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The macroeconomic impact of financial and uncertainty shocks

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ABSTRACT

The extraordinary events surrounding the Great Recession have cast a considerable doubt on the traditional sources of macroeconomic instability. In their place, economists have singled out financial and uncertainty shocks as potentially important drivers of economic fluctuations. Empirically distinguishing between these two types of shocks, however, is difficult because increases in economic uncertainty are strongly associated with a widening of credit spreads, an indication of a tightening in financial conditions. This paper uses the penalty function approach within the SVAR framework to examine the interaction between financial conditions and economic uncertainty and to trace out the impact of these two types of shocks on the economy. The results indicate that (1) financial shocks have a significant adverse effect on economic outcomes and that such shocks were an important source of cyclical fluctuations since the mid-1980s; (2) uncertainty shocks, especially those implied by uncertainty proxies that do not rely on financial asset prices, are also an important source of macroeconomic disturbances; and (3) uncertainty shocks have an especially negative economic impact in situations where they elicit a concomitant tightening of financial conditions. Evidence suggests that the Great Recession was likely an acute manifestation of the toxic interaction between uncertainty and financial shocks.

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1. Introduction

The acute turmoil that swept through global financial markets during the 2008–09 financial crisis and the depth and duration of the associated economic downturn, both in the United States and abroad, have cast a considerable doubt on the traditional sources of business cycle fluctuations. In response, recent theoretical and empirical research aimed at understanding these extraordinary events has pointed to financial and uncertainty shocks—or their combination—as alternative drivers of economic fluctuations (Bloom, 2009; Bloom et al., 2012; Arellano et al., 2012; Christiano et al., 2014; Gilchrist et al., 2014).

Empirically distinguishing between these two types of shocks, however, is difficult because increases in financial market volatility—a widely used proxy for macroeconomic uncertainty—are frequently associated with significant increases in credit

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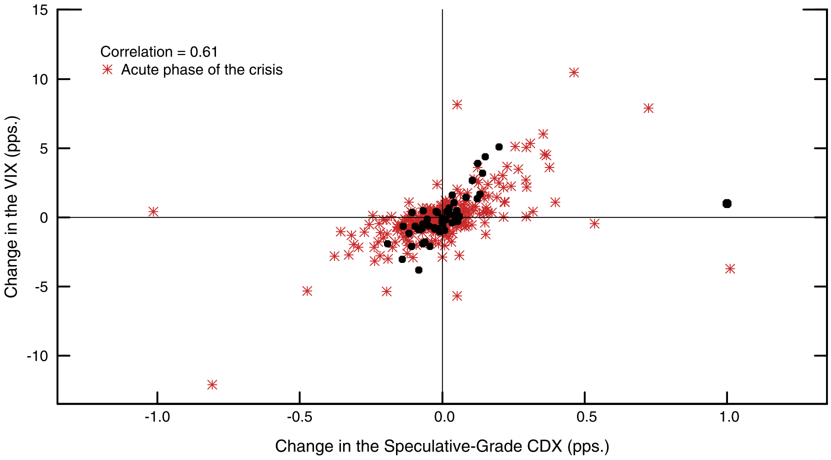

Fig. 1. Financial market volatility and credit risk during the great recession. *Note*: Sample period: daily data from 12/01/2007 to 06/30/2009. The scatter plot depicts the relationship between the daily change in the option-implied volatility on the S&P 500 stock futures index (VIX) and the daily change in the 5-year (on-the-run) speculative-grade CDX index. The period 09/01/2008 to 08/05/2009 marks the acute phase of the crisis, which reached a critical stage in early September 2008, when an evaporation of liquidity in the global credit markets threatened the solvency of several major financial institutions. The end date of the acute phase follows the release of the results from the Supervisory Capital Assessment Program (the so-called bank stress test) at 5 p.m. EST on May 7, 2009.

spreads. A stark illustration of this empirical challenge is depicted in Fig. 1, which shows the relationship between the daily change in the option-implied volatility on the S&P 500 stock futures index (the VIX) and the daily change in the speculative-grade CDX index during the recent financial crisis.[1] Clearly evident is the fact that episodes of acute financial distress are associated with spikes in asset price volatility. Indeed, in their comprehensive empirical anatomy of the Great Recession, Stock and Watson (2012) explicitly single out the high (positive) correlation between credit spreads and proxies for economic uncertainty and conclude that “[T]hese two sets of instruments do not seem to be identifying distinct shocks.”

Within a structural vector autoregressive (SVAR) framework—the workhorse of empirical macroeconomics—this high degree of comovement between indicators of financial distress such as credit spreads and uncertainty proxies significantly complicates the identification of financial and uncertainty shocks, as both types of variables are “fast moving.” As a result, it is difficult to impose plausible zero contemporaneous restrictions to identify these two types of disturbances. It it also difficult to impose sign restrictions on the impulse response functions in order to achieve an economically plausible identification because financial and uncertainty shocks have theoretically the same qualitative effects on both prices and quantities in most instances.

In this paper, we use the penalty function approach developed initially by Faust (1998) and Uhlig (2005) to examine the interaction of economic uncertainty and financial conditions and to trace out the impact of the associated shocks on the macroeconomy. Within our SVAR framework, these two structural innovations are identified using a criterion that each shock should maximize the *impulse response* of its respective target variable over a pre-specified horizon. In economic terms, our identified uncertainty and financial shocks generate a prolonged period of heightened economic uncertainty and a persistent tightening of financial conditions, respectively. Moreover, our identifying assumptions allow for financial conditions to react immediately to an uncertainty shock, while financial shocks can also have a contemporaneous effect on the level of economic uncertainty.[2] Compared with identification schemes based on sign restrictions, this framework allows us to distinguish empirically between shocks that have otherwise very similar qualitative effects on the economy.

Our approach, however, still requires a sequential identification of these two shocks. As a result, we implement the penalty function criterion in two steps. Under the baseline identification scheme, we first search for an innovation that maximizes the response of the uncertainty proxy over a given horizon—this optimization step identifies what we call an

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[1] The VIX index is a commonly used proxy for macroeconomic uncertainty (Bloom, 2009, 2014). The speculative-grade CDX index is a tradable credit derivative index used widely by investors for hedging of and investing in corporate credit risk. Buying and selling of the credit derivative index is comparable to buying and selling portfolios of corporate bonds: By buying the index, the investor takes on the credit exposure—is exposed to defaults—a position similar to that of buying a portfolio of bonds; by selling the index, the credit exposure is passed on to another party. The speculative-grade CDX index references 100 (5-year) credit default swap (CDS) contracts on firms that have a “junk” rating from either Moody's or Standard & Poor's. The component firms must have highly liquid single-name CDS trading in their name, and the composition of both indexes, which is determined by a dealer poll, is representative of the U.S. corporate sector.

[2] To the best of our knowledge, there are only two studies that analyze the effects of both financial and uncertainty shocks in the VAR context. Focusing on the German economy, Popescu and Smets (2010) identify financial and uncertainty shocks using a recursive ordering, in which the uncertainty proxy is placed after the macro block but before the financial market risk index—that is, they allow uncertainty shocks to elicit an immediate change in financial conditions but not vice versa. Gilchrist et al. (2014) use U.S. data to explore the macroeconomic implications of uncertainty and financial shocks using alternative orderings for the uncertainty and financial stress proxies. The key finding that emerges from their analysis is that the economic significance of uncertainty shocks hinges crucially on whether they have been orthogonalized with respect to the contemporaneous information in credit spreads. This result highlights the need for an approach that allows for a contemporaneous feedback between financial conditions and economic uncertainty.

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