Financial Conditions and the Business Cycle

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Motivation

- Business cycles remarkably similar even when seemingly instigated by different shocks.
- Implies a common shock or a common propogation mechanism.
- "Business-Cycle Anatomy" by Angeletos, Collard, and Dellas (2020) use new max forecast error variance method to empirically identify a "business cycle" shock from a large VAR.

We show financial conditions are a compelling candidate for a common propogation mechanism.

Volatility Financial Conditions Index (VFCI)

Introduced in "The Market Price of Risk and Macro-Financial Dynamics" by Adrian, Duarte, and Iyer (WP)

- Can be interpreted as the *price of risk*.
- Better than other financial condition indexes at explaining equity and bond risk premia.
- Causal evidence that a tightening of the VFCI leads to a decline in macroeconomic conditions, easing of monetary policy, but little impact on inflation.
- Constructed using (1) asset returns and (2) 10 quarter forward consumption growth

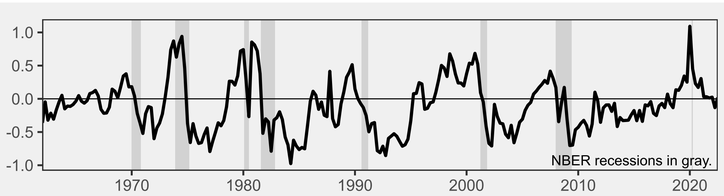

Figure 1: VFCI

Max Forecast Error Variance (FEV) ID

A SVAR(p) model with p lags, for a vector of variables, x_t,

$$B_0 x_t = B_1 x_{t-1} + ... + B_p x_{t-p} + \epsilon_t \tag{1}$$

Empirically, only the following A_i matrices and reduced form residuals, ν_t, are observed,

$$x_t = \underbrace{B_0^{-1} B_1}_{A_1} x_{t-1} + ... + \underbrace{B_0^{-1} B_p}_{A_p} x_{t-p} + \underbrace{B_0^{-1} \epsilon_t}_{\nu_t} \tag{2}$$

The identification problem is determining B_0.

$$\nu_t = B_0^{-1} \epsilon_t \tag{3}$$

Compute the forecast error for one target variable (i.e. u) for target horizon, h

$$F_{t+h} = x_{t+h}^{(u)} - x_{t+h|t}^{(u)} = \sum_{i=0}^{h-1} \underbrace{\Gamma_i}_{IRF} B_0^{(u)^{-1}} \epsilon_{t+h+i} \tag{4}$$

Choose vector $B_0^{(u)}$ to maximize the variance of F_{t+h},

$$\max_{B_0^{(u)}} \text{Var}\left[F_{t+h}\right] \tag{5}$$

This will identify one shock, up to a change of sign.

$$\epsilon_t^u = B_0^{(u)} \hat{v}_t \tag{6}$$

For business cycle shock, calculate forecast errors over a frequency range, 6 to 32 quarters.

Using VFCI to Identify the Business Cycle

We use the max FEV identification method to identify two shocks:

- one targeting unemployment—the "Business Cycle" shock,
- one targeting VFCI.

The dynamics of the IRFs are remarkably similar.

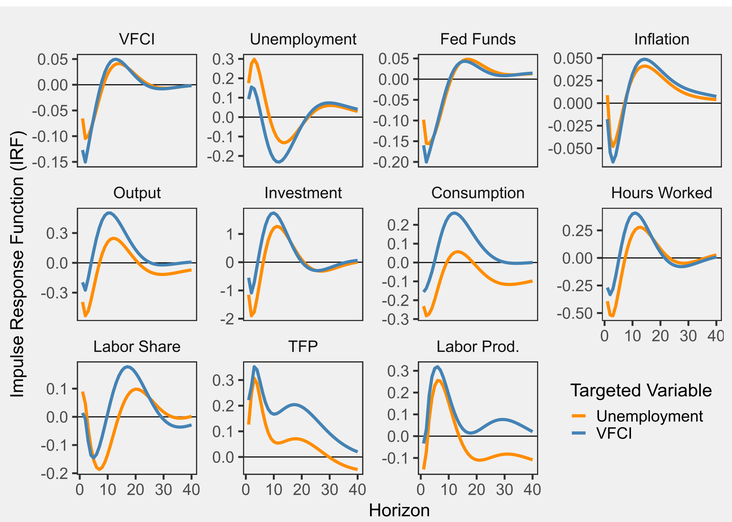

Figure 2: IRFs for Max FEV Shocks Targeting Unemployment or VFCI

- Target each variable with max FEV method and compare with business cycle shock.

VFCI is clearly a part of the "business cycle" block. Inflation, TFP, productivity are not.

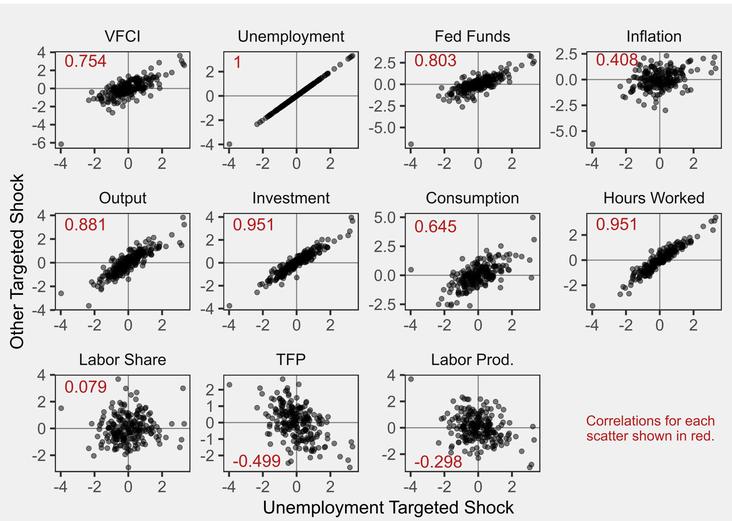

Figure 3: Scatterplot of Max FEV VAR Shocks

VFCI Shock Generates Same Dynamics

Assume a recursive identifcation scheme (i.e. Choleskey). Set VFCI as the first variable.

$$B_0^{(vfci)} = \left[b_{0,1}^{(vfci)} \;\; 0 \;\; 0 \;\; ... \;\; 0\right] \tag{7}$$

- Implies that innovations to all other variables do not have a contemperoneous impact on the VFCI.

This can be justified by:

- VFCI is the only financial variable,
- VFCI reacts to any new shock before the slowly moving macro variables.

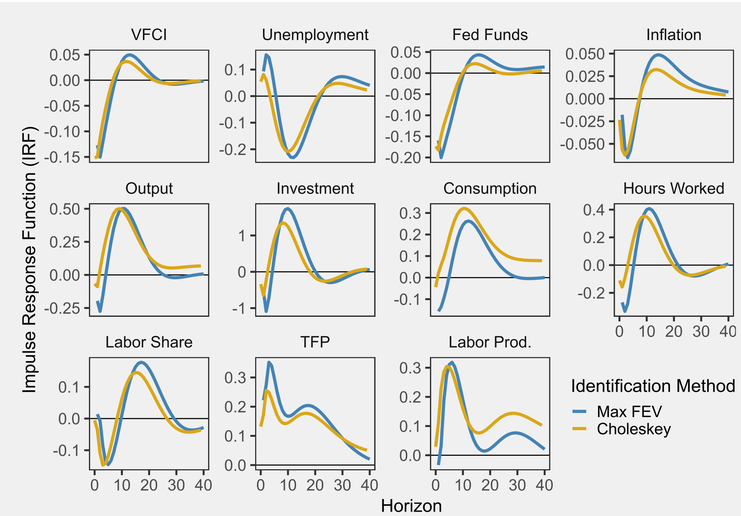

Figure 4: IRFs for VFCI Shock Identified with Max FEV or Choleskey

A shock to VFCI causes the same dynamics as the identified business cycle shock.

- This is evidence that financial conditions could act as the common propogation mechanism of shocks to the economy.

Conclusion

- We first showed that VFCI has the same business cycle properties as unemloyment, output, investment, consumption, and hours worked.
- Then we showed that shocks to the VFCI generate the exact dynamics seen in the business cycle.

The implication is that financial conditions are not just a reflection of macroeconomic events, but are either a source of shocks or a common transmission mechanism of shocks from elswhere in the economy.

This makes financial conditions extremely relevant for policymakers and an area that should be given a more prominent focus in macroeconomic research and modeling about the business cycle.