Do Credit Shocks Matter? A Global Perspective

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Main Questions and Results

- **Do Credit Shocks Drive the Global Business Cycle?**
  - We study the period 1988:1-2009:4
  - Over the full sample credit shocks matter, but to a modest extent
  - In the recent crisis credit shocks are a main driver of global GDP
  - In contrast, global credit shocks mattered little in the 1991, 2001 recessions

- **Do US credit shocks transmit to the world?**
  - In the recent crisis, yes, in earlier periods, no
Main Questions and Results

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- Do US credit shocks transmit to the world?
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Our Approach

- We estimate common factors to a number of key macro variables in the G7
  - Macroeconomic Aggregates of Interest: GDP, Inflation
  - Potential 'Source' Variables: Interest rates, Credit, Credit Spreads, Productivity
  - Estimated Common Factors are placed in a Global VAR

- We then identify a number of shocks that may drive the global cycle
  - Productivity, Credit, Monetary, Demand
  - Each shock is identified with sign restrictions
  - We examine IRFs, Variance Decompositions, and Counterfactual Simulations

- We then estimate a VAR on US data with the Global GDP factor
  - We identify the same shocks
  - We study how US shocks transmit to the world
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Data

- Quarterly data for the G7, 1988:1-2009:4
- Credit: Aggregate Claims on Private Sector
- Credit is deflated by CPI
- US Corporate Bond Spread: Aaa-Baa
- GDP, CPI Inflation, Short Term Treasury Rates
- Productivity: Real GDP per Hours Worked
Constructing a Global VAR

- We will use common factors as estimates of Global measures of GDP, credit etc.
- Factors are estimated with principal components
- Exact factor analysis as in Kose, Otrok and Whiteman (2003) is an alternative
  - Their approach is most useful in multifactor settings
  - In a one factor model the estimated factors are very similar
  - Principal components is easier
G7 GDP Factor
Credit Factor and Credit Spread

Global Factors

Note: The graphs show the common factors for the G-7 countries estimated using the principal component method. The spread is based on US corporate bond spread only.
Sign Restrictions

- Restrict impulse response functions of some variables using theory
- Less restrictive and more intuitive than informational orderings
- Start with the idea that there are many possible statistically valid mappings between the reduced form and structural VAR
- We then draw a 'candidate' IRF from this large set
- If the candidate meets our IRF restrictions we retain the draw
Sign Restrictions

- **Credit Shocks**
  - decrease in credit, rise in credit spread
- **Productivity Shocks**
  - Rise in productivity, rise in GDP, fall in inflation
- **Demand Shocks**
  - Increase in inflation and GDP
- **Policy Shocks**
  - rise in interest rates, fall in inflation, GDP
  - credit spreads do not rise

- All restrictions are imposed for 4 quarters, then the IRFs are unconstrained
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Credit Shocks in Global VAR

Figure 2
Impulse Responses due to a Credit Shock: Global VAR

Note: The graphs show the impulse responses of the global factors and the US credit spread due to a 1 standard deviation credit shock in the global VAR model. The solid line represents the median and the dotted lines represent the 16th and the 84th percentiles based on 5000 draws.
Demand Shocks in Global VAR

![Impulse Response Functions](image)

- **GDP**
- **Productivity**
- **Inflation**
- **Interest Rates**
- **Credit**
- **Credit Spread**

Note: The graphs show the impulse responses of the global factors and the US credit spread due to a 1 standard deviation demand shock in the global VAR model. The solid line represents the median and the dotted lines represent the 16th and the 84th percentiles based on 5000 draws.
Productivity Shocks in Global VAR

**GDP**

**Productivity**

**Inflation**

**Interest Rates**

**Credit**

**Credit Spread**

Note: The graphs show the impulse responses of the global factors and the US credit spread due to a 1 standard deviation productivity shock in the global VAR model. The solid line represents the median and the dotted lines represent the 16th and the 84th percentiles based on 5000 draws.
Policy Shocks in Global VAR

Figure B2
Impulse Responses due to a Policy Shock: Global VAR

Note: The graphs show the impulse responses of the global factors and the US credit spread due to a 1 standard deviation policy shock in the global VAR model. The solid line represents the median and the dotted lines represent the 16th and the 84th percentiles based on 5000 draws.
## 4 Shocks in the Global VAR

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Credit Shocks and Global GDP: Recent Crisis

Figure 3: Dynamics of Global GDP: Credit Shock

Note: The graphs show the dynamics of cumulative four quarterly growth rates of the global GDP factor during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The solid line represents the actual global GDP factor and the dotted line represents the counterfactual when the global credit shock is set to zero during the period considered.
Credit Shocks and Global GDP: Previous Episodes

Figure 3
Dynamics of Global GDP: Credit Shock

Note: The graphs show the dynamics of cumulative four quarterly growth rates of the global GDP factor during the recessions of 2007-2009, 1990-1991, and 2000-2001 respectively. The solid line represents the actual global GDP factor and the dotted line represents the counterfactual when the global credit shock is set to zero during the period considered.
All Shocks and Global GDP: Recent Crisis

Figure 4
Difference between Counterfactual and Actual Global GDP

Note: The graphs show the difference between cumulative four quarterly growth rates of the counterfactual and actual global GDP factor during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The counterfactual is the cumulative growth rates of the global GDP factor when the respective shock is set to zero during the period considered. A positive (negative) bar at each period then captures how the decrease in the global GDP factor would have been lesser (greater) in the absence of the respective shock.
Do US Credit Shocks Transmit to the Rest of the World?

- VAR with US data + Global GDP Factor = FAVAR
- Do Credit Shocks that originate in the US propagate to the world?
- Same sign restrictions as before
Credit Shock in US FAVAR

**Figure 5**

Impulse Responses due to a Credit Shock: US FAVAR

- Note: The graphs show the impulse responses of the global GDP factors and the US credit spread due to a 1 standard deviation credit shock in the US FAVAR model. The solid line represents the median and the dotted lines represent the 16th and the 84th percentiles based on 5000 draws.
# 4 Shocks in the US FAVAR

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US Credit Shock and US GDP: Recent Crisis

Figure 6a
Dynamics of US GDP: Credit Shock

Note: The graphs show the dynamics of cumulative four quarterly growth rates of US GDP during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The solid line represents the actual US GDP and the dotted line represents the counterfactual when the US credit shock is set to zero during the period considered.
US Credit Shock and US GDP: Previous Episodes

Figure 6b
Dynamics of Global GDP: Credit Shock

Note: The graphs show the dynamics of cumulative four quarterly growth rates of global GDP factor during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The solid line represents the actual global GDP factor and the dotted line represents the counterfactual when the US credit shock is set to zero during the period considered.

1990-1991

2000-2001

Counterfactual
Actual
US Credit Shock and Global GDP

- Figure 6b: Dynamics of Global GDP: Credit Shock

Note: The graphs show the dynamics of cumulative four quarterly growth rates of global GDP factor during the recessions of 2007-2009, 1990-1991, and 2000-2001 respectively. The solid line represents the actual global GDP factor and the dotted line represents the counterfactual when the US credit shock is set to zero during the period considered.
All Shocks and US GDP

Figure 7a
Cumulative Growth Gap of US GDP

Note: The graphs show the difference between cumulative four quarterly growth rates of the counterfactual and US GDP during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The counterfactual is the cumulative growth rates of US GDP when the respective shock is set to zero during the period considered. A positive (negative) bar at each period then captures how the decrease in the US GDP would have been lesser (greater) in the absence of the respective shock.
All Shocks and Global GDP

Figure 7b
Cumulative Growth Gap of Global GDP

Note: The graphs show the difference between cumulative four quarterly growth rates of the counterfactual and the global GDP factor during the recessions of 2007-2009, 1990-1991 and 2000-2001 respectively. The counterfactual is the cumulative growth rates of the global GDP factor when the respective shock is set to zero during the period considered. A positive (negative) bar at each period then captures how the decrease in the global GDP factor would have been lesser (greater) in the absence of the respective shock.
Conclusion

This paper is the first to study credit shocks at a global level.

We find that global credit shocks:
- Have a modest impact on GDP, but not other variables.
- On average they are about as important as other shocks.
- Were a prime driver of the crisis, accounting for 25 percent of the decline.
- Were not very relevant for the 1991 and 2001 recessions.

We find that US credit shocks:
- Have a modest impact on Global GDP.
- Were a prime driver of the global recession of 2009.