THE FINANCIAL STABILITY INDEX (3)

Estimated by the Institute of Financial Studies[*]

Last Update: second quarter, 2017

Abstract

There is a vast literature on developing a composite index of relevant macroeconomic indicators that predicts the real economic growth. This is of great importance not only for international financial institutions (e.g. IMF, ECB), central banks, and financial supervisory authorities, but also for the private sector (credit rating agencies).

Our goal is to build a Financial Stability Index (FSI) or financial stress index that tracks economic growth in Romania. We constructed a composite index using a linear combination of financial variables that are considered to have a significant impact on economic activity. These financial variables are weighted with respect to their cumulated two quarters impulse response on GDP growth, as estimated by a VAR model.

Developing such a composite index of financial stability or financial stress has two main utilities:

- The analysis of the correlation between financial variables and the real economy placed in the context of different historical episodes of financial crisis. Also, this correlation analysis reveals, in each period, the significant positive or negative contribution of each financial variable to real economic growth. Following this analysis, the FSI can measure the impact of economic and financial policy measures aimed at mitigating financial crises.
- The short-term prediction of real economic growth estimated by forecasting the next period evolution of the real economic activity (GDP_{t+1}) using current period GDP_t and FSI_t.

Keywords: composite index, financial stress index, economic growth, VAR model, short-term prediction

JEL Classification: E63; G01; G28

Introduction

Starting with the first issue of the Review of Financial Studies, the Financial Studies Institute assumed the mission of periodically informing the economic and financial community about the evolutions of the financial stability conditions in Romania, using a Financial Stability Index (FSI) as barometer of the most representative indicators on the financial market and,

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For details one can acces Review of Financial Studies issues 1 and 2 (http://revista.isfin.ro/wp-content/uploads/2017/05/4_Ion-Stancu_ARTICOL_Indicile-de-stabilitate-financiara.pdf)

correlatively, of the real economy. The first and second versions of our indicator were published inside the first two issues of the Review of Financial Studies (http://revista.isfin.ro/arhiva-rsf/). In the third issue of the journal we return with an updated index for the second quarter of 2017.

Our Financial Stability Index (FSI) or financial stress is a composite index as a linear combination of financial variables, considered to have a significant impact on economic reality. In the composition of FSI, the financial variables are weighted by the response, estimated by the VAR model, cumulated over a two-quarter period, to the impulse of the shocks of these financial variables on GDP.

FSI's third edition resulted from updating the data series with Q1 and Q2 in 2017, as well as revisions of the data series according with the available official statistical reports.

Research methodology and results

We used the time series of financial and economic variables, quarterly, for Q1 2004 – Q2 2017:

- CPI, budget balance, net exports

- ROBOR, EURIBOR, REER, VIX

- BET index, Gross insurance premiums (GIP)

The EURIBOR and VIX variables have been included in the FSI composition as a result of economic co-integration at European and international level.

For the FSI calculation we used the VAR model, i.e. the response to the impulse to change the variables analysed on GDP. The contribution of each component variable to FSI evolution was studied. Then, correlations and potential causal relationships between FSI and GDP, including gaps, were investigated.

The underlying hypothesis of FSI development is both intuitive and empirically correlated with the causal relationship between systemic phenomena in financial markets and their effects on the real economy. The quality of the financial stability index is validated by the intensity and the stability of this correlation, respectively, between the aggregate index of these financial variables and the real economy reflected by real GDP growth.

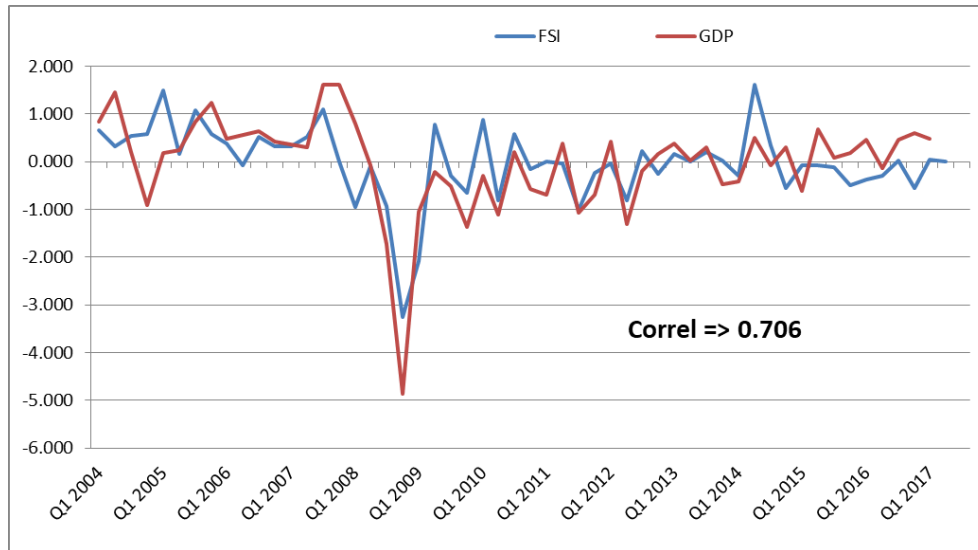The FSI evolution thus estimated is illustrated in the chart below (Figure 1).

Figure no. 1: Graphical representation of estimated FSI evolution correlated with real GDP evolution

The development of a composite index of financial stability or financial stress has mainly two utilities:

• Analysis of the correlation between the financial variables and the real economy with the identification of the various historical episodes of "financial crises". Also, the correlation analysis will allow for the significant contribution of each of the financial variables to the positive or negative evolution of the real economy in each period. Following this analysis, FSI can measure the impact of economic and financial policy measures aimed at mitigating financial crises.

• Short-term prediction of the real economy evolution estimated by the projection, in the immediate period, of the real economy's evolution (GDP_{t+1}) based on GDP_t and FSI_t in the current period.

Our results are sustained, first of all, by the correlation of FSI_{t-1} evolution with real GDP_t evolution: $\rho = 0.706$. Secondly, our results are also supported by FSI's correlation with the main episodes of financial crisis in Romania and international markets: the global crisis financial crisis of 2008-2009, the Ukraine crisis and the recent political and social crisis in Turkey (see details in issues 1 and 2 of the Review of Financial Studies).

As mentioned above, FSI reveals, in each period and the contribution of each financial variable to the evolution of the real economy, implicitly the impact of economic and financial policy measures aimed at mitigating financial crises (Figure 2).
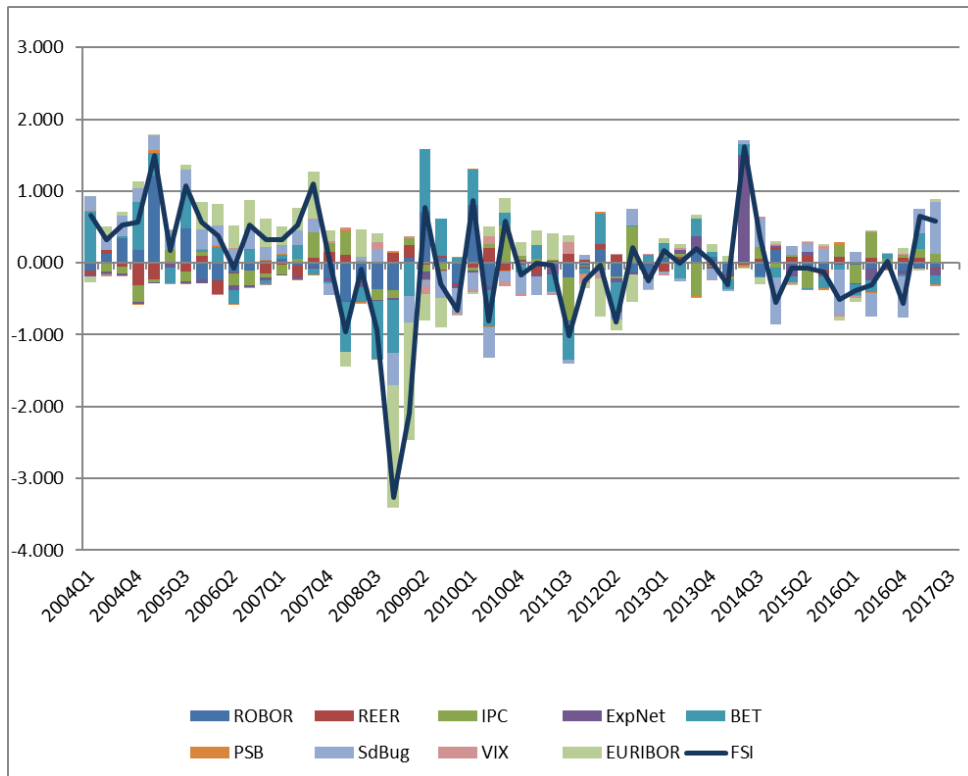
Figure no. 2. Graphical representation of the contribution of each financial variable to the estimated FSI

The fall of the FSI in the fourth quarter of 2008 is largely driven by the evolution of the EURIBOR, BET index and ROBOR financial variables which, combined with the response to GDP momentum, have the largest contributions to the decline in FSI. The phenomenon was also evident in the first quarter of 2009 with the contribution of EURIBOR, BET index and REER. These FSI developments are also confirmed by the decline in GDP in the respective quarters of 2008 and 2009.

The above graphical representation identifies a close correlation between real GDP evolution and EURIBOR evolution ($\rho = 0.625$), respectively VIX evolution ($\rho = 0.29$), SdBug ($\rho = 0,239$), PBS ($\rho = 0,123$), ROBOR and REER evolution ($\rho = 0,12 – 0,13$), leading to significant weightings of these financial variables on FSIs.

Table no. 1. Identifying correlations, GDP impulse/response values and recent evolution of FSI

	Correl =>	0.118	0.128	-0.052	0.032	0.021	0.123	0.239	0.310	0.565
Accum response/PIB		-0.29	-0.10	0.20	-0.21	0.34	0.02	0.28	0.04	0.39
Time	FSI	ROBOR	REER	IPC	ExpNet	BET	PBS Asig	SdBug	VIX	EURIBOR
2016Q4	-0.56	0.37	-0.68	0.19	0.25	-0.10	0.71	-2.07	0.13	0.21
2017Q1	0.04	0.22	-0.63	0.69	0.07	0.63	0.00	1.22	-0.22	-0.05
2017Q2	-0.01	0.24	0.07	0.65	0.44	-0.39	-0.44	2.60	-0.15	0.11

As result of the recent evolution of the component variables, the following two notable evoltuions in the ISF were noted during Q1 and Q2 2017:

- a favourable evolution in Q1 2017 (to +0,04 from -0,56 in Q4 2016) determined mainly by REER, IPC, BET and SdBug;
- a deterioration in Q2 2017 (-0,01) caused mainly by the evolution of ROBOR, IPC and especially SdBug and EURIBOR.

Following Granger causality FSI ~ GDP, presented in table no. 2, the second utility of FSI is to improve the short-term prediction capacity of GDP growth.

Table no. 2. Identifying Granger's Causality between FSI and GDP

Null Hypothesis:	Obs	F-Statistic	Probability
FSI does not Granger Cause GDP	**52**	**16.9926**	**0.0000**
GDP does not Granger Cause FSI		0.32455	0.7245

Table no. 3. Parameters of the regression equation: $GDP_t = c + b_1 \cdot GDP_{t-1} + b_2 \cdot FSI_{t-1}$

	$GDP_t = c + b_1 \cdot GDP_{t-1}$	$GDP_t = c + b_1 \cdot GDP_{t-1} + b_2 \cdot FSI_{t-1}$
C	0.167	**-0.0243**
GDP(-1)	-0.4566***	**0.2482***
FSI(-1)	-	**0.7519***
R-pătrat ajustat	0.197	**0.5218**
F-statistic/Prob	13,76/0,0005	**29,37/0,0000**

Durbin-Waston stat	2,011	**1,98**

Based on the second equation (with higher statistical parameters, table 5) and the history of the two variables (GDP and FSI), a GDP growth rate of 5.1% is estimated for 2017 (Table 4 and Figure 3).

Table no.4. Estimate of GDP growth rate for 2017

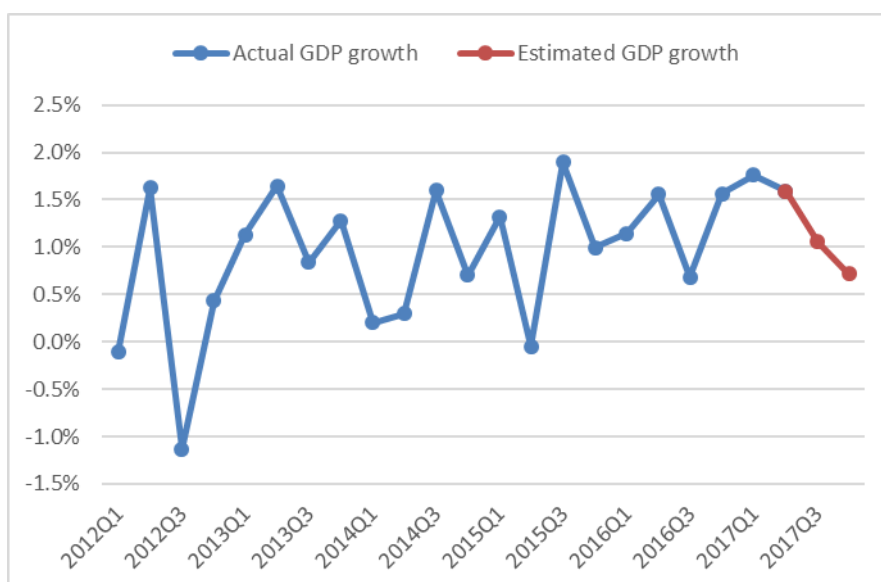| 2017Q1	1.8%	
2017Q2	1.6%	
2017Q3		1.05%
2017Q4		0.72%

Figure no. 3: The actual and projected evolution of GDP over the period 2012-2017

The quarterly update, when the data becomes available, will allow us to evaluate the prediction power of the model and make estimates as close as possible to economic reality.

Conclusions and future research

- There is a significant correlation between FSI and GDP, including a relevant response in times of crisis.
- The inclusion of variables related to non-banking entities in the financial sector in the model does not significantly improve the performance of the model.
- It is necessary to test other methods for building the financial stability index (eg PCA, weighted averages).
- It is also necessary to find and test the inclusion in the model of other variables related to the Romanian non-banking financial system (eg investment funds, pension funds, other indicators of the insurance market).

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