

Financial Conditions and the Business Cycle

Tobias Adrian
IMF¹

Matthew DeHaven
Brown

Fernando Duarte
Brown

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 propagation 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 propagation 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.

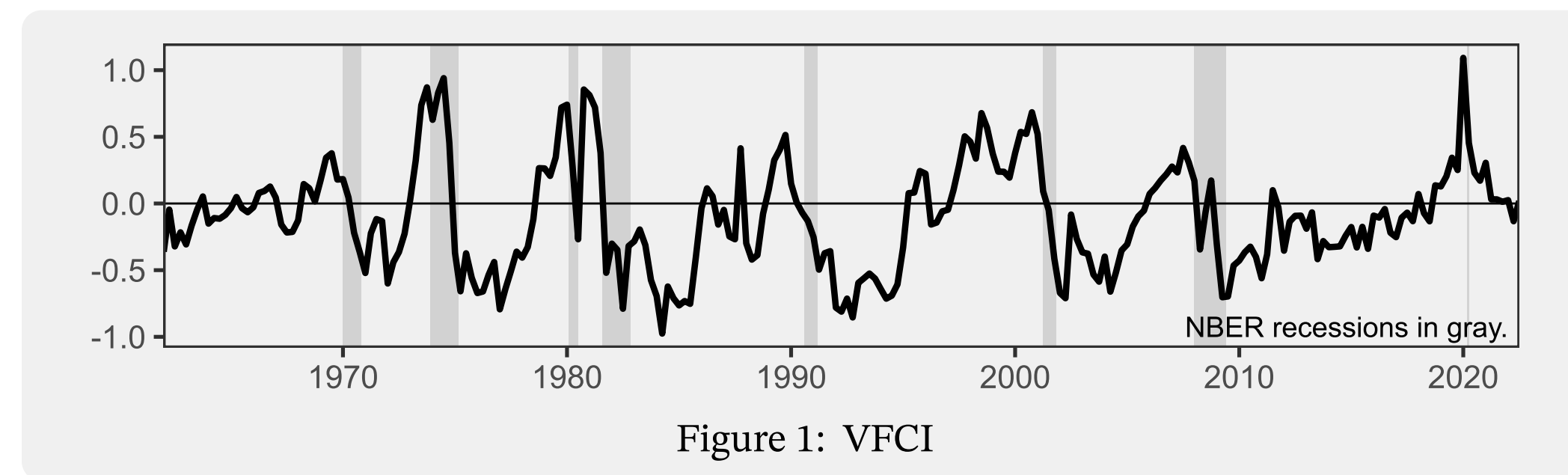


Figure 1: VFCI

MAX FORECAST ERROR VARIANCE (FEV) ID

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

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

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

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

The identification problem is determining B_0 .

$$\nu_t = B_0^{-1} \epsilon_t \quad (3)$$

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

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

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

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

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

$$\epsilon_t^u = B_0^{(u)} \hat{\nu}_t \quad (6)$$

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.

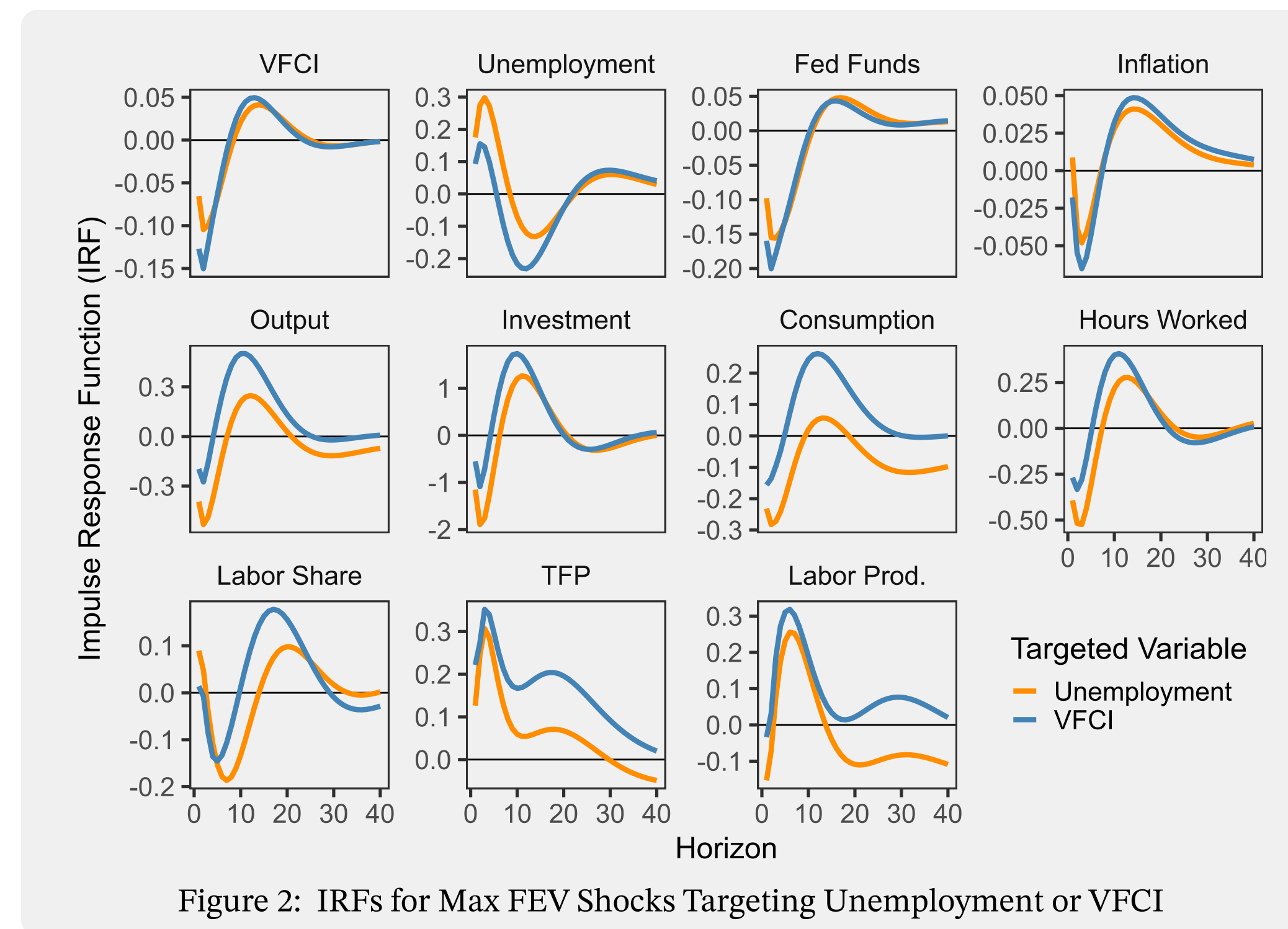


Figure 2: IRFs for Max FEV Shocks Targeting Unemployment or VFCI

- 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.

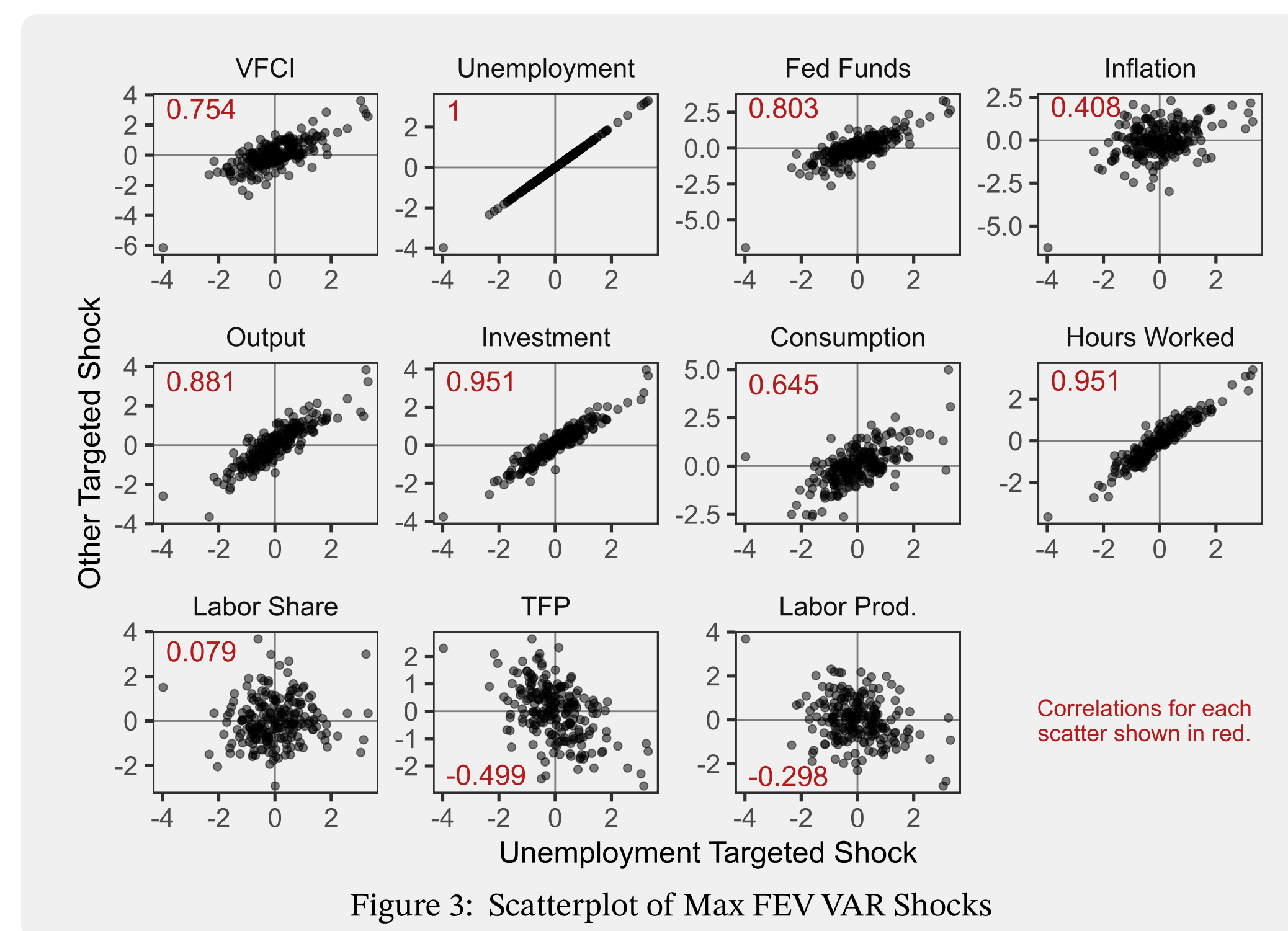


Figure 3: Scatterplot of Max FEV VAR Shocks

VFCI SHOCK GENERATES SAME DYNAMICS

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

$$B_0^{(vfc)} = \begin{bmatrix} b_{0,1}^{(vfc)} & 0 & 0 & \dots & 0 \end{bmatrix} \quad (7)$$

- Implies that innovations to all other variables do not have a contemporaneous 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.

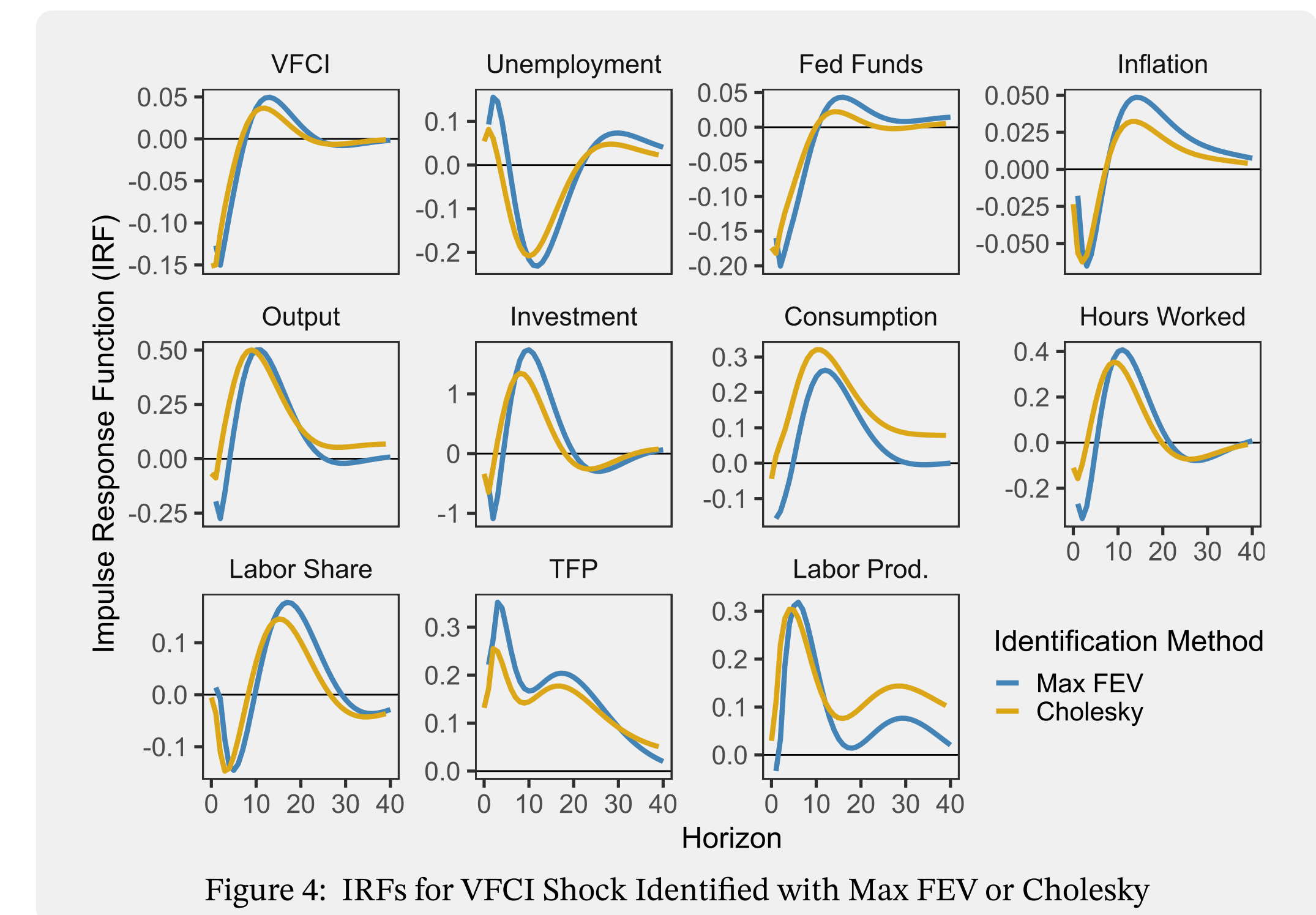


Figure 4: IRFs for VFCI Shock Identified with Max FEV or Cholesky

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 propagation mechanism of shocks to the economy.

CONCLUSION

- We first showed that VFCI has the same business cycle properties as unemployment, 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 elsewhere 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.

¹The 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.