Financial Conditions and the Business Cycle

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Motivation

Q: What is the role of financial conditions in generating business cycles?

- 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 or shock.

Volatility Financial Conditions Index (VFCI)

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

- Can be interpreted as the *price of risk*.
- Which is equivalent to the effective level of risk aversion for the aggregate household.
- 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.

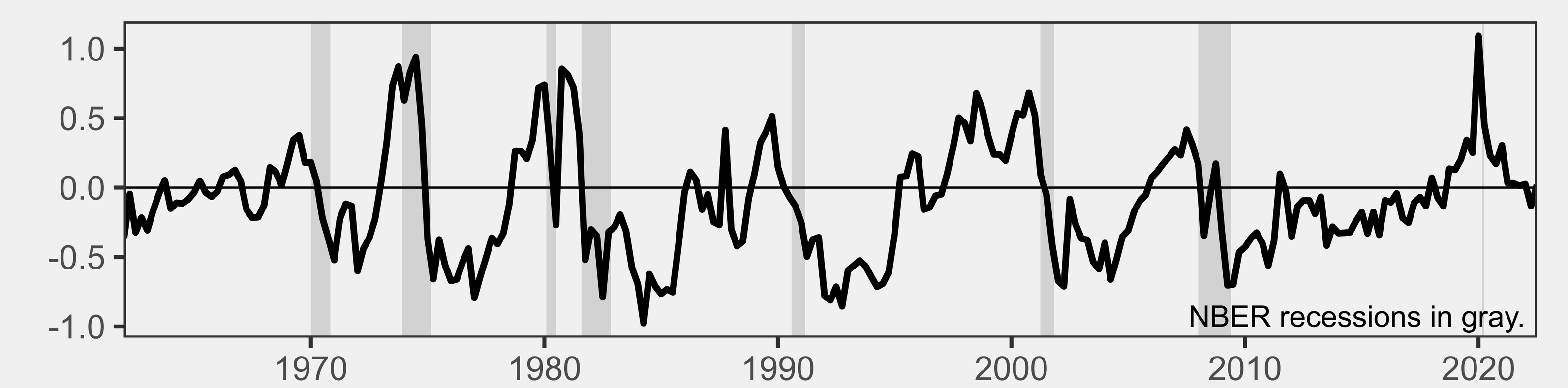

Figure 1: VFCI

Max Forecast Error Variance (FEV) ID

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

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

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

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

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

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

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

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

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

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

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.

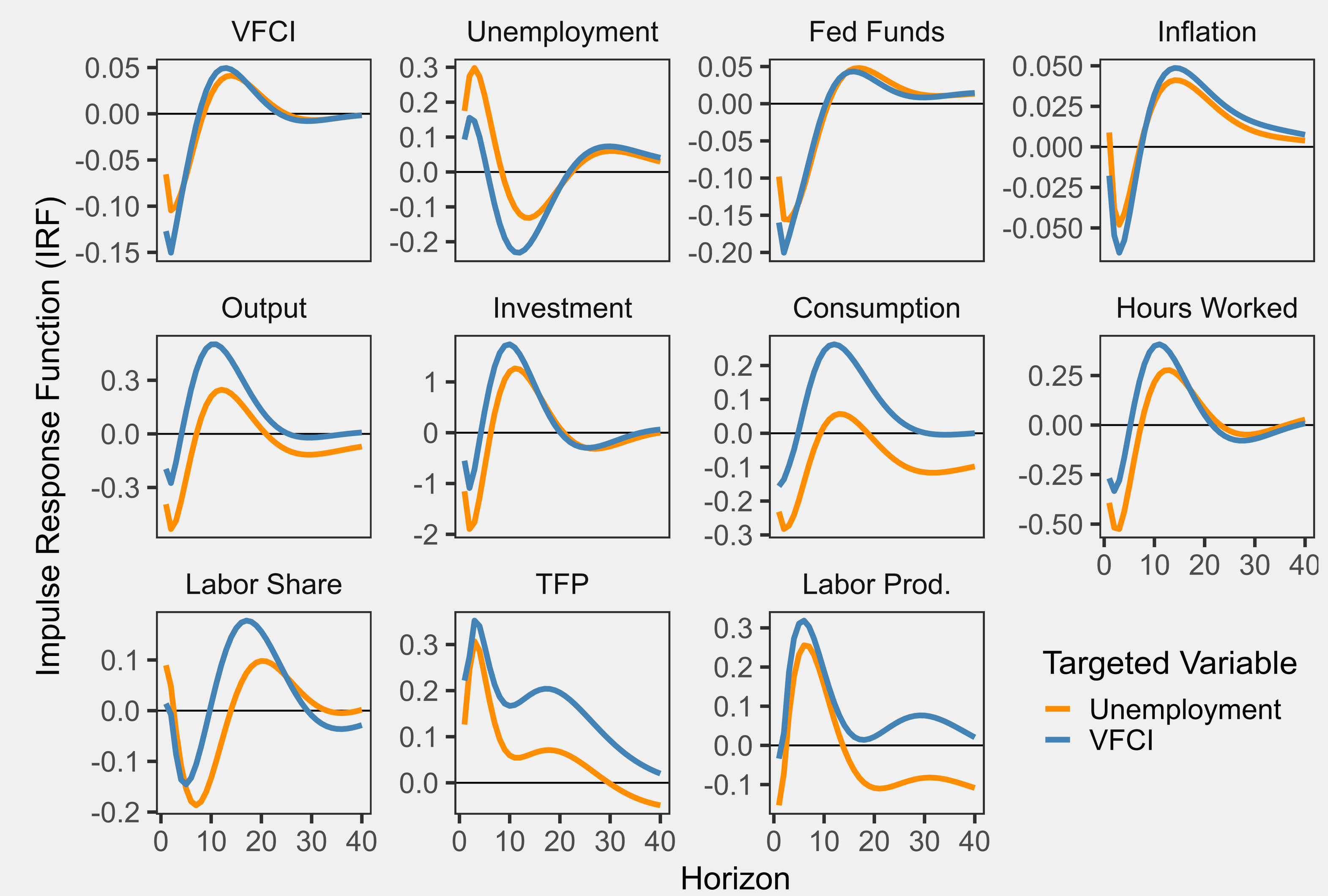

Figure 2: IRFs for Max FEV Shocks Targeting Unemployment or VFCI

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

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

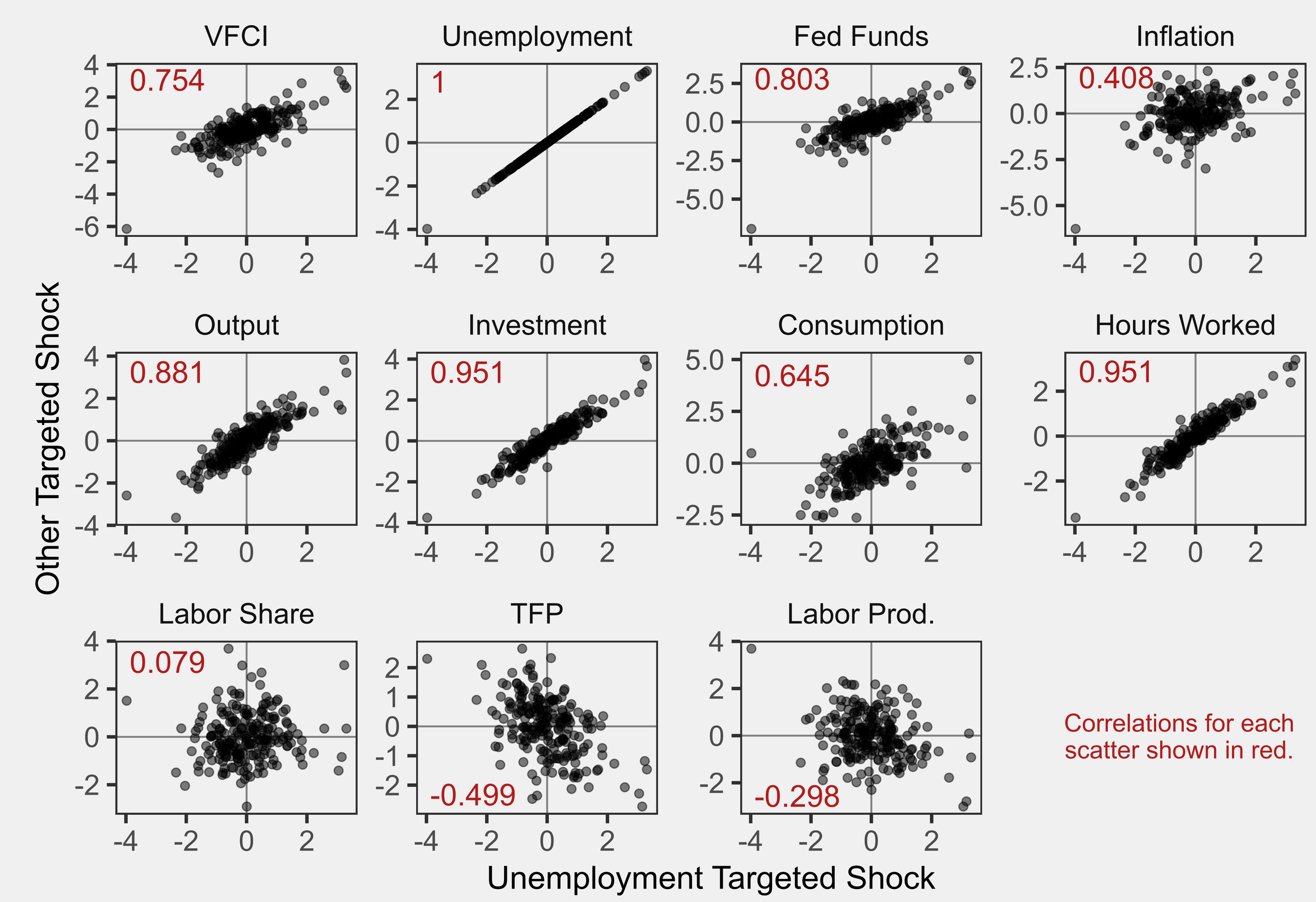

Figure 3: Scatterplot of Max FEV VAR Shocks

VFCI Shock Generates Same Dynamics

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

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

- 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.

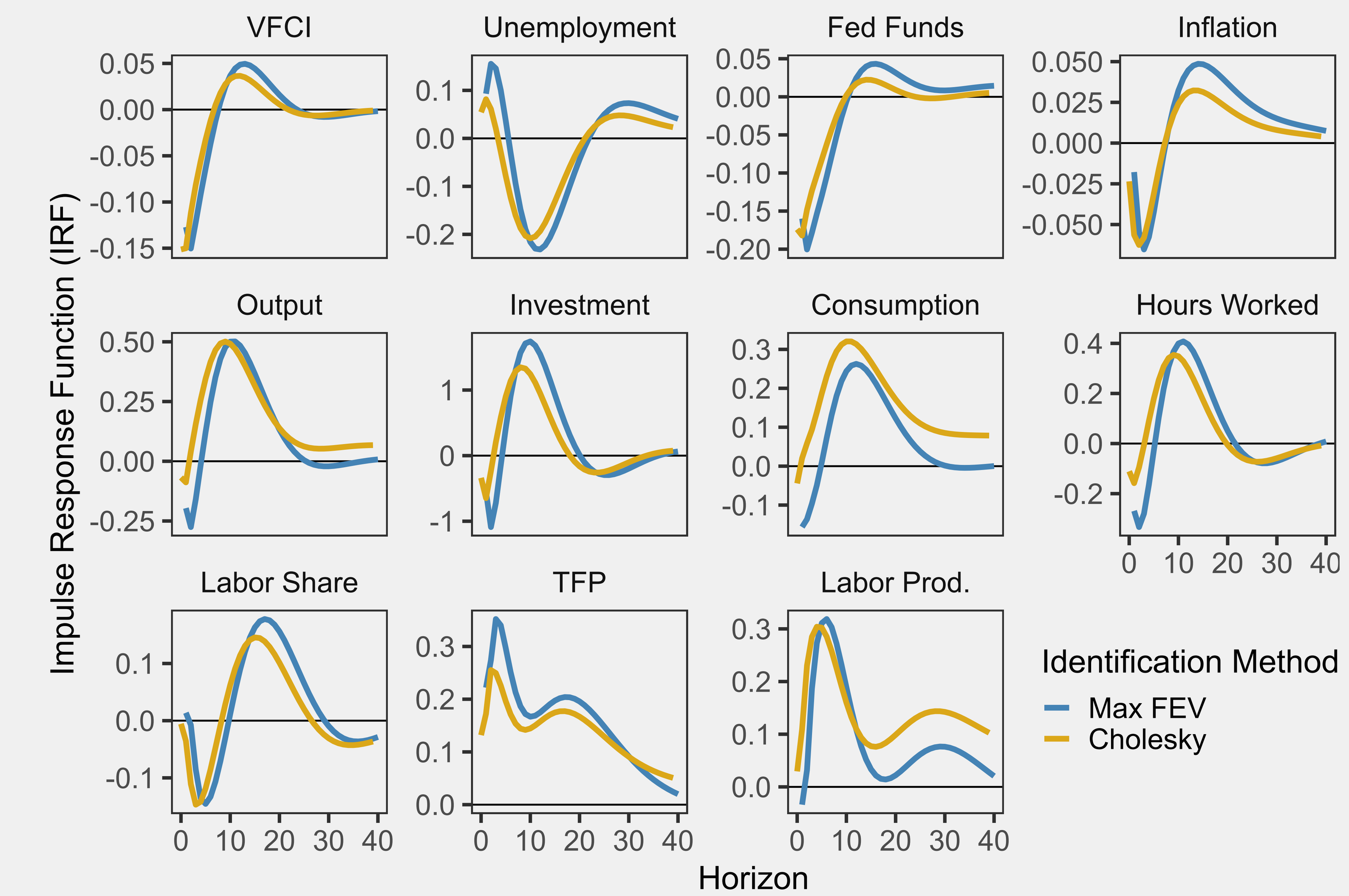

Figure 4: IRFs for VFCI Shock Identified with Max FEV or Cholesky

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 focused on in macroeconomic research and modeling about the business cycle.

[1] The views expressed here are the authors' and are not necessarily representative of the views of the International Monetary Fund, its Management, or its Executive Directors.