itself came to be questioned...had there been no oil shock, we would have described the U.S. economy in 2007:Q4-2008:Q3 as growing slowly, but not in a recession.

Hamilton acknowledges early on in his report that the proportion of income spent on energy is an important determinant of consumer spending patterns. The theory is fairly simple: if energy

expenditures rise faster than income, then the share of income for other things besides purchasing energy must decline, such as spending on mortgage payments for a second home in Las Vegas. In other words, rapid, large increases in energy prices may curtail consumption enough to trigger larger financial problems – like the bursting of a housing bubble – that when aggregated across an economy may cause or contribute significantly to a recession.

Figure 1 shows petroleum expenditures by consumers as a share of total GDP. Monthly data for 2008 was annualized so that each value represents what the petroleum expenditures as a share of GDP would have been had the expenditures remained the same until the end of 2008 (i.e. the value in March of 2008 represents what the annual expenditures would have been if the level of expenditures in March remained constant for all of 2008). We did this because the increase and subsequent decline in prices and consumer spending occurred within one year, so that using annual averages actually “annualizes-out” the volatility of the data.

Figure 1 shows that slow economic growth and even recessions tend to occur when petroleum expenditures reach about 5 or 6% of GDP.

This relation seems to be consistent for the major recessions but not for the minor recessions that occurred in 1990 – 1991 and 2001. However, a clearer picture is painted by looking at the year on year change in GDP and the year on year change in percent of GDP spent on petroleum expenditures (Figure 2). In this graph it is clear that rapid increases in the price of oil leads to rapid increases in the percent of GDP spent on petroleum which is followed by a slowing of economic growth, i.e. a recession.

Although neither correlation nor causation between expenditures and recessions are tested explicitly in these figures, the implication is certainly present. Every major and minor recession in the past 38 years was preceded by a rapid increase in prices and expenditures on petroleum. This does not mean that recessions are caused, or caused solely by increasing oil prices or expenditures on petroleum, rather that it is a common pre-condition for recessions.

Often there are exogenous and/or endogenous factors that seem to exacerbate the economic climate during times of high petroleum prices and expenditures, which taken together, can cause a recession. The major recessions of the 70’s and early 80’s were driven clearly by exogenous supply perturbations, while the recession of the early 2000’s (dot-com bubble) and the current recession (housing bubble) were driven by endogenous financial problems. Nonetheless, the common factor to all of these recessions was a rapid and large increase in expenditures on petroleum.

The next phase of this research will test statistically for correlation and causation within this data set. We welcome any comments/critiques/alternative theories.



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