Discussion of "Financial Variables as Predictors of Real Growth Vulnerability"

by Lucrezia Reichlin, Giovanni Ricco and Thomas Hasenzagl

Vítor Constâncio

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Summary of the Paper

- Assesses how well financial indicators, particularly the NFCI, predict G@R, with sufficient anticipation to be useful for Macroprudential policy

- Proposes an alternative model approach, using real and credit variables to substitute the Basel credit-to-GDP gap methodology

- The paper focus on out-of sample performance of the Adrian et al (2018,2019) methodology, calculating predictive scores, entropy and shortfall. Main findings in out-of sample-analysis:

  – Small predictive power for four quarters. Does not capture the great recession. (model 1)

  – Using the NFCI "cleaned" of correlation with real variables index, performs worse than the simple real variables index (model 3). This model 3 captures the great recession but works badly outside that period.

- The paper therefore concludes that the G@R methodology of Adrian et al cannot be exploited for macro-prudential policy in real time. It offers then a different approach of a new measure of excess leverage in credit variables

- The overall message gives a powerful blow on the promising G@R approach to macroprudential policy as a way to prevent or mitigate systemic risk.

Policy maker ideal goals

- To provide more quantitative structure to Macroprudential policy the following 3 goals would be important to achieve:

- 1) To have a generally accepted composite indicator of systemic risk (SRI), corresponding to the definition that SR "materialises when the ability of the financial system to provide essential financial products and services to the real economy is impaired to a point where economic growth and welfare may be materially affected." (ECB)

- 2) That such indicator can be used to predict the effects of the SRI on the tail of the conditional GDP distribution a few years ahead. This would allow the use of Macroprudential policy on a risk management perspective to correct financial conditions and improve the resilience of the financial system. It is important that the SRI includes financial variables as they are the ones that respond quicker to macroprudential instruments

- 3) That models can be developed to assess the impact of Macroprudential instruments on the composite financial indicator of systemic risk.

The methodology of G@R, using quantile regression to assess the left tail of the GDP distribution promises to be important to achieve these objectives

Some assessment points

1) The paper takes as benchmark the papers by Adrian et al (2018, 2019) that uses for the US the NFCI which is indeed not a good systemic risk indicator. As all financial conditions indexes, is more an indicator of stress that moves contemporaneously with GDP growth with little predictive power. Figure 1 makes evident to the naked eye the weak predictive relationship between NFCI and GDP, specially before the GFC when the NFCI was <0.

2) The ECB work on SRIs (ECB´s FSR , May 2018 and wp 2194 by Lang, Jan Hannes and Peter Welz) shows that their lead time is longer than 4 quarters and that the forecasting capability is stronger at 8 to 12 quarters. The ECB´s CSRI uses long term changes in variables (e.g. 2 years changes on credit-to-GDP).The paper uses short horizons.

3) The paper focus on the US recessions, some of which are not related to financial crises. The ECB CSRI was optimized using the ECB/ESRB crises dataset.

4) The semi-structural model in the last section, an extension of the Basel-gap approach, extracts a measure of excess leverage in credit variables (deviations of credit growht from output trend-growth that are not due to business cycle fluctuations) that the authors consider "a promising quantity to monitor the building-up of financial fragilities" .
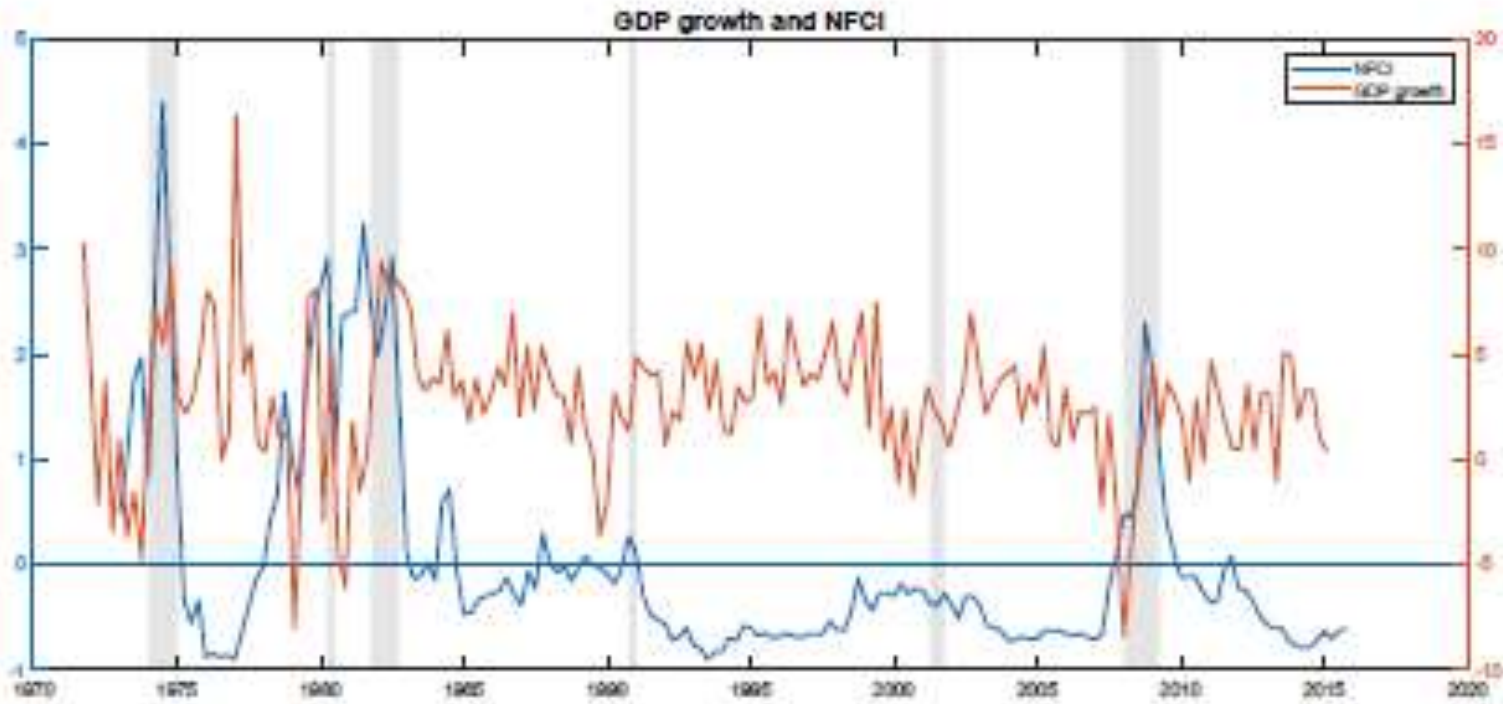
NFCI and GDP growth

Figure 1: Chicago Fed's National Financial Condition Index (NFCI) and GDP growth rates for the period from 1973q1 to 2015q1.

The alternative of the ECB´s SRIs

I recall briefly the work done at the ECB on this issue. The ECB's FSR of May 2018 published two new composite systemic risk indicators, the FSRI and the CSRI. The first is very broad and more focused on short-term analysis (1 quarter ahead). The second, is more focused in longer horizons, and considers in its domestic component: (a) measures of potential overvaluation of property prices; (b) measures of credit developments; (c) measures of external imbalances; (d) measures of private sector debt burden; (e) measures of potential mispricing of risk; (Plus exposures to spillovers from 3d countries for the total CSRI.I will use only the d-CSRI).
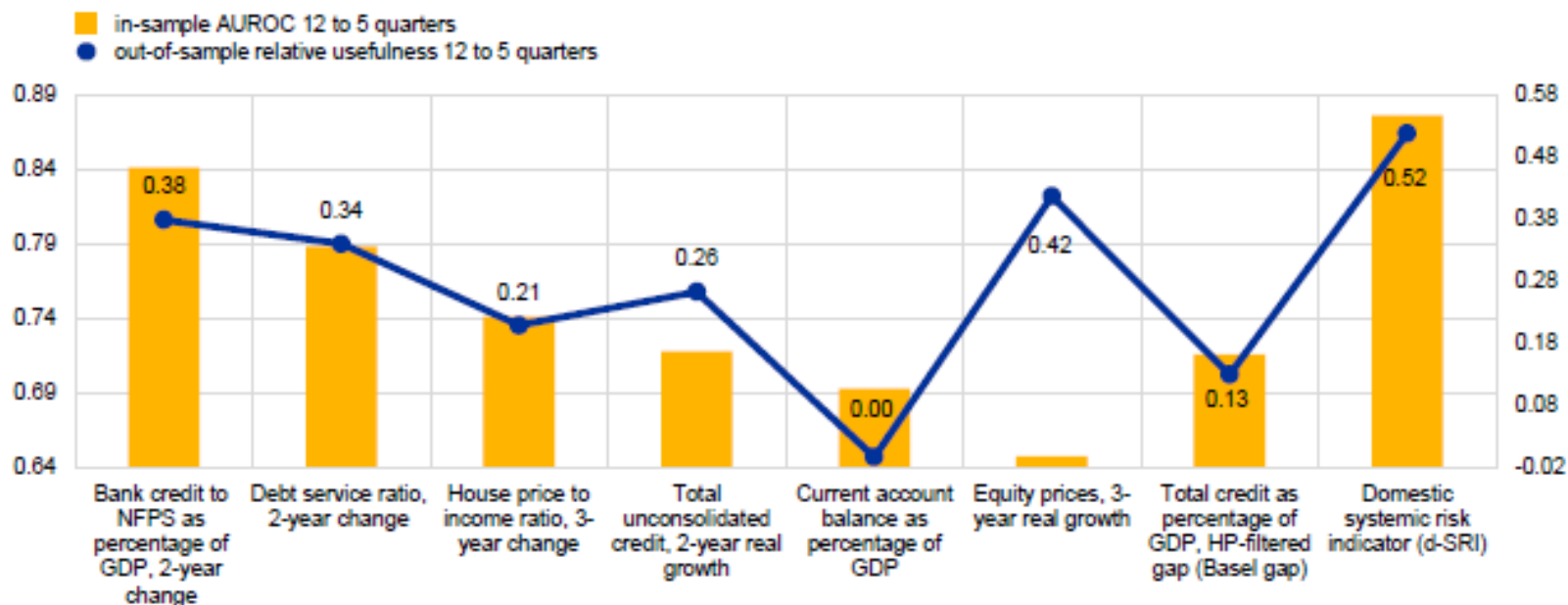
For each of the categories chosen for risk monitoring, the best univariate early warning indicator is identified and included (using in-sample AUROC and for out of sample the relative usefulness measure). Weights of each index component result from otimization of early warning properties. High values of the CSRI contain information about large declines in real GDP growth three to four years down the road, as it anticipates shifts in the entire distribution of future real GDP growth and especially of its left tail.

The ECB´s CSRI

In-sample and out-of-sample early warning properties of the best univariate indicators and the Basel gap

(left-hand scale: in-sample AUROC; right-hand scale: out-of-sample relative usefulness)

- in-sample AUROC 12 to 5 quarters
- out-of-sample relative usefulness 12 to 5 quarters

Bank credit to NFPS as percentage of GDP, 2-year change: 0.38
Debt service ratio, 2-year change: 0.34
House price to income ratio, 3-year change: 0.21
Total unconsolidated credit, 2-year real growth: 0.26
Current account balance as percentage of GDP: 0.00
Equity prices, 3-year real growth: 0.42
Total credit as percentage of GDP, HP-filtered gap (Basel gap): 0.13
Domestic systemic risk indicator (d-SRI): 0.52

Source: ECB calculations based on the ECB/ESRB EU crises database.

The domestic d-SRI achieves an AUROC of 0.88 for a prediction horizon of 5 to 12 quarters while the total credit-to-GDP gap reaches an AUROC of 0.67
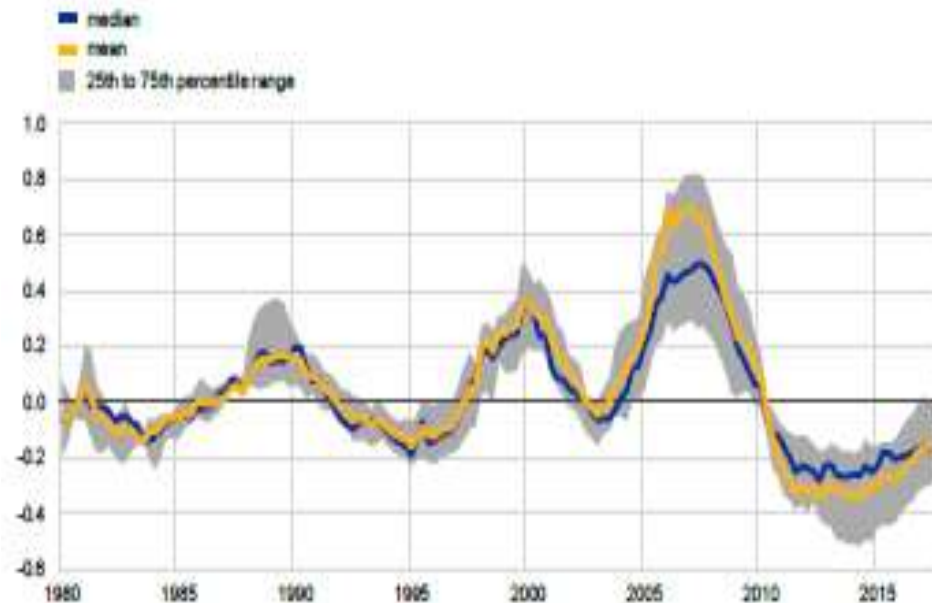
Source: ECB Financial Stability Review, May 2018

The CSRI performance

The CSRI displays long cycles with three peaks since the early 1980s across euro area countries

Cross-country mean, median and interquartile range of the CSRI over time
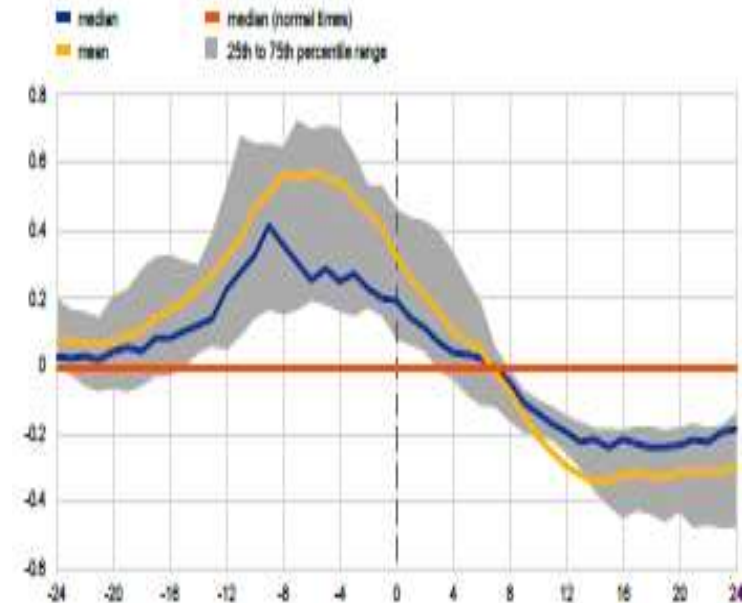
(x-axis: time; y-axis: CSRI)

Source: ECB calculations based on various data sources.
Notes: The grey shaded area indicates the interquartile range of the CSRI across euro area countries. The CSRI is constructed as a weighted average of the d-SRI and the a-SRI.

The CSRI starts to increase on average around five years before a financial crisis

Cross-country distribution of CSRI values around past systemic financial crises

(x-axis: quarters before/after the start of systemic financial crises; y-axis: CSRI)
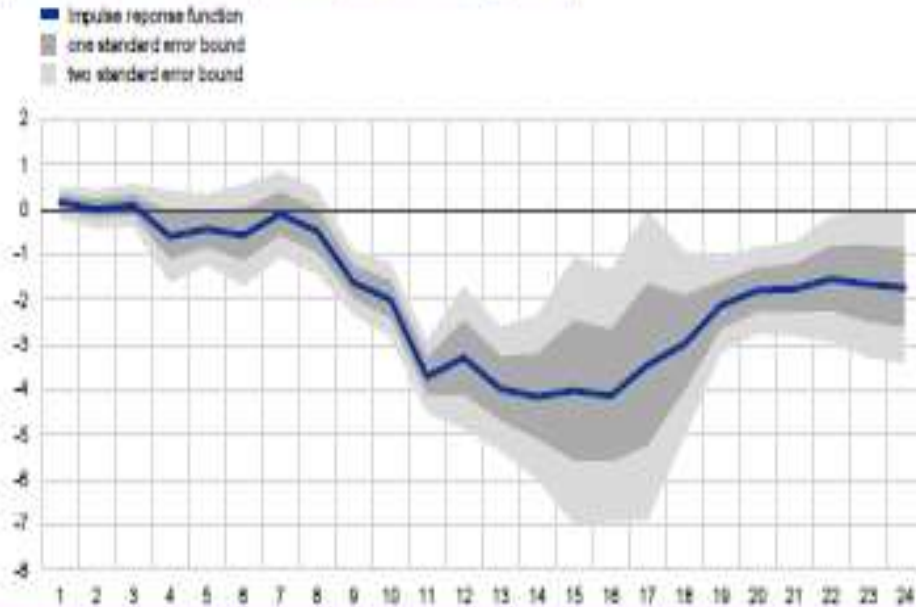
Source: ECB calculations based on various data sources.
Notes: The grey shaded area indicates the interquartile range of the CSRI across euro area countries during the 24 quarters before and after systemic financial crises. The orange line indicates the median of the CSRI across euro area countries in "normal times" within +/- 8 years of the start of a systemic financial crisis). The dating of systemic financial crises in the chart is based on the ECB/ESRB EU crises database described in Lo Duca et al. (2017).

Source: ECB Financial Stability Review, May 2018

The CSRI

Local projection impulse response of future real GDP growth to current values of the CSRI

Quantile regression impulse response of real to current values of the CSRI. Predictive power specially for the lower quantile
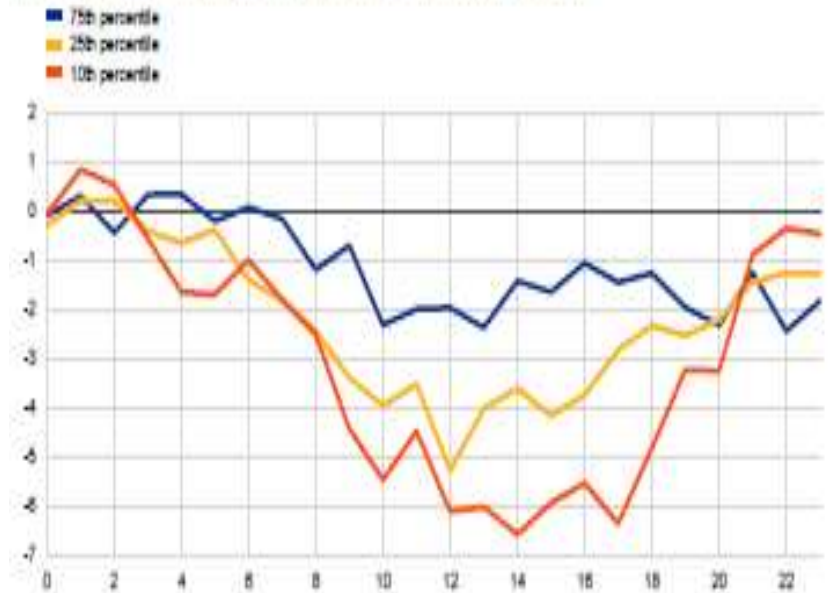

Source: ECB calculations based on various data sources.
Notes: The chart displays the impulse response function (IRF) of one-year-ahead real GDP growth to a one standard deviation shock in the CSRI. The IRF is obtained from local projections as proposed by Jordà (2005), controlling for ten lags of one-year-ahead GDP growth rates, ten lags of the CSRI, and country fixed effects. Yellow areas indicate the one and two standard error bounds.

Source: ECB calculations based on various data sources.
Notes: The IRF is obtained via local projections based on quantile regressions with ten lags of one-year-ahead GDP growth rates and ten lags of the CSRI.

Source: ECB Financial Stability Review, May 2018

Another model approach

- The model by Chavleishviliy and Manganelli, presented at a recent Bundesbank Conference (16ht June) uses a quantile VAR to model tail interactions:

$$\Delta GDP_{t+1} = \omega_1 + \qquad\qquad a_{11}\Delta GDP_t + a_{12}NFCI_t$$
$$NFCI_{t+1} = \omega_2 + a_0 GDP_{t+1} + a_{21}\Delta GDP_t + a_{22}NFCI_t$$

- The approach of Adrian et al (2018) does not account for the potential tail interaction between NFCI and ΔGDP in the quarters t+1, t+2, t+3 and t+4. This model allows for shocks to NFCI to feed through ΔGDP and vice versa. For forecasting, it allows setting future (mean) shocks to any desired (non-zero) value.

- For macro stress testing, the model can then be used to study how a sequence of shocks in quarters t+1, t+2, t+3 and t+4 propagate through the system taking into account the interactions between the tail interaction between NFCI and ΔGDP in the quarters t+1, t+2, t+3 and t+4..

The research and policy agenda ahead

- The G@R methodology is a promising way to quantify the severity macro-prudential risks.

- It is important to have a proper systemic risk indicator and a model that considers both real and financial variables and their interactions .

- If a very high predictive power is not attainable, we need to examine whether the method can be used to perform macro stress-tests and approach macroprudential policy from a risk management perspective

- We need a better understanding of the financial variables driving the tail effects on GDP growth.

- We need to quantify the impact of macro-prudential tools on the macro-finance interaction and on the systemic risk indicator. This is still a major open field for research

- BACKGROUND SLIDES