



Uncertainty shocks are aggregate demand shocks[☆]



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ABSTRACT

Search frictions in the labor market give rise to a new option-value channel through which uncertainty affects aggregate economic activity, and the effects of which are reinforced by the presence of nominal rigidities. With these features, an increase in uncertainty resembles an aggregate demand shock because it increases unemployment and lowers inflation. Using a new empirical measure of uncertainty based on the Michigan survey and a VAR model, we show that these theoretical patterns are consistent with US data. Using a calibrated DSGE model, we show that combining search frictions and nominal rigidities can match the qualitative VAR pattern and account for about 70 percent of the empirical increase in unemployment following an uncertainty shock.

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1. Introduction

Measures of uncertainty surged in the Great Recession of 2008–2009 and remained elevated during most of the recovery period. Some have argued that increases in uncertainty contributed to the deep recession and the slow recovery, with a persistently high unemployment rate (Williams, 2013; Baker et al., 2015). In this paper, we present a DSGE framework with search frictions and nominal rigidities to illustrate a new transmission mechanism through which uncertainty can produce large macroeconomic effects. This mechanism works through an interaction between an option-value channel that arises from labor search frictions and an aggregate-demand channel associated with nominal rigidities.

Our theoretical framework is guided by empirical evidence about the joint dynamics of unemployment and inflation following an uncertainty shock. We show that, in a small-scale Bayesian vector-autoregression (BVAR) model, an increase in

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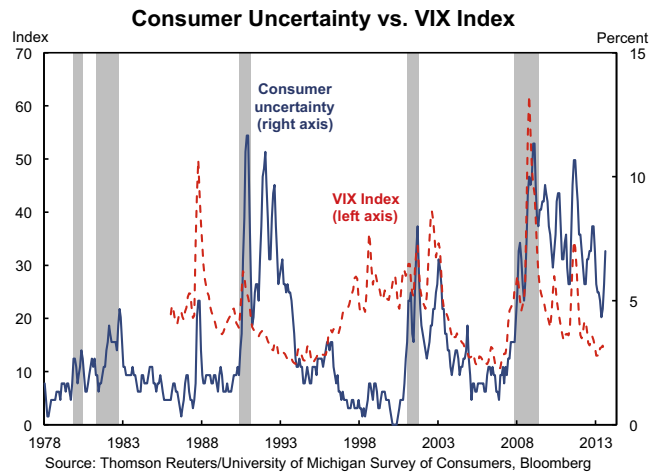


Fig. 1. Consumers' perceived uncertainty from the Michigan Survey of Consumers in the United States (solid line) versus the VIX/VXO index from the Chicago Board of Exchange (dashed line). The grey shaded areas indicate NBER recession dates in the United States. Data frequencies are monthly. The consumer uncertainty series starts in January 1978 and the VIX/VXO series starts in January 1986. Both series end by October 2013. Three-month moving averages are plotted.

uncertainty raises unemployment and lowers inflation, suggesting that the macroeconomic effects of uncertainty operate partly through an aggregate-demand channel. This empirical pattern is robust to the use of alternative measures of uncertainty, including standard measures such as the CBOE Volatility Index (VIX) and a novel measure of consumers' perceived uncertainty constructed using data from the Thomson Reuters/University of Michigan Surveys of Consumers. Despite a weak correlation between the raw time series of the VIX and consumer uncertainty measure, the BVAR model consistently predicts that an uncertainty shock acts like a negative aggregate demand shock, raising unemployment and lowering inflation, independent of the particular measure of uncertainty used. Furthermore, the BVAR evidence suggests that uncertainty shocks lead to large increases in the unemployment rate. The large real effect of uncertainty shocks presents a challenge for standard DSGE models (e.g., [Born and Pfeifer, 2014](#)).

We use our theoretical framework to examine the mechanism through which uncertainty shocks can generate the large increase in unemployment and the fall in inflation observed empirically. Consistent with our VAR evidence, the DSGE model predicts that a rise in uncertainty raises the unemployment rate and lowers the inflation rate. More importantly, our model suggests that interactions between search frictions and nominal rigidities are the key to obtaining the observed large increase in unemployment following an uncertainty shock.

1.1. The key mechanism

First, nominal rigidities help amplify the effect of uncertainty shocks on the unemployment rate through declines in aggregate demand, as in the standard DSGE model without search frictions ([Fernández-Villaverde et al., 2013](#); [Basu and Bundick, 2011](#)). In our model with search frictions, the decline in aggregate demand reduces the value of a new match so that firms post fewer job vacancies, pushing the unemployment rate up. As more searching workers fail to find a job match, household incomes decline further. This leads to an even greater fall in aggregate demand, which magnifies the effects of uncertainty shocks. In addition, with sticky prices, inflation falls as aggregate demand declines, in line with our evidence.

Second, search frictions provide an additional mechanism for uncertainty shocks to generate large increases in unemployment via an option-value channel. With search frictions, a job match represents a long-term employment relationship that is irreversible. When times are uncertain, the option value of waiting increases and the match value declines. Firms respond by reducing hiring. This option-value effect in our model with search frictions arises for a similar reason as in the literature of irreversible investment decisions under uncertainty ([Bernanke, 1983](#); [Bloom, 2009](#); [Bloom et al., 2012](#)).

Indeed, in our model with search frictions, uncertainty shocks can be contractionary even with flexible prices, in contrast to the real business cycles (RBC) model with a spot labor market. A contraction occurs as long as the option-value channel dominates the effect of precautionary savings, which lowers interest rates and boosts the present value of a job match. When prices are sticky, an increase in uncertainty also leads to a decline in aggregate demand (the demand channel), which reinforces the option-value channel and generates an increase in unemployment that is roughly 70 percent of that observed in the data. Search frictions also amplify the decline in inflation, although the magnitude of the fall in prices remains notably smaller than what we see in the data.

We also examine the relative importance of these two channels through the lens of our model. Absent significant search frictions, the demand channel alone accounts for at most 16 percent of the observed increase in the unemployment rate following an uncertainty shock. This relatively small impact of uncertainty on real economic activity is in line with the recent findings of [Born and Pfeifer \(2014\)](#) using a standard DSGE model without search frictions. Similarly, absent nominal

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