Why is Trade so Volatile? The Great Trade Collapse of 2008/09

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Extended abstract:

The recent global economic crisis has been characterized by sharp declines in economic output. However, the accompanying declines in international trade were even sharper, in some cases up to 50 percent. Standard models of international macroeconomics and international trade fail to account for the severity of the trade collapse.

In this paper, we attempt to explain why international trade is so volatile in response to economic shocks. On the theoretical side, we combine the uncertainty shock approach by Bloom (2009) with a model of international trade. Bloom's (2009) real-options approach is motivated by high-profile events that

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trigger an increase in uncertainty about the future path of the economy, for example the 9/11 terrorist attacks or the collapse of Lehman Brothers. In the wake of such events, firms adopt a 'wait-and-see' approach, slowing down their hiring and investment activities. Bloom (2009) shows that large uncertainty shocks typically lead to sharp recessions. Once the degree of uncertainty subsides, firms revert to their normal hiring and investment patterns and the economy recovers.

We extend the uncertainty shock approach to the open economy. In contrast to Bloom's (2009) closed-economy set-up, we develop a theoretical framework in which firms import a range of their intermediate inputs from foreign suppliers. This production structure is motivated by the empirical observation that a large fraction of international trade consists of capital-intensive intermediate goods such as car parts and wind turbines.

Due to transportation and transit time, firms pre-order the foreign intermediate inputs and hold an inventory. We show that in response to a large uncertainty shock to the future demand for final products, firms optimally adjust their inventory policy cutting their orders of foreign intermediates more strongly than orders for domestic intermediates (Caplin, 1985 and Hassler, 1996). In the aggregate, this differential response leads to a bigger contraction in international trade flows than in domestic economic activity. Thus, our model magnifies the response of international trade to uncertainty shocks.

On the empirical side, we confront the model with high-frequency monthly U.S. import and industrial production data going back to 1958. Preliminary results suggest a tight link between uncertainty shocks as identified by Bloom (2009) and the cyclical behavior of international trade. That is, the behavior of trade can be well predicted with standard uncertainty measures such as VIX stock market volatility indices (see Bloom, 2009 on how to measure uncertainty shocks).

In particular, the Great Trade Collapse of 2008/09 can be quantitatively explained by the large degree of uncertainty triggered by the collapse of Lehman Brothers. According to our empirical results, the unusually large trade collapse of 2008/09 is thus a response to the unusually large increase in uncertainty at the time. But qualitatively, it is comparable to previous post-World War II slowdowns or contractions in international trade.

In addition, we aim to exploit variation across sectors. A testable implication of our model is whether industries that are more dependent on foreign intermediate inputs react more strongly to uncertainty shocks. We investigate this hypothesis using input-output tables examining monthly three-digit NAICS industry-level data from 1989 to the present.

Our approach is relevant for researchers and policy makers who seek to understand the recovery process in response to the global economic crisis. It also helps to predict the trajectory of international trade for future economic crises.

The trade collapse of 2008/09 has been documented in detail by Levchenko, Lewis and Tesar (2010), Eaton, Kortum, Neiman and Romalis (2011) as well as Bems, Johnson and Yi (2010) amongst others (also see Baldwin, 2009). Eaton, Kortum, Neiman and Romalis (2011) develop a structural model of international trade in which the decline in trade can be related to a collapse in demand for tradable goods and an increase in trade frictions. They find that a collapse in demand explains the vast majority of declining trade.

Our approach is different in that we explicitly model the collapse in demand by considering uncertainty shocks. Consumers and firms react to the uncertainty by adopting a 'wait-and-see' approach so that demand recedes endogenously. Thus far, we have not invoked changes in trade frictions, although those might be important to explain differences in trade responses across countries.

Amiti and Weinstein (2009) and Chor and Manova (2010) stress the role of financial frictions and the drying up of trade credit. Engel and Wang (2011) highlight the fact that the composition of international trade is tilted towards durable goods. Building a two-sector model in which only durable goods are traded, they can replicate the higher volatility of trade relative to general economic activity. Instead, our approach adopts an inventory approach combined with uncertainty shocks.

Finally, our paper is also related to Alessandria, Kaboski and Midrigan (2011) who rationalize the decline in international trade by changes in firms' inventory behavior due to a shock to the cost of labor and a shock to the interest rate. In

contrast, we focus on the role of increased uncertainty, which was a marked shock in particular during the recent recession.

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