Uncertainty Shocks

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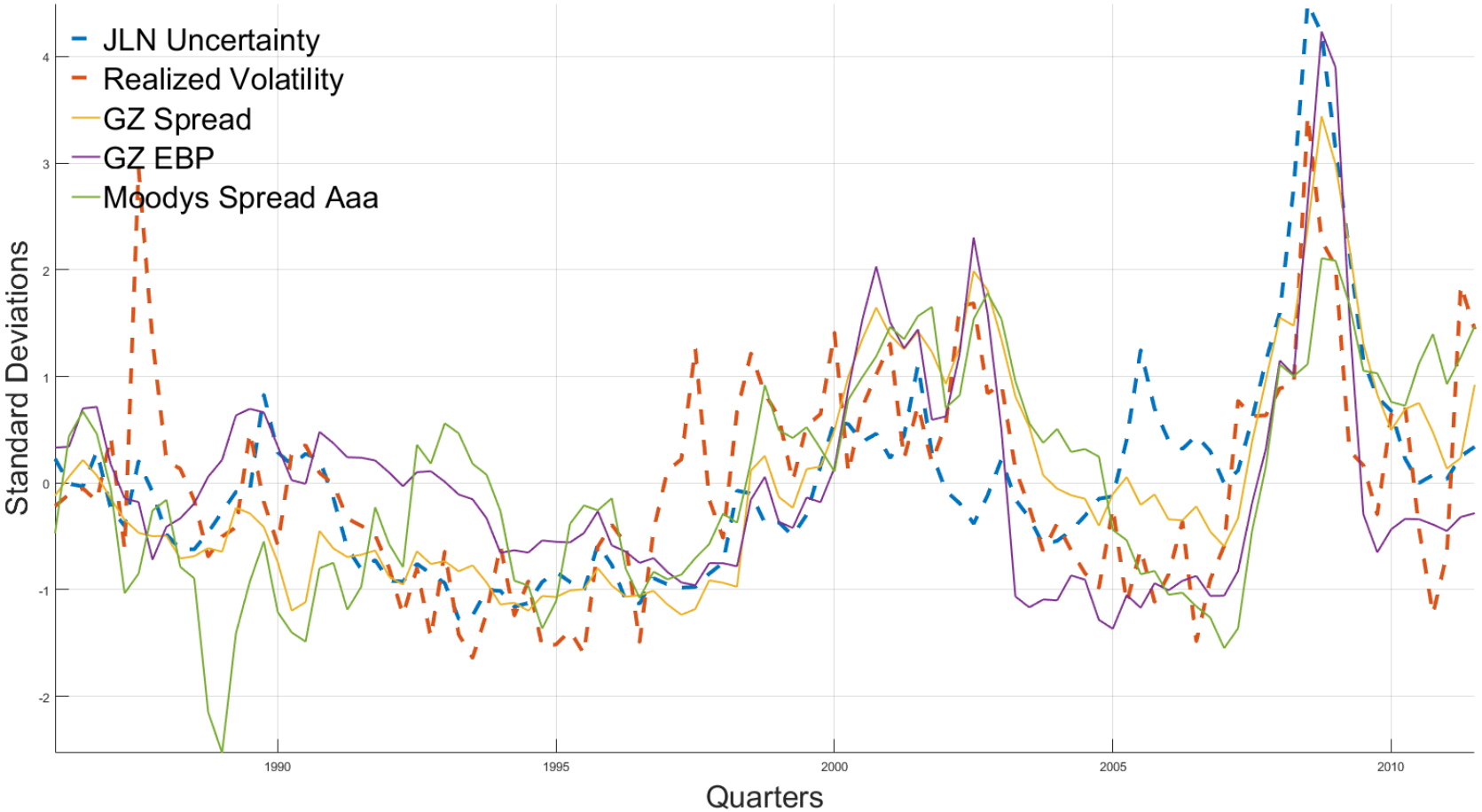
September 2018

Dissertation Workshop

Two Possible Avenues

1. News-noise driven uncertainty
2. Financial Shocks vs Uncertainty Shocks

Credit Conditions and Uncertainty (I)



Proxies for **credit conditions** and **uncertainty** are both countercyclical and tightly correlated.

Credit Conditions and Uncertainty (II)

	JLN	RV	GZ	EBP	Moodys Aaa
JLN	1	-	-	-	-
RV	0.5865	1	-	-	-
GZ	0.7742	0.6247	1	-	-
EBP	0.6213	0.5621	0.7316	1	-
Moodys Aaa	0.4386	0.4554	0.7993	0.5243	1

As suggested by the graph above, all the variables are strongly correlated.

Financial Shocks and Uncertainty Shocks

Stock and Watson (2012); Caldara et al. (2016) among others shown that uncertainty shocks and financial shocks are deeply confounded.

$$corr(\iota_t^{EBP}, \iota_t^{JLN}) \approx 0.45$$

where ι_t^{EBP} is an unpredictable innovation in the **excess bond premium** from Gilchrist and Zakrajzek (2012) and ι_t^{JLN} is an unpredictable innovation in the **uncertainty proxy** from Jurado et al. (2015).

Both a theoretical and empirical question

Literature did not succeed yet to disentangle the two exogenous sources for two main reasons:

1. Simultaneity
   - Both types of variables are fast moving
2. Observationally equivalence
   - They have the same qualitative effects on prices and quantities

As a result, both **zero-impact restrictions** cannot be used and **internal instruments** are not available.

My contribution

I want to take a step back and show evidence and theory that financial and uncertainty shocks

- are not observationally equivalent, and
- they can be successfully disentangled.

In particular, I will show evidence that there exists a set of variables which respond differently to financial and uncertainty shocks.

- there exists an **economic intuition** for this response
- those variables can be used as **internal instruments**

Variables of Interest

Cash Flow is defined as (i) undistributed corporate profits plus (ii) consumption of fixed capital minus (iii) net capital transfers paid.

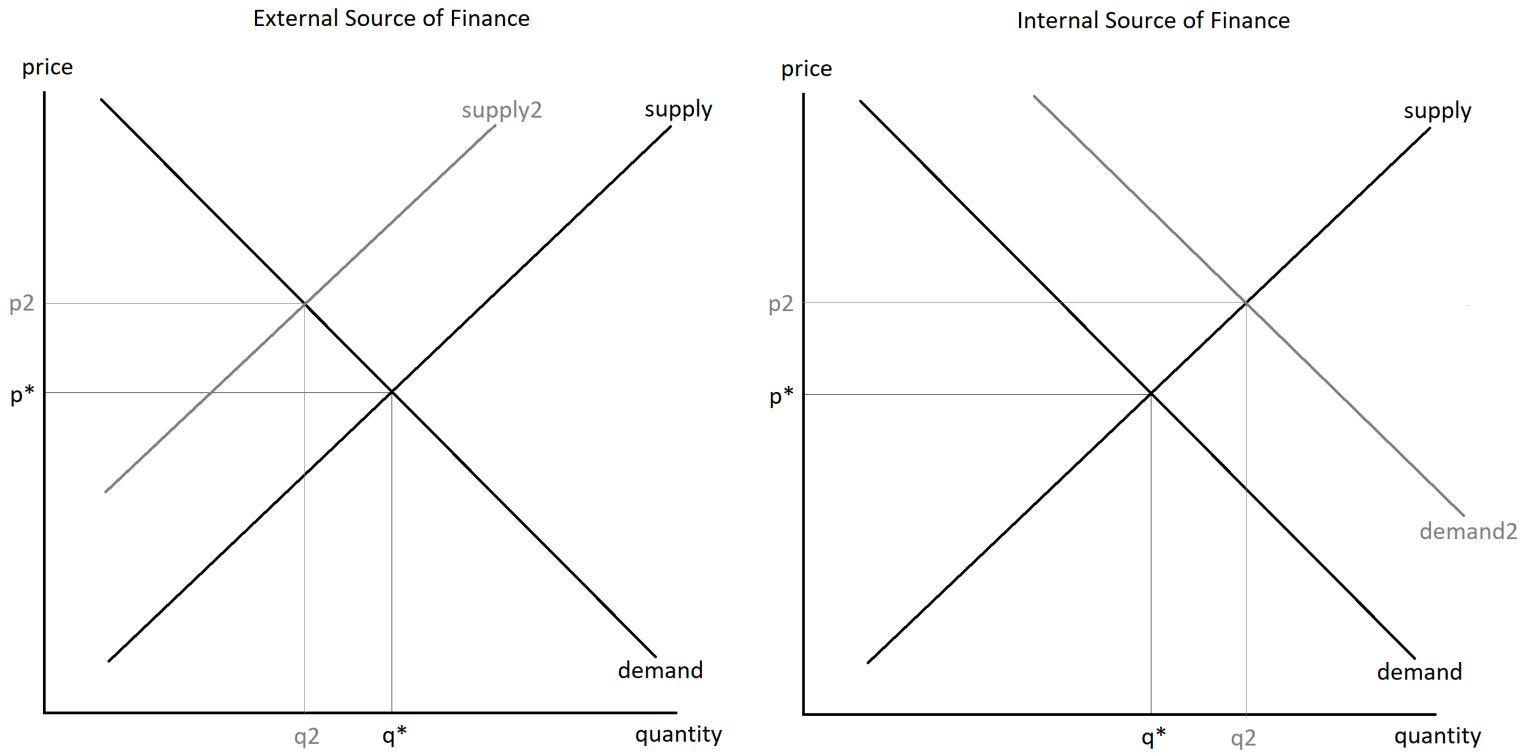
where

1. **Undistributed corporate profits** are defined as (i) corporate profits minus (ii) dividends
2. **consumption of fixed capital** can be simply interpreted as capital depreciation
3. **net capital transfers paid** are unrequited transfers, e.g. charity

Cash Flow is a profit-related measure of **internal funds** available for investment. [The NIPA Handbook, December 2015]

Partial Equilibrium Analysis (I)

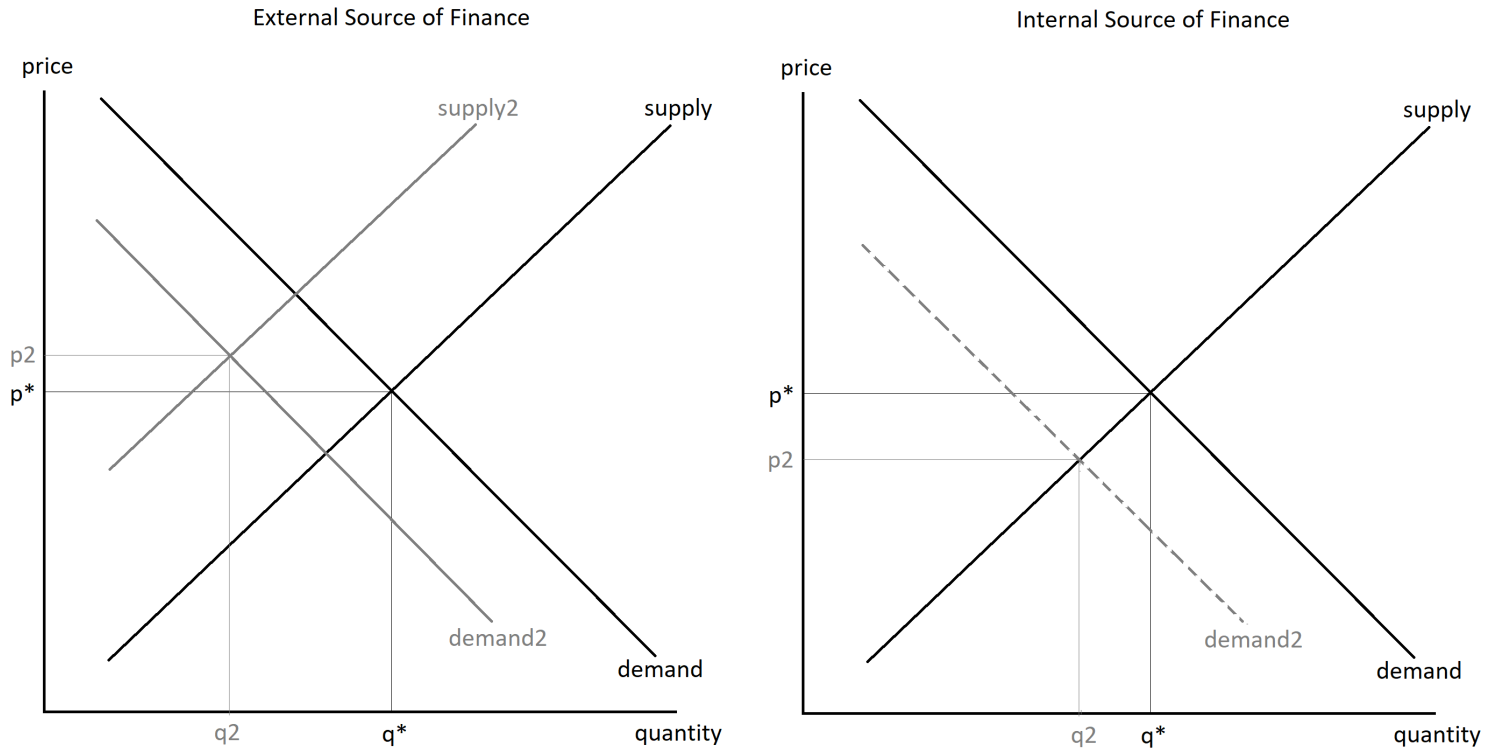
Decrease in the risk bearing capacity of the financial sector.



Notice that I am taking as given the supply of internal source of finance.

Partial Equilibrium Analysis (II)

Increase in the level of uncertainty.



Notice that I am taking as given the supply of internal source of finance.

Economic Intuition

- After a **decrease in credit supply**, quantity of the internal source of finance should increase.
  - Controlling for supply of internal funds cash flow should increase.

- After an **increase in uncertainty**, quantity of the internal source of finance should either decrease or remain unchanged.
  - Controlling for supply of internal funds cash flow should either decrease or remain unchanged.

Controlling for the Supply of Internal Funds

The main source of internal funds available for investment is the **flow profit** of the current year.

In order to control for general equilibrium effect, cash flow needs to be normalized by the corporate profit.
In particular, normalized cash flow can be thought as an index between 0 and 1

- If the index is equal to zero, current profits are fully distributed outside the firm
- If index is equal to one, current profits are going to be internally used

Suggestive Evidence

Run the following regression,

$$\frac{CF_t}{CP_t} = \alpha + B(L)X_{t-1} + \beta^F F_t + \beta^U U_t + \varepsilon_t$$

where CF_t and CP_t are cash flow and corporate profits as described above, X_{t-1} is a vector of control variables,

$$X_{t-1} = [GDP_{t-1}\ I_{t-1}\ C_{t-1}\ SP_{t-1}\ H_{t-1}\ U_{t-1}\ F_{t-1}\ CF_{t-1}/CP_{t-1}]$$

and F_t and U_t are proxies for financial conditions and uncertainty levels, respectively.

Results

Benchmark regression,

$$\frac{CF_t}{CP_t} = \alpha + B(L)X_{t-1} + \beta^F F_t + \beta^U U_t + \varepsilon_t$$

- β^F is always positive and significant at 1%.
- β^U is either negative and significant at 10% or not significant.

Technically Speaking (I)

Assume you use OLS techniques to regress X_t on its own past

$$X_t = B_1 X_{t-1} + B_2 X_{t-2} + \cdots + B_p X_{t-p} + \iota_t$$

where $X_t = [U_t \quad Y_t \quad F_t]'$, U_t represents a proxy for uncertainty, Y_t a column vector of macro variables, and F_t a vector of financial variables.

Moreover, $\iota_t = [\iota_t^U \quad \iota_t^Y \quad \iota_t^F]'$ is a vector of time-varying innovations related to the corresponding variables.

In general, ι_t does not represent a vector of structural shocks since

$$\iota_t \iota_t' \neq I_n$$

which implies that innovations represent a (linear) combination of the structural shocks.

Technically Speaking (II)

Structural VARs methods aim to solve the following system in order to recover structural shocks

$$\iota_t = C s_t \quad \Rightarrow \quad s_t = C^{-1} \iota_t \quad \Rightarrow \quad s_t = A \iota_t$$

which is

$$\begin{cases} s_t^U = A_{11} \iota_t^U + A_{12} \iota_t^Y + A_{13} \iota_t^F \\ s_t^Y = A_{21} \iota_t^U + A_{22} \iota_t^Y + A_{23} \iota_t^F \\ s_t^U = A_{31} \iota_t^U + A_{32} \iota_t^Y + A_{33} \iota_t^F \end{cases}$$

1. **Latent variable** $\Rightarrow \iota_t^U$ may not represent innovations to uncertainty
2. **Simultaneity** $\Rightarrow$ Each element of A is different from zero
3. **Reverse causality** $\Rightarrow \iota_t^U$ may be lead by $s_{t,t+h}$, $h > 0$
4. **Financial shocks** $\Rightarrow E[\iota_t^U \iota_t^{F\prime}] \neq 0$ and large

(1) Latent Variable

Not surprisingly, $Corr(VXO_t, JLN_t) = 0.4139$

However, $Corr(\iota_t^{VXO}, \iota_t^{JLN}) \in [-0.1865 \;\; 0]$

Which means that although the 2 raw series are highly correlated, once we control for available information at $t-1$ then they convey different information.

Solution. JLN proxy is consistent with the theoretical definition of uncertainty.

$\Rightarrow$ VXO measures **macro volatility** and not macro uncertainty.

(2) Simultaneity with other shocks

In general,

$$corr(\iota_t^{JLN}, s_t^Y) \approx 0$$

which implies that uncertainty innovations are fairly uncorrelated with macro structural shocks series derived in the literature.

s_t^Y are several series of macro structural shocks derived by the literature (possibly via narrative approach).

- Romer and Romer (2010) unanticipated tax shocks
- Martens and Ravn (2011) labor productivity shocks
- Leeper et al. (2013) anticipated tax shocks
- Kilian (2009) oil shocks
- ...

(3) Reverse causality with news shocks

- **JLN proxy** controls for the forecastable part of each variable
- Some structural shocks shown above are **anticipated**
- We can possibly control for **news shocks** to TFP
  - However, we will have to assume that TFP is fully exogenous
- **Surveys** can help for the short run horizon
  - SPF has the best timing
- Most importantly, we should control for the shocks and the **square of the shocks**
  - Potentially, uncertainty may evenly react for large shocks no matter the sign

(4) Financial Shocks vs Uncertainty Shocks

Stock and Watson (2012); Caldara, Fuentes-Albero, Gilchrist, and Zakrajzek (2016) shown that uncertainty shocks and financial shocks are deeply confounded.

$$corr(\iota_t^{EBP}, \iota_t^{JLN}) \approx 0.45$$

where ι_t^{EBP} is an innovation in the **excess bond premium** from Gilchrist and Zakrajzek (2012).

Literature did not succeed yet to disentangle the two exogenous sources:

- **External instruments** do not seem to be available
- **Internal instruments** are difficult to find because variables respond analogously to both shocks

(4) Financial Shocks vs Uncertainty Shocks - Solution (I)

I propose a **novel family of internal instruments** which can help out to disentangle the two exogenous shocks.

Economic Intuition.

- An exogenous deterioration of credit conditions should display the attempt of borrowers to fund their projects with **alternative sources** (at least on impact): internal cash flow, equity issuance, ...
- Alternatively, following real-options models (Bernanke, 1983; Brennan and Schwartz, 1985; McDonald and Siegel, 1986) after an uncertainty shock firms prefer to **wait-and-see** without undertake any investment.

(4) Financial Shocks vs Uncertainty Shocks - Solution (II)

Although the impact effect on investment is expected to be negative in both cases, I expect

- a financial shock to have a **negative impact** on internal cash flow;
- an uncertainty shock to have a **non-negative impact** on internal cash flow.

The two shocks can be disentangled via **sign restrictions** à la Uhlig (2005)