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Journal of Monetary Economics 51 (2004) 781–808

Journal of  
MONETARY  
ECONOMICS

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# A quantitative analysis of oil-price shocks, systematic monetary policy, and economic downturns<sup>☆</sup>

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Received 18 October 2001; received in revised form 13 December 2002; accepted 29 September 2003

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## Abstract

Are the recessionary consequences of oil-price shocks due to oil-price shocks themselves or to the monetary policy that responds to them? We investigate this question in a calibrated general equilibrium model in which oil use is tied to capital utilization. The response to an oil-price shock is examined under a variety of monetary policy specifications. Under our benchmark calibration, which approximates the Federal Reserve's behavior since 1979, monetary policy contributes about 40 percent to the drop in output following a rise in oil prices. Moreover, none of the commonly proposed policies we examine completely offsets the recessionary consequences of oil shocks.

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*JEL classification:* E52; E32; Q43

*Keywords:* Oil; Monetary policy; Recessions

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<sup>☆</sup>We thank Chris Sims, James Hamilton, and seminar participants at the 2001 Econometric Society Summer Meeting, the Ente Einaudi, Rice University, and the Sveriges Riksbank for their comments. We also thank the editor and an anonymous referee for helpful suggestions. The views expressed here are those of the authors and do not necessarily represent those of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

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## 1. Introduction

Are the recessionary consequences of oil-price shocks due to oil-price shocks themselves or to the monetary policy that responds to them? Fig. 1 plots the federal funds rate and oil-price increases over the postwar period. The shaded areas in the graph are NBER recessions. Oil prices generally rise prior to recessions but so does the funds rate, suggesting that contractionary monetary policy may play a role in downturns as well. Recent work by Bernanke et al. (1997) argues that monetary policy plays the larger role: a monetary policy different from that in place during the 1970s, i.e., a fixed nominal interest rate policy, could have largely eliminated the negative output consequences of the oil-price shocks on the U.S. economy. This view has, in turn, been challenged by Hamilton and Herrera (2000), who argue that Bernanke, Gertler, and Watson's (BGW) empirical results are driven by model misspecification. Hamilton and Herrera reimplement the BGW experiment using a different model specification and find that it is the increases in the price of oil that lead directly to contractions in real output: contractionary monetary policy plays only a secondary role in generating the downturn. Thus, while there is widespread agreement that oil-price shocks have been an important factor for the volatility of real output in the postwar period, there is less agreement on the channel of transmission.

We explore the role of alternative monetary policies in amplifying or dampening the economy's response to oil-price shocks in the framework of a dynamic, stochastic, general equilibrium model. This approach contrasts with much of the existing analysis that has examined interaction between oil-price shocks and monetary policy using reduced-form vector autoregression (VAR) models. These empirical models are largely silent on the channels through which oil-price changes affect real output. Further, any VAR-based analysis of the reaction of the economy

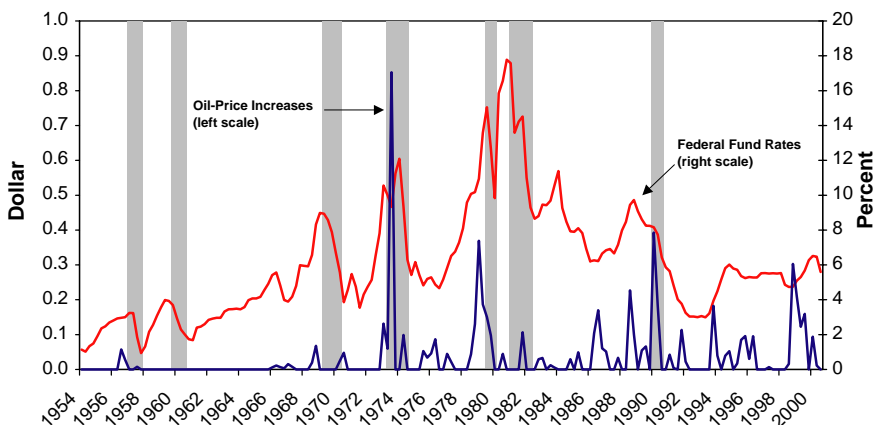


Fig. 1. Recessions, oil-price increases, and the federal fund rates. Gray bars are NBER recessionary periods. The net oil-price increase is calculated as the first-difference of the logarithm of the price of oil. If the first-difference is negative, the entry is set to zero.

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