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Monetary policy, macro-financial vulnerabilities, and macroeconomic outcomes

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MONETARY POLICY, MACRO-FINANCIAL VULNERABILITIES, AND MACROECONOMIC OUTCOMES

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IES Working Paper 20/2024

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Monetary Policy, Macro-Financial Vulnerabilities, and Macroeconomic Outcomes

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Abstract:

Given the prevailing global circumstances, characterized by tightening global financial conditions and substantial macro-financial vulnerabilities, the significance of monitoring financial conditions becomes even more pronounced and calls for heightened attention to the assessment and surveillance of financial indicators. This paper introduces a Financial Conditions Index (FCI) tailored for Albania, spanning from 2000 to 2022, using a factor augmented vector autoregressive models with time-varying coefficients (TVP-FAVAR) and incorporating a wide range of indicators, grounded in the empirical literature. By aligning with the main financial dynamics during this timeframe, the constructed index emerges as a robust gauge for monitoring and assessing the financial landscape of the country. Additionally, through a threshold Bayesian VAR model, the paper examines the transmission of monetary policy and financial conditions shocks to the real economy, by capturing non-linear dynamics through differentiating between periods characterized by different stands of financial fragilities. The findings suggest that the credit-to-GDP gap could potentially function as an early warning indicator of financial vulnerabilities, with a positive gap possibly reflecting excessive risk-taking by financial institutions. Furthermore, the transmission of monetary policy and financial conditions shocks to the real economy depends non-linearly on the private nonfinancial sector credit and is not symmetric throughout the considered period, with monetary policy transmission being attenuated during periods of heightened vulnerabilities.

JEL: E52, E51, E61, E63, E65

Keywords: financial conditions, monetary policy, credit gap stance, macro-financial vulnerabilities

1. INTRODUCTION

Monitoring of financing conditions plays a pivotal role in assessing the monetary policy transmission process and determining the appropriate monetary policy stance. It takes a greater importance in the light of the current global developments, as economies worldwide are facing the unique challenge of taming inflation amidst tightening global financial conditions and major macro-financial vulnerabilities (BIS, 2022). These vulnerabilities can significantly jeopardize a country's economic stability and performance, by intensifying the repercussions of adverse shocks and exacerbating economic downturns. When macro-financial vulnerabilities permeate an economy, they sow the seeds of structural weaknesses, undermining its resilience to shocks and disruptions. Beyond their initial impact, these vulnerabilities create feedback loops that perpetuate economic instability, exacerbating the severity and duration of downturns.

In such background, this paper aims at investigating the role of financial fragilities in propagating and amplifying adverse shocks and particularly in conditioning the effectiveness of monetary policy and the transmission of financial conditions to the real economy in Albania. More specifically, our paper addresses the following research questions: (i) How does the transmission of the monetary policy to the real economy differ between varying degrees of financial vulnerabilities?; (ii) How does the Albanian economy's responsiveness to a financial shock fluctuate across intervals marked by differing levels of macro-financial imbalances?

In pursuit of addressing these research questions, this paper develops an index of financial conditions for Albania, which can be used to enhance the understanding of the macro-financial linkages and provide a comprehensive assessment of the overall economic situation. Based on the current empirical literature and data availability, several indicators are chosen to depict financial market conditions and the stance of monetary policy for the period 2000-2022. Afterwards, a principal components analysis (PCS) and factor augmented vector autoregressive models with time-varying coefficients (TVP-FAVAR) are used to synthesize the information of these indicators into a financial condition index (FCI). The dynamic analysis of financing

conditions allows to capture the changing financial structure of the country. Finally, a threshold autoregressive model (TVAR) estimated through Bayesian techniques, is utilized to investigate the monetary policy transmission to the real economy and how the latter is influenced by financial conditions, contingent upon different stances of financial fragilities.

The paper makes several valuable contributions to the literature on Albania. Firstly, it introduces a tailored index for Albania that captures the changing financial conditions in the country over time, which is aligned with the indices used by international organizations like the IMF, and employs advanced econometric methodologies that account for the structural changes in the Albanian economy. This provides a deeper and more comprehensive understanding of the country's financial landscape. Secondly, the paper investigates the transmission mechanism of monetary policy and financial conditions shocks to the key macroeconomic indicators, by incorporating nonlinearities associated with different credit-to-GDP ratio regimes. This provides a more accurate depiction of the complex interactions between monetary policy, financial conditions and the broader economy.

The findings underscore the potential role of the credit-to-GDP gap as an early warning signal for financial vulnerabilities, suggesting that a positive gap may signify heightened risk-taking by financial institutions. Moreover, our analysis unveils a non-linear relationship between the private nonfinancial sector credit and the transmission of both monetary policy and financial conditions shocks to the real economy. This relationship is not uniform across the entire period under consideration. Notably, during periods characterized by elevated vulnerabilities, we observe a dampening effect on the transmission of monetary policy to the real economy. This suggests that the effectiveness of monetary policy is diminished when financial vulnerabilities are heightened, highlighting the importance of considering such dynamics in policy formulation and implementation.

To the best of our knowledge, this paper is among the first to investigate the interconnected nonlinear dynamics of monetary policy transmission, financial conditions and macroeconomic

outcomes in Albania, while also constructing a comprehensive financial condition index to the country's context, thus filling an important gap in the existing literature.

The paper proceeds as follows. Section 2 reviews the main approaches encountered in the literature for constructing financial conditions indexes. Section 3 outlines the methodology and the data used in this study to construct a FCI with the Albanian data, and to examine the effects of financial conditions on the main macroeconomic indicators. Section 4 presents the empirical findings of the analysis and Section 5 provides concluding remarks.

2. MAIN CONCEPTS AND A SUMMARY OF THE RELEVANT LITERATURE

2.1 DEFINITION AND MAIN CONCEPTS

The study of financial conditions is integral to comprehending the intricate functioning of an economy, and thus, a considerable amount of scholarly attention has been devoted to exploring this topic. The concept of FCIs has been explored in the literature since the early 2000s, with seminal studies such as Goodhart and Hofmann (2001) and Wacker et al. (2014) considering FCIs as a natural extension of the Monetary Conditions Index (MCI)¹, which takes into account a broader range of indicators beyond just interest rates and exchange rates typically found in MCIs used by central banks. Such extension has the advantage that it encapsulates a whole set of information describing conditions in the financial system in one series. Therefore, FCIs are considered valuable instruments that can serve policy purposes by facilitating a comparison of financial conditions over time and by providing additional input to macro-econometric models where interest rates alone may not suffice.

While the International Monetary Fund (IMF, 2017, p. 85) defines "financial conditions" as the degree of ease in accessing financing or borrowing in both local and international markets,

¹ See, for instance, Federal Reserve Bank of New Zealand, 1996; Eika et al, 1996; Ericsson et al, 1997; Gerlach and Smets, 2000; Dudley and Hatzius, 2000).

literature offers additional definitions. For example, Hatzius et al. (2010) define financial conditions as the current state of financial indicators that impact economic behaviour and ultimately the future economic performance of a nation, while Carlson et al. (2012) associate financial conditions with the costs of credit in terms of price and non-price factors.

In the same spirit, this paper adopts a notion of domestic financial conditions, endeavouring to capture the multifaceted dimensions of costs, conditions, and availability of domestic funds within the local economy, recognizing the nuanced interplay of various elements in shaping the financial landscape. Beyond traditional indicators like interest rates and asset prices, factors such as risk appetite and agents' propensity to hold illiquid assets also play a significant role in shaping financial conditions.

A comprehensive exploration of various financial conditions indexes can be found in Hatzius et al. (2010), where they highlight the added value of these indexes in gauging current financing conditions and their potential in projecting future economic activity based on empirical evidence. Similar findings have been corroborated by Matheson (2011). In this perspective, Espinoza, Fornari, and Lombardi (2009) emphasize the importance of financial market developments in forecasting economic cycles, noting that constricted financial and credit conditions may hinder the expansion of the corporate sector's operations and household consumption, while asset prices may indicate the expected profitability of enterprises closely tied to future economic growth.

2.2 ECONOMETRIC APPROACHES TO CONSTRUCT FCIs

The construction of FCIs has been approached through two main methods. The first one, known as the weighted-sum methodology, typically involves assigning weights to individual financial variables based on their estimated relative impact on real GDP. The statistical tools that are commonly utilized to estimate the weight of the financial components comprise simulation of structural macro-econometric models, estimation of reduced-form aggregate demand

equations, and estimation of vector autoregression (VAR) systems and their impulse response functions. The second one named principal component approach represents a method to derive the most influential factors from a group of indicators by extracting principal components that encompass the maximum variability within the information set. The literature offers two options for this: the standard principal component analysis (PCA) and the time-varying parameter factor-augmented vector autoregression (TVP-FAVAR) model. The fundamental difference between the two is that while the former presupposes a fixed relationship between each pair of financial variables, the latter allows this relationship to vary at each point in time.

As Goodhart and Hofmann (2001) argue, a structural model is superior to other weighted-sum methods in that it considers the structural features of an economy and the interaction of all macroeconomic indicators. However, due to data limitations, a well-defined structural model with an explicit role for each of the main macro-financial indicators is not available for many G7 countries. Instead, a VAR model is commonly used to create a Financial Conditions Index (FCI), which weights financial indicators based on their relative impacts on macroeconomic variables. However, the VAR model has an inherent limitation in that the weights on each index constituent are typically fixed. Primiceri (2005) introduces a time-varying parameter VAR (TVP-VAR) model to settle the constant-weight problem, but this method requires a limited number of variables to avoid computational burden. The reduced form model, which is based on the aggregate demand equation, is also used to estimate the FCI by identifying the impact of each potential monetary transmission channel on the real economy. Goodhart and Hofmann (2001) estimate the reduced form model using OLS and suggest that FCIs based on the reduced form model generally perform better than those based on VARs. Montagnoli and Napolitano (2005) and Castro (2011) use the Kalman filter algorithm to estimate the reduced form model for the Eurozone, Canada, the US, and the UK. However, Hatzius et al. (2010) argue that financial indicators should be purged of current economic activity, which is widely accepted in the PCA literature but not yet considered in reduced form model-based FCIs. Additionally, Nakajima (2011) suggests that incorporating stochastic volatility into a time-varying parameter regression is crucial to improving the accuracy

of parameter estimation, as the Kalman filter algorithm overlooks the fluctuations of stochastic volatility.

As regards the principal components methods, two strands of the literature have been identified. The first involves summarizing all variables with more than one single principal component, where the FCI is weighted by the first few components that express the primary trend of the financial markets. The second strand entails selecting the number of principal components to extract by balancing the goodness of fit and parsimony criteria. In this approach, the first principal component is treated as the FCI. Empirical studies have shown that the one-factor FCI performs at least as well as the two and three-factor versions.

Despite the PCA's popularity, there are criticisms of its standard implementation. Constant loadings over the entire sample period result in the correlation structure between financial variables remaining unchanged. However, there is evidence in the literature suggesting time-varying correlations between financial variables. To address this shortcoming, Koop and Korobilis (2014) introduce a time-varying parameter factor augmented VAR (TVP-FAVAR) with stochastic volatility model that allows the correlation structure between constituent financial variables to evolve over time. This addresses the fixed loading assumption's limitation in the standard PCA.

The purpose of modelling an FCI in a VAR is to evaluate the forecasting performance of the index. The question of what constitutes a good FCI is addressed by Gauthier et al. (2004), Hatzius et al. (2010), and Koop and Korobilis (2014), which suggest that a good FCI is the one that forecasts real economic development as accurately as possible.

2.3 SELECTING CONSTITUENT INDICATORS

The two key MCI variables, the interest rate and the exchange rate, play a fundamental role in the implementation of monetary policy, and their values carry vital information on the stance of

monetary policy, making them appropriate channels for its transmission. The interest rate, which is highly correlated with the monetary policy instrument, is often regarded as a proxy for its stance. However, emphasis should be placed on variables that govern the transmission of monetary policy to the real economy, specifically the interest rate and the exchange rate (Dudley and Hatzius, 2000).

Notably, several FCIs integrate the interest rate among multiple financial variables as in Montagnoli and Napolitano (2005) and Hatzius et al. (2010), while others exclude it to uncover traditional channels' limitations, as emphasized by Castro (2011). Nevertheless, Wacker et al. (2014) demonstrate that including the interest rate in FCIs has little effect on their outcomes in the United States.

Additionally, an indicator of the wealth effect is considered in nearly all existing FCIs (see Dudley and Hatzius (2000) and Wacker et al. (2014)). Hatzius et al. (2010) explain that the natural constituents of an FCI are equity and house prices, which affect the wealth of individuals and firms. These indicators are also considered by Brave and Butter (2011) and Koop and Korobilis (2014) in describing the condition of financial markets. Kiyotaki and Moore (1997) explore the interaction between asset prices and the real economy, suggesting that changes in asset prices signal future shifts in economic growth. From an individual's perspective, adjustments in asset prices change financial wealth, which, in turn, impacts consumption. From the firm's perspective, an increase in asset prices strengthens its borrowing capacity by increasing the value of collateral and vice versa. Increased available funds tend to raise investment activities, ultimately affecting aggregate spending and overall economic performance.

Studies by Guichard, Haugh, and Turner (2009), Hatzius et al. (2010), and Wacker et al. (2014) contend that an FCI should adequately reflect financial sector risk. Wacker et al. (2014) maintain that including risk measures in FCIs is necessary since credit spreads reflect the relative price of funds acceptable to different market participants. Taylor (2008) also argues that credit spreads add predictability during financial sector stress. Castro (2011) considers credit spreads a good

leading indicator of business cycles. Additionally, Castro (2011) follows Driffill, Rotondi, Savona, and Zazzara (2006) in including changes in future interest rate spreads ($\Delta\text{FutSprd}$) in his FCI estimates, which signal the degree of volatility in agents' expectations that central banks aim to reduce. Driffill et al. (2006) augment the theoretical analysis of determinacy of equilibrium in Bullard and Schaling (2002) and document a trade-off between macroeconomic stabilisation and movement in the futures market. At an empirical level, they indicate that the component in the Fed's reaction function related to futures prices has the same importance as the output component.

Most of the literature employs the methodology of Stock and Watson (1989, 2002), who pioneered the use of factor model analysis to forecast macroeconomic developments. Their approach assumes the existence of a composite financial conditions indicator, with the FCI representing the common component estimated on the basis of a set of financial indicators.

Using the same method to calculate the FCI for the US and the Euro Area, Matheson (2011) found that including the FCI in a VAR model alongside GDP gap, inflation, and the real short-term interest rate led to better forecasts of real economic activity compared to a basic VAR model that excluded the FCI or included only individual index variables. Montagnoli and Napolitano (2004) conducted an insightful analysis on the repercussions of asset price imbalances that had the potential to jeopardize the stability of the banking system. Their research focused on the monetary policies implemented by central banks in the US, Canada, and the Euro area, as they built on the methodology of Goodhart and Hoffman (2000), which highlights the impact of a broad spectrum of financial variables on the execution of monetary policy. Moreover, by integrating the FCI into the Taylor rule, they established a favourable and statistically significant impact of the index on the interest rate policies of the observed central banks.

Brave and Butters (2011) fashioned a Financial Conditions Index (FCI) by combining various indicators of risk, liquidity, and financial leverage such as debt-to-equity ratio using a range of indicators from the money market, equity and bond markets, and indicators of banking system

operations. Alongside a standard FCI, they also produced an FCI adjusted for current and past economic activity and inflation, which provides a more extensive measure of financial stability by highlighting the interdependence between economic and financial conditions.

A more recent and advanced methodology has been proposed by Koop and Korobilis (2014), employs a factor model with time-varying loadings and volatilities to synthesize a plethora of macroeconomic and financial variables into financial condition indices. This methodology aptly accounts for potential structural shifts that may characterize the interplay between the financial sector and the real economy over time. Moreover, the IMF's methodology for approximating FCIs in 43 advanced and emerging market economies, employing a set of ten financial indicators, is rooted in Koop and Korobilis (2014) and builds on the estimations of Primiceri's (2005) time-varying parameter vector autoregression model and the dynamic factor models of Doz, Giannone, and Reichlin (2011). This approach offers two primary benefits: firstly, it can purge (current) macroeconomic conditions from financial conditions, and secondly, it allows for a dynamic interplay between the FCIs and macroeconomic conditions, which can evolve over time. Therefore, this study avails itself of this approach to compute the FCI for Albania.

3 METHODOLOGY

3.1 THE THEORETICAL FRAMEWORK OF THE TVP-FAVAR MODEL

Dynamic factor methods are quite popular in empirical macroeconomics and finance (Bagliano and Morana, 2012; Bernanke, Boivin and Elias, 2005). The Factor-augmented VAR model (FAVAR) is a powerful tool for constructing indexes that incorporate a multitude of financial variables, which are essential components in the formation of the FCI, along with key macroeconomic indicators.

Following Koop and Korobilis (2014), let x_t (for $t = 1, \dots, T$) be a $n \times 1$ vector of financial variables considered for the construction of the FCI. Let y_t be a $s \times 1$ vector of macroeconomic variables

of interest, $y_t = (\pi_t, r_t, g_t)'$, where π_t is the CPI inflation rate, r_t is the monetary policy rate and g_t is the growth rate of real GDP. The p -lag TVP-FAVAR can be expressed as:

$$x_t = \lambda_t^y y_t + \lambda_t^f f_t + v_t$$

$$\begin{pmatrix} y_t \\ f_t \end{pmatrix} = c_t + B_{t,1} \begin{pmatrix} y_{t-1} \\ f_{t-1} \end{pmatrix} + \dots + B_{t,p} \begin{pmatrix} y_{t-p} \\ f_{t-p} \end{pmatrix} + \varepsilon_t$$

where λ_t^y are regression coefficients, λ_t^f are factor loadings, f_t is the latent factor which represents the FCI, c_t is a vector of intercepts, $(B_{t,1}, \dots, B_{t,p})$ are VAR coefficients and v_t and ε_t are zero-mean Gaussian disturbances with time-varying covariance V_t and Q_t . V_t is assumed to be diagonal, thus ensuring that μ_t is a vector of idiosyncratic shocks and f_t captures movements that are common to the financial variables.

The vectors of loadings $\lambda_t = ((\lambda_t^y)', (\lambda_t^f)')'$ and VAR coefficients $\beta_t = (vec(B_{t,1})', \dots, vec(B_{t,p})')'$ are supposed to evolve as multivariate walks:

$$\lambda_t = \lambda_{t-1} + v_t$$

$$\beta_t = \beta_{t-1} + \eta_t$$

where $v_t \sim N(0, W_t)$ and $\eta_t \sim N(0, R_t)$. All disturbance terms presented in the equations are uncorrelated over time and with each other. For further technical details, see Koop and Korobilis (2014).

In simplified terms, the loadings characterise the degree of significance attributed to each singular variable in shaping the FCI. Higher loadings indicate a more substantial impact of the respective variable on the overall index. Conversely, the factors act as hidden forces, representing synchronized movements across diverse variables. When multiple variables exhibit correlated changes due to shared underlying factors, these latent factors capture the collective

influence, offering a holistic perspective of how different aspects interact to influence overall financial conditions.

Unlike the bulk of the existing literature on time-varying FAVAR models, which employs Bayesian approaches, we estimate our model by classical (i.e. Maximum Likelihood) methods. Bayesian estimation of FAVARs (as well as VARs) with time-varying parameters is typically implemented using Markov Chain Monte Carlo (MCMC) methods, which sample from the very complex multivariate joint posterior density of the factor f_t and the remaining model parameters; see, e.g., Primiceri (2005), or Del Negro and Otrok (2008). Such Bayesian simulation methods are computationally expensive even in the case of estimating a single TVP-FAVAR. When faced with multiple TVP-FAVARs and when doing recursive forecasting (which requires repeatedly doing MCMC on an expanding window of data), the use of MCMC methods is prohibitive.

In this paper, a fast two-step estimation algorithm is used, which reduces massively the computational burden, and simplifies considerably the estimation of the FCI, following Koop and Korobilis (2014). The likelihood-based approach (using the Kalman filter) is feasible and straightforward in our context, as we use a model representation that allows equation-by-equation estimation, where each equation with time-varying parameters is represented as a linear state space model.

As long as both the factor, f_t , and the loadings, λ_t , in the measurement equation are unobserved, it is not possible to apply the typical Kalman filter recursions for state-space models. Therefore, a dual, conditionally linear filtering/smoothing algorithm is used, which allows the estimation of the unobservable state f_t and the parameters $\theta_t = (\lambda_t, \beta_t)$ in a fraction of a second. The idea of using a dual linear Kalman filter is very simple: first update the parameters θ_t given an estimate of f_t , and subsequently update the factor f_t given the estimate of θ_t . Such conditioning allows us to use two distinct linear Kalman filters or smoothers, one for θ_t and one for f_t .

3.2 DATA DESCRIPTION FOR FCI CONSTRUCTION

In line with Koop and Korobolis (2014) and IMF (2017), this study employs a comprehensive dataset encompassing various financial indicators such as: new loans interest rates, sovereign spreads, term interest rate fluctuations, credit growth, house prices, the bilateral exchange rate of domestic currency ALL with the Euro and several bank soundness metrics including: profitability, liquidity, market and credit risk for the period 2000-2022 at quarterly frequency.

The interest rates of new loans and annual growth of new loans in both domestic and foreign currency² (adjusted for exchange rate changes) indicate shifts in the availability of credit and the willingness of banks to extend loans to both households and firms, influencing the ease with which businesses and individuals can access financing in the given currency. New loans better capture the current dynamics of credit markets and reflect the decisions made by lenders and borrowers in response to prevailing economic conditions, providing a more sensitive measure of evolving financing conditions. Higher growth rates may suggest a more favorable lending environment, while lower or negative growth rates could signal tighter credit conditions.

The levels of interest rates, including both the short-term 3-month Treasury Bills rates and the long-term 10-year bond rates, impact borrowing costs, investment decisions, and market dynamics, contributing to the overall framework that defines the ease of accessing financing and funding in the economy. The short-term rates more immediately affect liquidity and short-term financial decisions, while the long-term rates shape strategic investment choices and market sentiment over an extended period. As these rates rise, borrowing costs increase for businesses and individuals, creating a headwind for investment and consumer spending; conversely, lower long-term rates ease borrowing costs, facilitating financing conditions.

² Euro is the predominant currency for banks' activities; the exclusion of other foreign currencies from the discussion acknowledges that their contribution to the overall lending dynamics is comparatively less substantial.

Long-term interest rates volatility is determined by assessing the standard deviation of quarter-on-quarter changes over the last 8 quarters in the rates of interest on 10-year debt instruments. This evaluation specifically focuses on government bonds, including those issued by Albania and the Euro Area. A higher standard deviation indicates greater volatility in the changes of long-term interest rates, providing insightful perspective into the stability or fluctuation in the bond market over the considered period. In times of large volatility, corporates may face uncertainty regarding the stability of interest rates for their funding. This uncertainty can lead businesses to adopt a cautious approach, making them more risk-averse in committing to long-term projects or expansion initiatives, and potentially postponing their investment decisions.

Term spread, often interpreted as a measure of the yield curve slope, is computed as the difference between the 2Y long-term government bonds and 3M interest rates on short-term, and reflects the market's expectations of future financial conditions. A positive spread signals that investors expect future interest rates to rise, creating an environment where obtaining financing is favourable, and ultimately improving economic growth prospects. On the other hand, in an environment of negative term spread, lending behavior tends to become more conservative due to a combination of factors, impacting the availability of credit and potentially tightening overall financial conditions. Firstly, the compressed interest rate spread affects the profitability of traditional lending activities, prompting financial institutions to exercise caution in lending. Additionally, the negative term spread often signals expectations of an economic downturn, because it indicates what investors think the central bank will do with its benchmark rate in the future, leading lenders to become more risk-averse to mitigate potential loan defaults. Further, in an environment of economic uncertainty, banks may prioritize capital preservation and adhere more closely to regulatory guidelines, constraining their lending activities.

Of particular importance is the country's sovereign spread, calculated as the difference between the yields of Albanian's 10-year bond and Euro-Area 10-year bonds, which serves as a crucial indicator for financing conditions for domestic firms, especially in emerging market economies with limited data on corporate spreads. Other alternative indicators such as JP Morgan EMBI has

not been included due to unavailability of data pertaining to Albania. Additionally, S&P and Moody's country ranking scores for Albania have been omitted, as these scores have remained constant throughout the entire period under consideration. The absence of variability in these scores for Albania precludes their usefulness in providing information on the country's risk volatility over time.

A significant depreciation of the local currency (Lek) against the Euro can increase the cost of obtaining financing denominated in foreign currencies, affecting businesses and the government that rely on foreign loans or issue bonds denominated in foreign currency.

In conjunction with tracking changes in the exchange rate, our analysis incorporates the quarterly exchange rate volatility derived from daily data. The calculation involves computing the daily percentage returns, squaring these returns to eliminate negative values, determining the average squared daily returns for each quarter, and ultimately calculating volatility. The inclusion of exchange rate volatility is crucial for assessing the ease of obtaining funding as it reflects uncertainties and potential risks. Elevated volatility may erode investor confidence, lead to tightened credit conditions, and introduce uncertainties for borrowers, influencing the willingness of lenders to extend credit and the ease with which businesses and individuals can access financing in both domestic and international markets.

Measured as the annual percentage change in the average prices of residential properties over a one-year period, the House Price Index (HPI) is another important indicator for constructing a FCI, because it directly influences collateral values, credit availability, market dynamics, and economic confidence. Higher collateral values make borrowers more creditworthy, improving their ability to secure financing and potentially obtaining more favorable loan terms.

Various indicators characterizing the health of the banking sector are taken into account including: banks' profitability, liquidity, asset quality, capital adequacy ratio that collectively contribute to shaping the financial landscape, influencing the accessibility of funding for

businesses and individuals. The profitability, indicated by the return on assets (ROA), influences investor confidence and contributes to banks' creditworthiness, potentially making it easier for businesses and individuals to access financing. Liquidity, reflected in the current assets to current liabilities ratio, is essential for short-term stability, affecting a bank's capacity to meet obligations promptly and, consequently, shaping the availability of credit. The non-performing loan (NPL) ratio, representing credit risk, is a crucial factor influencing the perception of a bank's loan portfolio quality, affecting the terms at which funding can be obtained. Furthermore, the Capital Adequacy Ratio (CAR) indicates a bank's financial strength and its ability to absorb potential losses though maintaining an adequate buffer of capital. Banks with a solid CAR are more likely to offer favourable terms for individuals and businesses, including lower interest rates, since they often benefit from lower borrowing costs due to their perceived lower risk, and they typically have enhanced access to capital markets.

Lastly, the data used to describe the real economy in the model includes key macroeconomic indicators such as Gross Domestic Product (GDP), Consumer Price Index (CPI), and the REPO rate. GDP provides a comprehensive measure of a country's economic output, while CPI reflects changes in consumer prices; and the monetary policy rate allows for an assessment of the monetary policy stance. All data have been sourced from the Bank of Albania, with the exception of real GDP and the Consumer Price Index (CPI), which have been obtained from the National Institute of Statistics (INSTAT). To maintain uniformity, macro variables not originally in rates (CPI, GDP) have been converted to growth rates by taking the first log-differences, simultaneously transforming the series into a stationary form in accordance with Hatzius et al. (2010). A summary of variables used for the construction of FCI and their description can be found on the Appendix, Table 1A³.

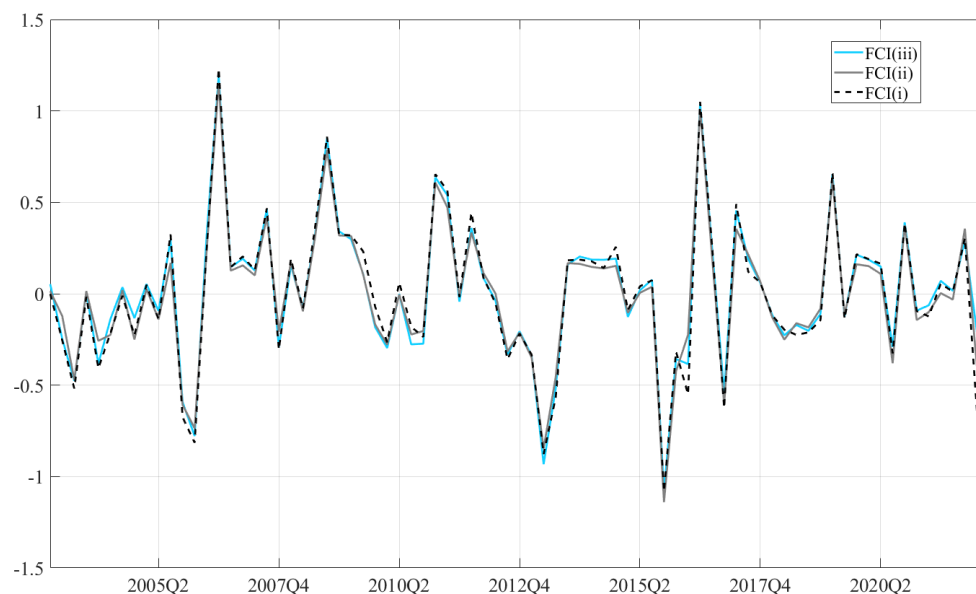
³ The macroeconomic variables (GDP, prices, and monetary policy rate) are not included in the construction of the FCI; they are incorporated alongside the factors estimated (i.e. the FCI) in the first stage when estimating the FAVAR model.

4 ESTIMATION RESULTS

4.1 FCI ESTIMATE AND ITS RELEVANCE TO MAIN MACROECONOMIC INDICATORS

For comparative purpose, we utilize three factor methods to estimate the financial conditions index (FCI): i) a static principal component analysis (PCA); ii) a single Time-Varying Parameters Factor-Augmented Vector Autoregression (FAVAR), which was designed to have a similar interpretation as in Doz et al. (2011), using all of the financial variables; and iii) a single Time-Varying Parameter Factor-Augmented Vector Autoregression (TVP-FAVAR) version of ii), with time-varying loadings and stochastic volatility, as previously explained in this paper. Figure 1 plots three different estimates of the FCI, which are standardized so as to have zero mean and standard deviation of one.⁴ In general, the three FCI-s in Figure 1 exhibit similar patterns over time.

Figure 1. Estimates of FCIs according to the three factor methods.



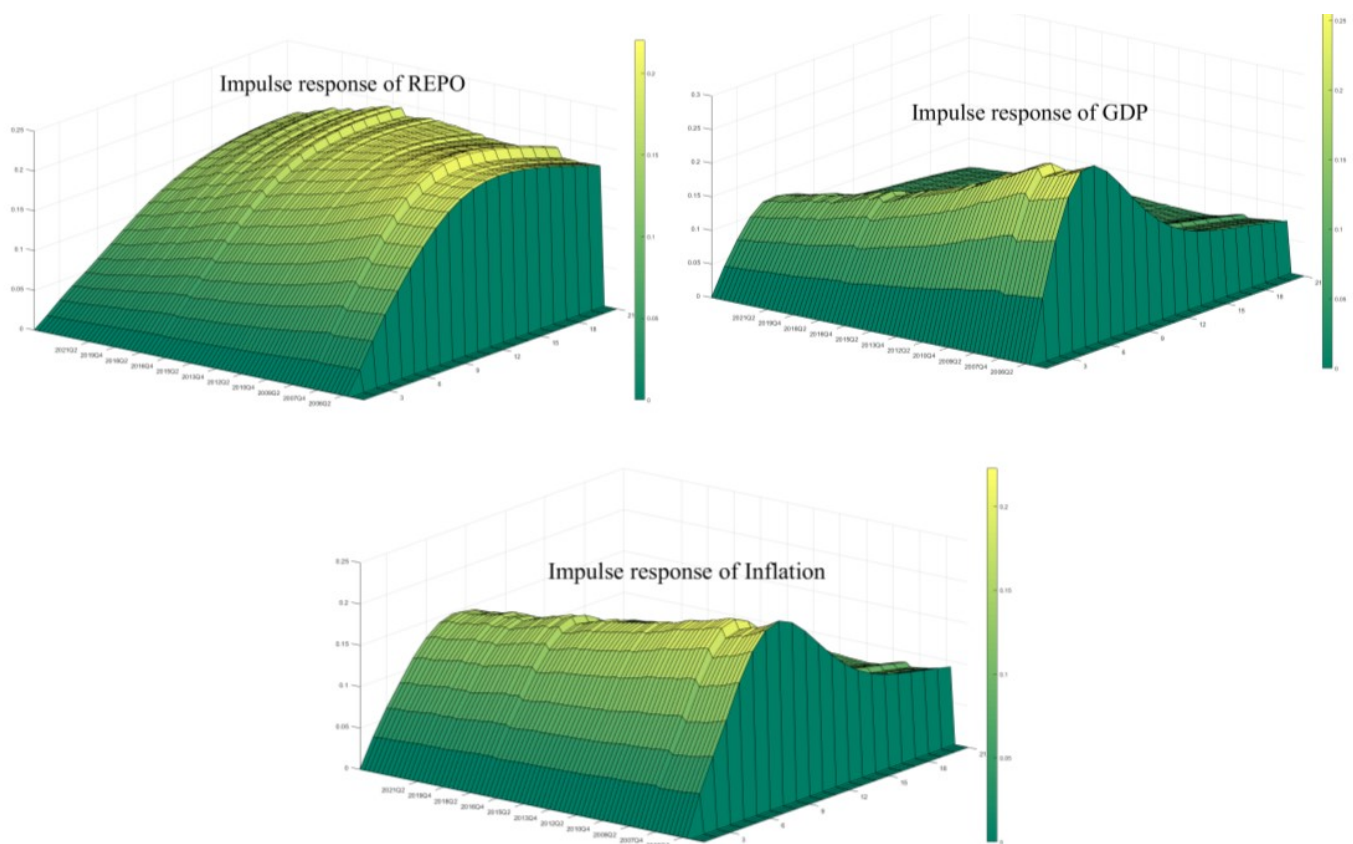
Source: Authors' computations.

⁴ In addition to the group of variables initially utilized for constructing the FCI, we explored alternative combinations. These alternates involved substituting the annual growth rate of HPI with HPI scaled by GDP or HPI scaled by wages. Moreover, instead of the sovereign spread calculated against the euro area bonds, we examined the sovereign spread against German bonds. The outcomes of these variations are detailed in the appendix, Figure 4A.

The financial conditions index estimated by different approaches seems to capture well the main financial events happening in Albania, when a lower value of the index indicates a worsening (i.e. tightening) of the financial conditions. The FCI offers a comprehensive picture of financial conditions than it is provided by looking at just interest rates.

Financial conditions in Albania have become progressively eased throughout the period, with tightening over certain episodes, notably the global financial crisis (GFC), the euro area sovereign debt crisis, and the onset of the COVID-19 pandemic. In the aftermath of the global financial crisis (GFC), financial conditions in Albania have deteriorated, even though slightly, relative to the rest of the considered period, attributed mainly to the contraction in credit markets and increased financial stress, reflected in the decline in new loans and the surge in NPLs. Immediate monetary policy expansion by Bank of Albania, like many other central banks around the world, have contributed to alleviate the effects of the onset of GFC and minimizing the impact of the euro area debt crisis.

Figure 2. Time-Varying Impulse Responses to an easing of Financial Conditions.



In addition, in order to test the appropriateness of the constructed FCI for policy analysis purpose and to determine whether it accurately reflects the dynamics of the macroeconomy over different periods and it is capturing all the relevant factors, we compute the time-varying impulse responses of the main macroeconomic variables to a negative shock to the FCI (i.e. an easing of financial conditions), presented in Figure 2. They are calculated for every period and for horizons of up to 21 quarters. To identify the structural shock, a standard Cholesky factorization identification scheme is used, which is similar to the approach taken in other studies such as Primiceri (2005), Castelnuovo (2012), and Korobilis (2013), Arregui et al. (2018) and details about estimation of impulse responses can be found in Koop and Korobilis (2014). Such a triangular identification scheme implies macroeconomic variables respond with a lag to changes in financial conditions, while financial conditions can respond contemporaneously to shocks in macroeconomic conditions.

While the impulse responses demonstrate consistent patterns across different time horizons, suggesting a relatively stable relationship among the analyzed variables, it is important to note that this observation does not necessarily provide strong evidence in favor of the superiority of employing Time-Varying Parameter (TVP) models over Constant Coefficient Factor-Augmented VARs (FAVARs)⁵. Despite this, it is noteworthy that GDP growth exhibits a distinctive reaction during the global financial crisis, underscoring the significance, albeit modest, of incorporating the time-varying dimension in understanding economic responses to financial shocks.

One of the main channels through which the shock is transmitted is the interest rate channel. An easing of financial conditions typically leads to a decrease in the cost of borrowing, resulting in lower interest rates for firms and households seeking credit. This, in turn, stimulates consumption and investment spending due to the more affordable borrowing. The rise in aggregate demand exerts upward pressure on output prices, potentially contributing to an increase in inflation rates.

⁵ Figure 3A in the Appendix illustrates time-invariant parameter impulse responses.

The transmission of a shock to financial conditions occurs through various channels. In a scenario where financial conditions become more accommodative, it becomes easier and less costly for firms and households to borrow. This often prompts an increase in consumption and investment expenditures. Consequently, there is an upward pressure on aggregate demand, influencing output prices, and impacting the monetary policy rate.

The credit channel represents another pathway. When financial conditions ease, banks may become more willing to lend, especially to borrowers with higher credit risks. This increased credit availability promotes higher consumption and investment spending, contributing to potential price increases, particularly for durable goods like housing and automobiles.

Furthermore, the wealth effect can also play a role in the transmission of a shock to financial conditions. With improved financial conditions, the value of financial assets such as stocks and bonds may rise, enhancing household wealth. This increase in wealth tends to boost consumption and investment expenditures, fostering higher aggregate demand and output prices.

Lastly, the impact of a shock to financial conditions can also be conveyed through the exchange rate channel. This scenario might lead to a depreciation of the domestic currency, making exports more competitive and potentially increasing demand for domestic goods. Consequently, this can result in an upward trajectory for output prices and contribute to an expansion in GDP growth.

4.2 CREDIT DYNAMICS AND MACROFINANCIAL VULNERABILITIES

Upon constructing a FCI, that seems to be satisfactorily appropriate for policy analysis, we deepen the analysis and try to gauge the relevance of credit and financial conditions on macro-financial imbalances in Albania. Some of the commonly used measures of the financial

vulnerabilities by researches and policymakers are: excess nonfinancial⁶ sector credit or leverage of the financial system (Adrian, Covitz, and Liang 2015). The Basel Committee on Banking Supervision (2010) suggests using excess private nonfinancial credit as a measure of anticipated future losses to the banking system, and considers this indicator as very important in determining the new countercyclical capital buffer.

Excess credit, particularly when it is not supported by an increase in income or economic activity, can lead to financial imbalances and potential risks to financial stability. This is because excessive credit can create asset price bubbles, fuel unsustainable borrowing and spending, and increase the vulnerability of borrowers to shocks. When borrowers take on too much debt, they become more sensitive to changes in interest rates or other economic shocks, which can lead to defaults or distress. Moreover, if lenders are too lenient in their lending standards, they may extend credit to borrowers who are more likely to default or engage in risky behaviour. This can lead to a build-up of non-performing loans on lenders' balance sheets, which can cause banks to become insolvent or trigger a broader financial crisis.

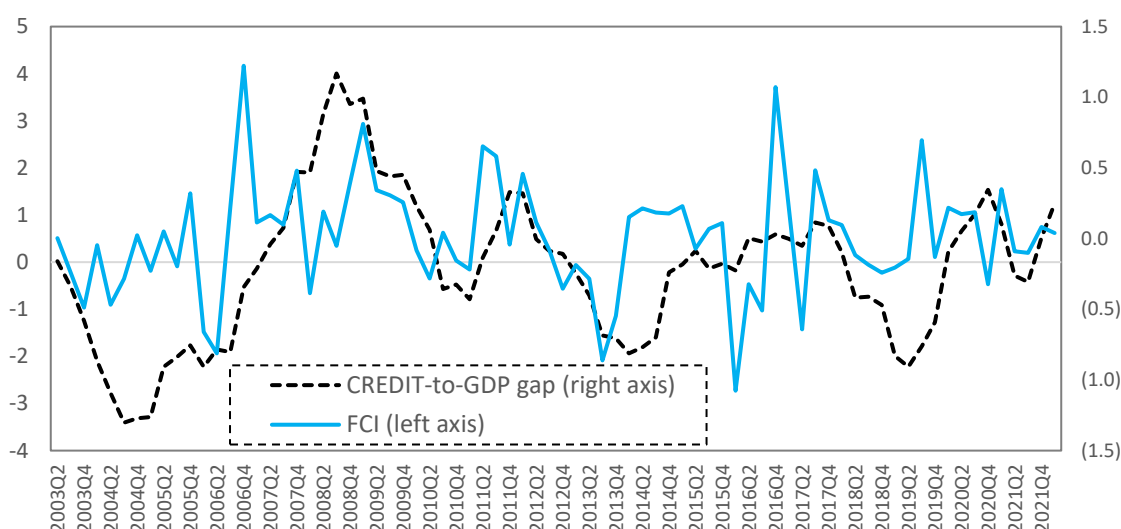
In this spirit, we examine the dynamic relations between financial conditions, monetary policy and macroeconomic performance in Albania for the period 2003-2022, under different conditions of financial vulnerabilities, capturing also nonlinearities in these relations through a Threshold Vector Autoregressive (TVAR) model. More specifically, we will analyse how is the relationship between financial conditions and monetary policy affected by the credit to private non-financial sector following Aikman et al. (2016). Since most of the literature suggests that higher imbalances make the economy more vulnerable to negative shocks, we split the analysis into high financial vulnerability regime and low vulnerability regime. Following a conventional practice in the literature (see Borio and Lowe 2002, 2004; Borio and Drehmann, 2009), the credit-to-GDP gap is used as an indicator to distinguish between low and financial vulnerability. More specifically, the high financial vulnerability regime is characterized by a positive credit-to-GDP

⁶ The nonfinancial sector of the economy refers to all industries and businesses that are not directly involved in financial activities such as banking, insurance, and investment.

ratio gap calculated as a difference between credit-to-GDP ratio and its estimated long-run trend, whereas in the low financial vulnerability regime credit-to-GDP ratio gap is below zero.

The credit-to-GDP gap is defined as the difference between the ratio of nonfinancial private-sector debt to nominal GDP and an estimate of its trend, which we estimate through a Hodrick-Prescott filter with a smoothing parameter of 1,600. This definition of the credit gap aligns with the Basel III recommendation for evaluating credit excesses for implementing the countercyclical capital buffer.

Figure 3. Evolution of financial conditions and credit-to-GDP gap.



Source: Authors' computation.

Figure 3 presents a graph of the dynamic relationship between the two variables over time. Looser financial conditions, represented by higher FCI, tend to be followed by periods of higher credit-to-GDP gaps across most of the observed time periods. One possible explanation for this relationship is that during times of loose financial conditions, financial institutions are more inclined to lend, resulting in an upsurge in credit supply and an increase in the credit-to-GDP gap. Conversely, during tight financial conditions, the credit supply may be constrained, leading to a decrease in the credit-to-GDP gap. Another possible explanation is that variations in credit conditions may influence economic activity, which ultimately affects the credit-to-GDP gap. For

instance, lenient credit conditions may encourage investment and spending, ultimately resulting in increased GDP growth and a higher credit-to-GDP gap.

To examine the effect of an FCI shock on credit and macroeconomic performance under various credit-to-GDP gap conditions, a TVAR model is estimated using Bayesian techniques. The estimation method draws inspiration from Giannone, Lenza, and Primiceri's (2015) methodology and incorporates the Litterman-Minnesota prior (1979, 1980). This prior assumes that each variable follows a random walk, possibly with a drift (if the variables are not stationary), leading to lower estimation uncertainty, more reliable inference and more accurate out-of-sample forecasts.

The TVAR model incorporates five endogenous variables: GDP growth, inflation, credit-to-GDP gap, FCI, and REPO rate. The model features annualized log levels of real GDP and CPI (i.e., taking logs and multiplying by 4), while the other variables are measured in levels. Identification of shocks is carried out through a Cholesky ordering⁷, where monetary policy is permitted to react within the same quarter as the shock to FCI, consistent with Gilchrist and Zakrajsek (2012).

The TVARs are estimated over separate subsamples with the thresholds determined by the credit-to-GDP gap, allowing to capture the nonlinear dynamics when computing impulse responses. Specifically, a credit-to-GDP ratio exceeding the trend indicates high excessive credit and exposes financial vulnerabilities, while a ratio falling below the trend signifies low excessive credit and minor financial vulnerabilities, as already explained earlier in the paper. Therefore, the specification of TVAR is based on the level of the credit-to-GDP gap (denoted as X_t) in this case, which has a sample mean of μ_X :

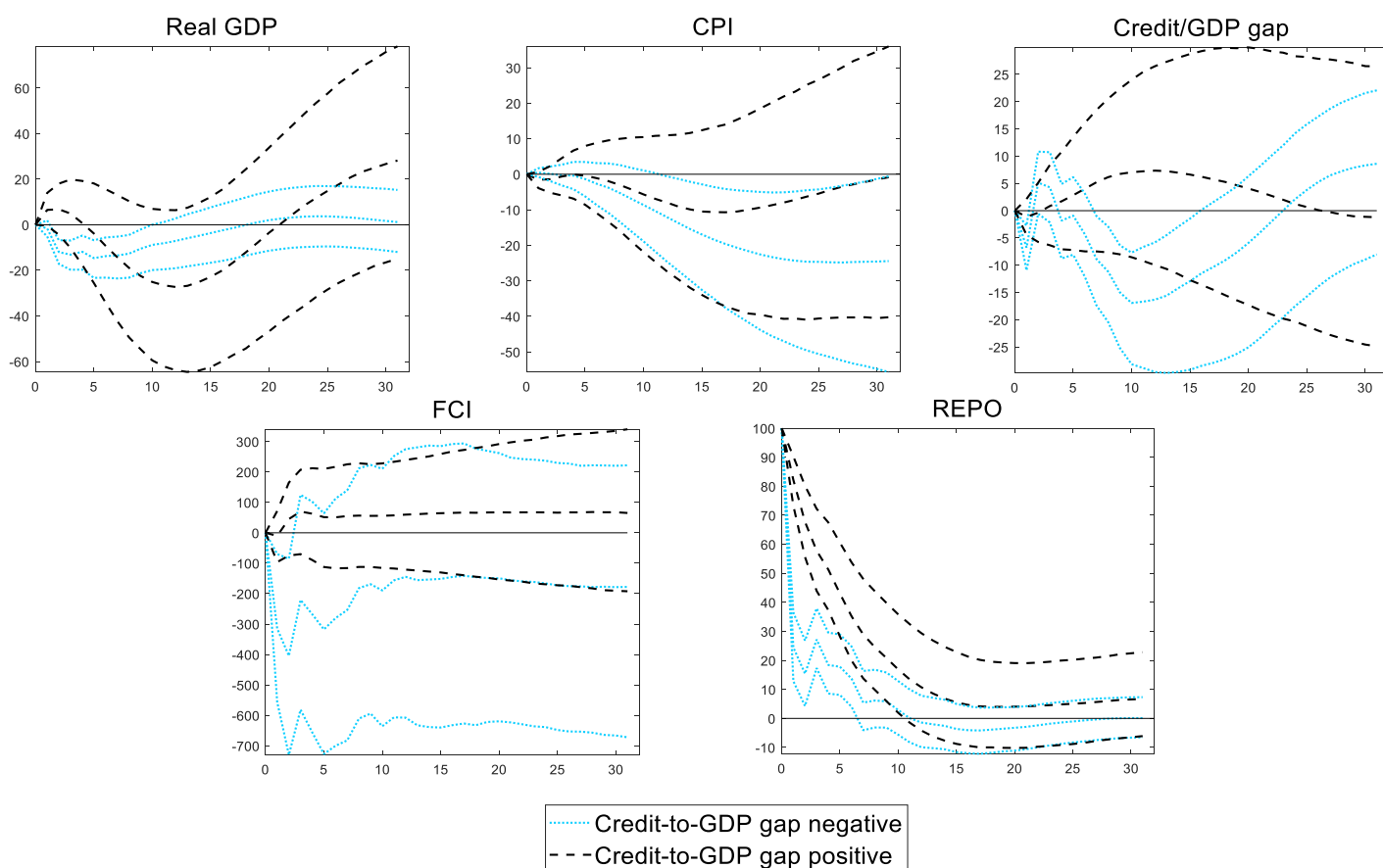
$$y_t = c^{(j)} + \Phi^{(j)}(L)y_{t-1} + u_t^{(j)} \begin{cases} j = \text{high vulnerability regime,} & \text{if } X_t > \mu_X \\ j = \text{low vulnerability regime,} & \text{if } X_t \leq \mu_X \end{cases}$$

⁷ This identification methodology is also advocated by Gilchrist and Zakrajšek (2012), Metiu et al. (2014), Aikman et al. (2017); and Arregui et al. (2018).

Where y_t is the vector of endogenous variables mentioned above and $\mu\chi = 0$; and where $u_t^j \sim (0, \Sigma_u^j)$ is a vector of Gaussian white noise forecast errors.

Figure 4 showcases the IRFs for two distinct regimes: a negative credit-to-GDP gap environment and a positive credit-to-GDP gap environment. Notably, substantial disparities can be observed in the response of the variables across these regimes.

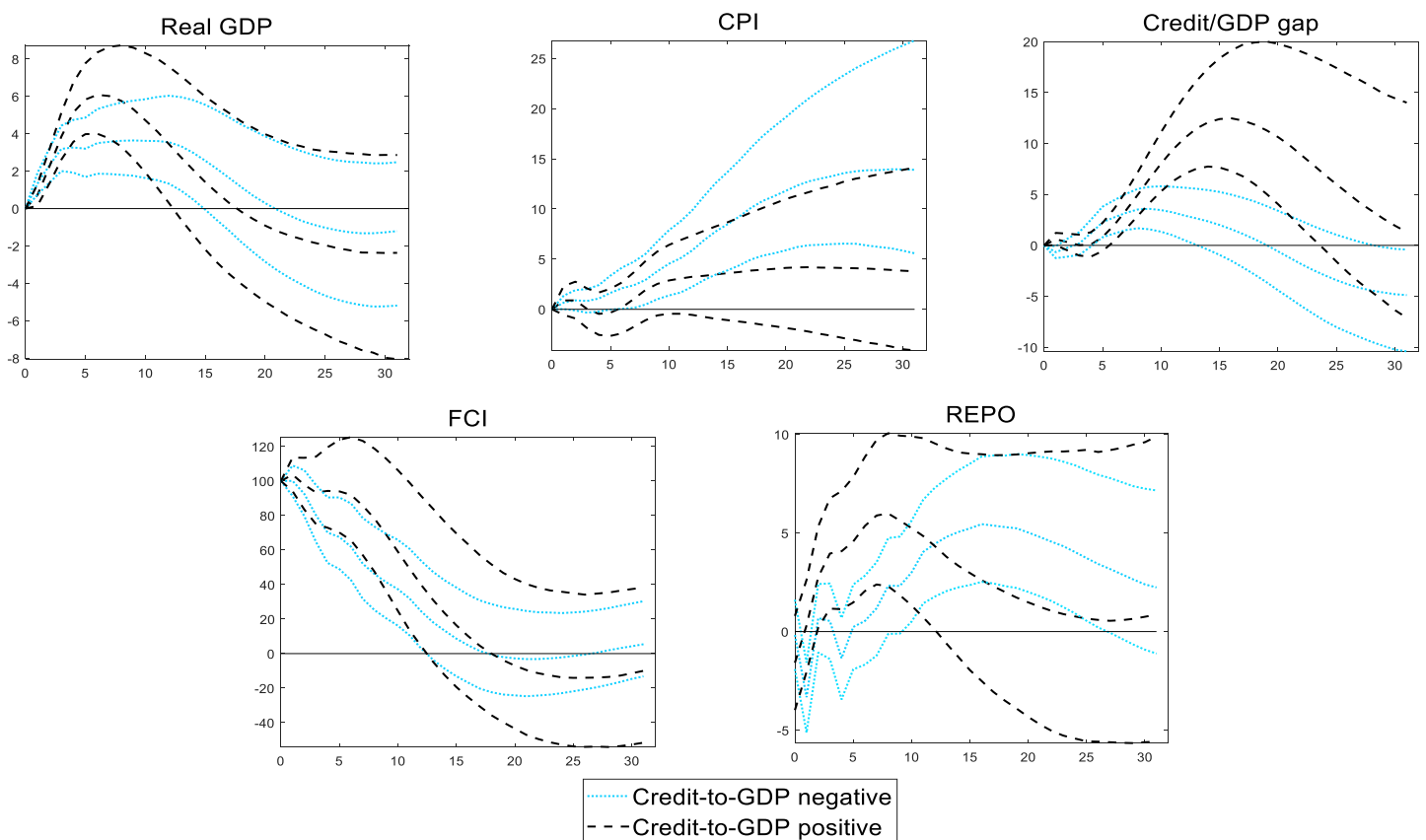
Figure 4. Impulse responses to a shock to monetary policy rate (REPO).



Source: Authors' computations.

The response of the endogenous variables to a monetary policy shock exhibits a discernible disparity depending on the credit-to-GDP ratio gap. Remarkably, the decline in economic output and prices ensuing a contraction in monetary policy in a low credit gap environment contrasts with the insignificantly reactive production and prices in a positive credit gap environment, signifying the ineffectiveness of monetary policy. The diverse conduct of the macro indicators towards the monetary shock is linked to the dynamics of financial conditions. When the credit gap is negative, the FCI contracts after a monetary contraction, thereby accentuating the monetary policy's tightening. In contrast, when the credit gap is positive, the financial conditions experience a slight loosening, countervailing the monetary contraction executed by the monetary authority.

Figure 5. Impulse responses to a shock to FCI.



Source: Authors' computation.

The results herein confirm that the monetary policy transmission mechanism alters along the financial cycle, which is in line with the vast literature on the role of financial frictions in the monetary transmission (Bernanke, Gertler, and Gilchrist 1999).

Furthermore, an analysis of the transmission of financial conditions to the real economy was conducted. Figure 5 shows the impulse response functions (IRFs) with respect to shocks to the FCI, where FCI is defined in such a way that higher values indicate looser financial conditions. As a standard practise in this literature, the 16th and 84th percentiles of the distribution of the impulse response functions are reported, in line with Uhlig (2005), Giannone, Lenza, and Primiceri (2015).

The transmission of a financial conditions shock to the other endogenous variables is tied to the prevailing state of financial vulnerabilities. Under conditions of a negative credit-to-GDP gap, an upward shock to the FCI (i.e. an improvement of financial conditions) results in an increase in both real GDP and prices, accompanied by a moderate expansion in the credit-to-GDP gap. This indicates the role of favourable financial conditions in fostering borrowing and lending activities within the economy. This expansion in credit availability is instrumental in fueling investment and consumption, supporting the observed boost in economic growth. Concurrently, the rise in prices denotes an increase in demand across various sectors of the economy. This surge in demand, propelled by favorable financial conditions, induces upward pressure on prices, indicating a healthy expansion in economic activity.

On the other hand, when the credit-to-GDP gap is positive, our analysis uncovers distinct dynamics following a favorable shock to the FCI, which results in a drop in both GDP and prices, alongside a more pronounced increase in the credit-to-GDP gap compared to the negative credit gap environment. This pattern suggests that in a negative credit-to-GDP gap environment, the positive influence of improved financial conditions fails to stimulate economic activity

adequately, probably due to excessive leverage and financial risk-taking in a setting with heightened financial vulnerabilities.

Moreover, while there is an initial expansion observed in output following the FCI shock, the longer-term trend paints a contrasting picture. Our analysis indicates a decline in output commencing around the fourth quarter post-shock, attributable to heightened indebtedness encouraged by the favorable financial conditions. This suggests that despite the initial boost to economic activity, prolonged exposure to favorable financial conditions may lead to a buildup of debt levels, ultimately impeding economic growth in the longer term.

A deeper examination of this finding reveals the complex interplay between financial conditions, credit dynamics, and economic performance. When financial conditions improve in an environment characterized by a high credit-to-GDP gap, there's an initial boost to economic output as businesses and consumers respond to improved access to credit. However, this positive momentum is tempered by the underlying vulnerability stemming from high levels of credit relative to GDP.

While the paper provides valuable insights into the interrelations between credit dynamics, macro-financial vulnerabilities and monetary policy implications in Albania, it is essential to recognize the limitations of the empirical analysis and suggesting potential avenues for future research. One limitation arises from the exogenous determination of the threshold value for credit-to-GDP gap in the model. Future research could explore alternative measures for financial vulnerabilities or incorporate endogenous determination of the threshold for the financial vulnerabilities measure, as well as additional indicators in the FCI construction. Another aspect that could enhance the analysis is the use of monthly data for the construction of the financial conditions index, which could capture finer fluctuations and provide a more accurate representation of the volatilities in financial conditions.

5. FINAL REMARKS

This paper contributes to the literature by first introducing a FCI for Albanian data using the most common and sophisticated methodologies found in the literature, and then by offering an analysis of the relationships between financial conditions, credit, and monetary policy in a threshold VAR framework that allows for nonlinear dynamics.

The FCI produced by the TVP-FAVAR approach seems to capture well the most prominent events occurring in the Albanian economy, such as the GFC and the Euro Area sovereign debt crisis. Additionally, we analyse the effects of a financial conditions shocks to the main macroeconomic indicators and further how these effects vary between low and high credit environments.

The results show that the transmission of financial conditions shocks to the real economy depends in a strongly nonlinear way on nonfinancial credit. More specifically, the effect of positive shocks to financial conditions on output and inflation depends on the credit-to-GDP gap stance. The expected expansionary effects from a positive impulse to financial conditions are evident when the initial credit-to-GDP gap is low. However, when the credit-to-GDP gap is high, the initial expansionary effects on macro performance fade out and performance deteriorates in next periods when credit increases even more. Also, a more sustained increase in credit is followed by a “harsher” economic contraction, but only when the credit gap is already high.

Financial conditions lead the credit gap. When financial conditions are looser in a high credit environment, the economy becomes more prone to a recession, perhaps because economic agents are more fragile as a consequence of their higher leverage. Another key result is that the monetary policy transmission channel also depends in a nonlinear way on the credit gap. When the credit gap is low, impulses to monetary policy lead to a decrease in economic output and prices, and a credit contraction. In the contrary, when the credit gap is high, a tightening in monetary policy is ineffective and does not lower output, prices and credit, or tighten financial conditions.

The empirical findings elucidated above bear thoughtful implications for the design and implementation of monetary policies. Specifically, policymakers must pay close attention to the credit-to-GDP gap, as it is a crucial indicator of financial vulnerabilities that influence the transmission of financial shocks to the economy. In addition, policymakers should recognize the significant differences in the reaction of macroeconomic variables to monetary policy shocks between the two regimes, and therefore consider the credit gap environment when formulating the appropriate monetary policy stance. Policymakers should foster responsible lending practices and enhance financial regulation to prevent excessive risk-taking and enhance the resilience of the financial system. The adverse impact of a positive financial conditions shock in a positive credit gap environment on economic output highlights the need for economic diversification.

Lastly, our results infer the importance of incorporating macroprudential policies to supplement the effectiveness of monetary policy in managing financial vulnerabilities. Specifically, the findings suggest that macroprudential policies can play a critical role in addressing high financial vulnerabilities, when monetary policy may be less effective. Therefore, policymakers should consider the complementarity of these two policy tools and adopt a comprehensive policy framework that involves both monetary and macroprudential policies to maintain financial stability.

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APPENDIX

Table 1A. Variables description for FCI construction.

VARIABLE	SOURCE	LABEL	DESCRIPTION
New loans to total private sector (y-o-y) (EUR)	BoA	new_loans_eur	Year-on-year percentage change in the volume of Euro-denominated new loans provided by banks
New loans to total private sector (y-o-y) (ALL)	BoA	new_loans_all	Year-on-year percentage change in the volume of Lek-denominated new loans provided by banks
Interest on new lending (ALL)	BoA	int_all	Interest rates on new lending denominated in Lek
Interest on new lending (EUR)	BoA	int_eur	Interest rates on new lending denominated in Euro
10y bonds yield (q-o-q)	BoA	10y_al	Quarterly percentage change in the yield of 10-year government bonds
10y bonds volatility	BoA	10y_vol_al	Standard deviation of 8 quarters of the yield on 10-year government bonds
2y bonds yield	BoA	2y_al	Yield of 2-year government bonds, obtained from financial markets
3m Treasury bills	BoA	int_3m	Yield on 3-month Treasury Bills obtained from financial markets
10y bonds yield EA (q-o-q)	EUROSTAT	10y_ea	Quarterly percentage change in the yield of 10-year Euro Area government bonds
10y bonds volatility EA	EUROSTAT	10y_vol_al	Standard deviation of 8 quarters of the yield on 10-year Euro Area government bonds
Term spread (2y - 3m)	BoA	spread_2y_3m	Difference between the yield on 2-year and 3-month government securities
Term spread (10y - 3m)	BoA	spread_10y_3m	Difference between the yield on 10-year and 3-month government securities
Country's sovereign spread (Country 10-year bonds - Euro-Area (EA) 10 year bonds)	BoA, EUROSTAT for EA 10-y	sov_spread_ea	The difference in yields between Albania's 10-year government bonds and the corresponding Euro-Area (EA) 10-year government bonds
Country's sovereign spread (Country 10-year bonds - German (DE) 10 year bonds)	BoA, EUROSTAT for DE 10-y	sov_spread_de	The difference in yields between Albania's 10-year government bonds and the corresponding German (EA) 10-year government bonds
ER (y-o-y)	BoA	all_eur	Year-on-year percentage change in the Exchange Rate (Albanian Lek to Euro)
ER volatility	BoA	all_eur_vol	Calculated as the standard deviation of daily returns, where the latter is the percentage change in the exchange rate from one day to the next
House Price Index (y-o-y)	BoA	hpi	Year-on-year percentage change in the House Price Index
House Price Index scaled by GDP	BoA, INSTAT	hpi_gdp	House Price Index as a ratio of GDP after converting GDP into an index (2015=100)
House Price Index scaled by wages	BoA, INSTAT	hpi_wage	House Price Index as a ratio of GDP after converting nominal wages into an index (2015=100)
ROA (%)	BoA	roa	Return on Assets, indicating a bank's profitability, calculated as Net Income / Average Total Assets
NPL (%)	BoA	npl	The proportion of loans within a bank's portfolio, being more than 90 days past due

Capital Adequacy Ratio (%)	BoA	car	Capital Adequacy Ratio, a measure of a bank's capital to its risk-weighted assets
Banks' liquidity ratio (%)	BoA	lr	Calculated as a ratio of current assets to current liabilities
Total assets growth (y-o-y)	BoA	asset_growth	Year-on-year percentage change in the total assets of banks

Figure 1A. Evolution of the variables (in level) considered for the FCI construction.

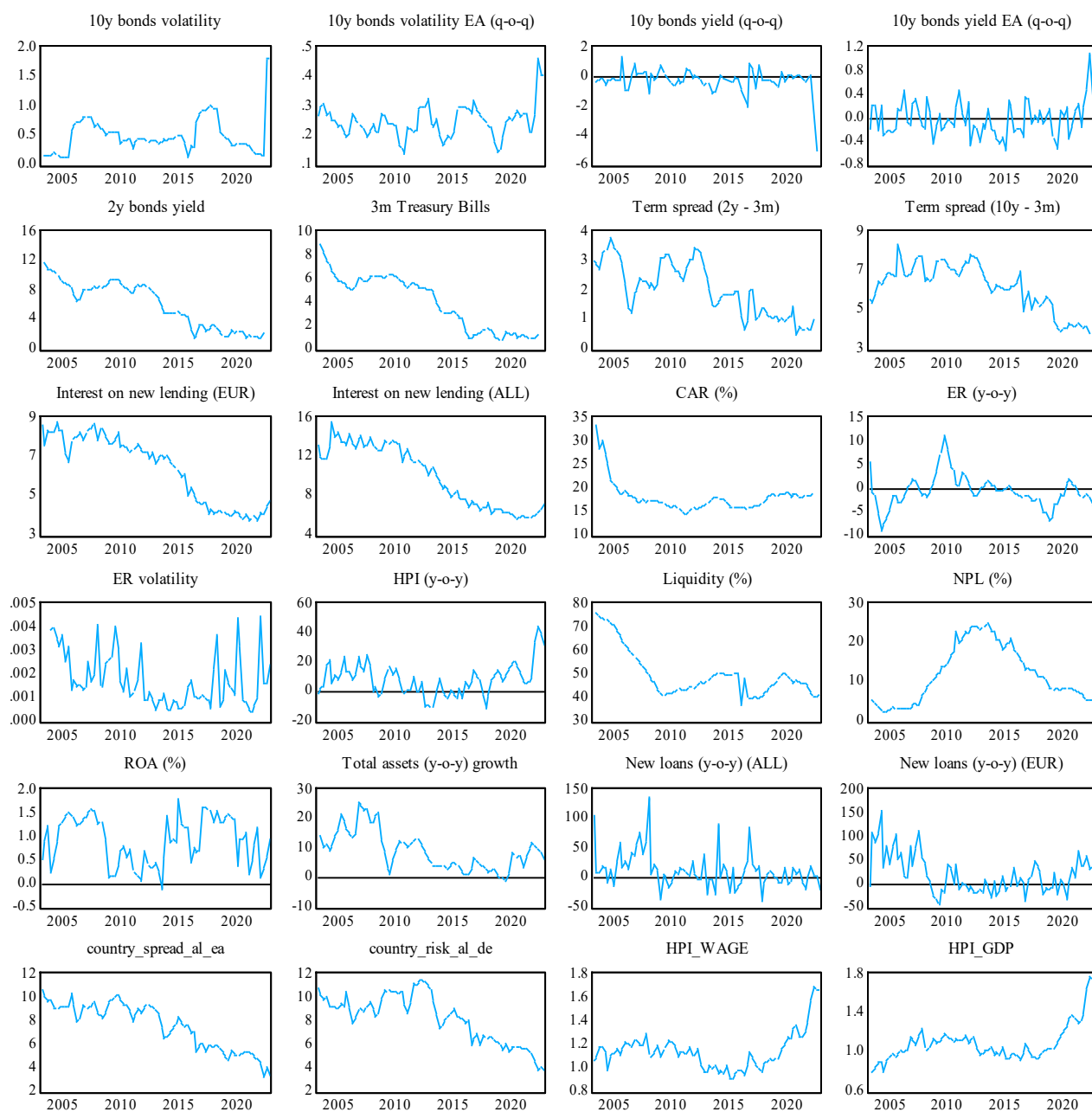


Figure 2A. Evolution of the variables (transformed series) considered for the FCI construction.

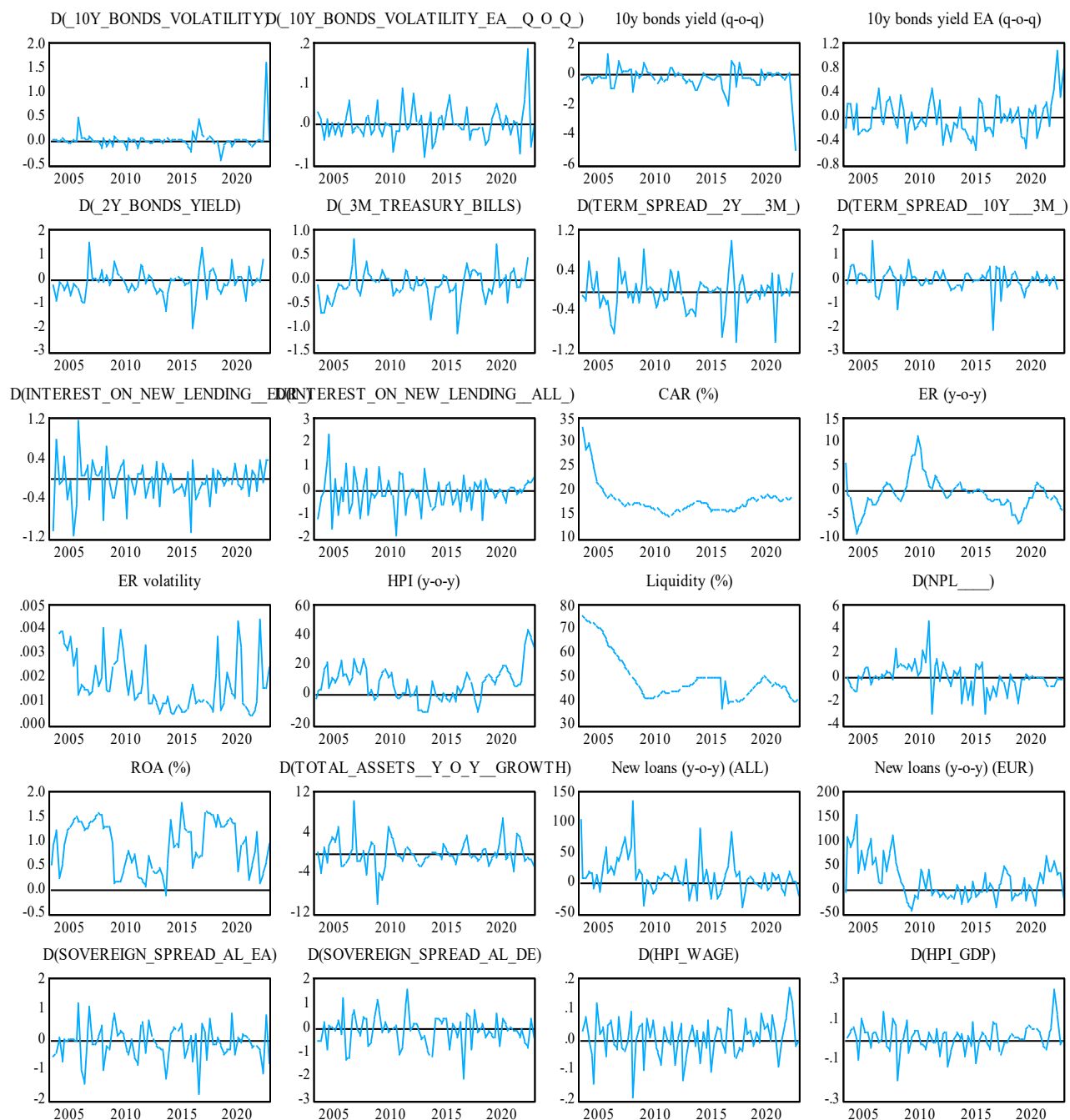


Table 2A. Descriptive statistics of the variables considered for the FCI construction.

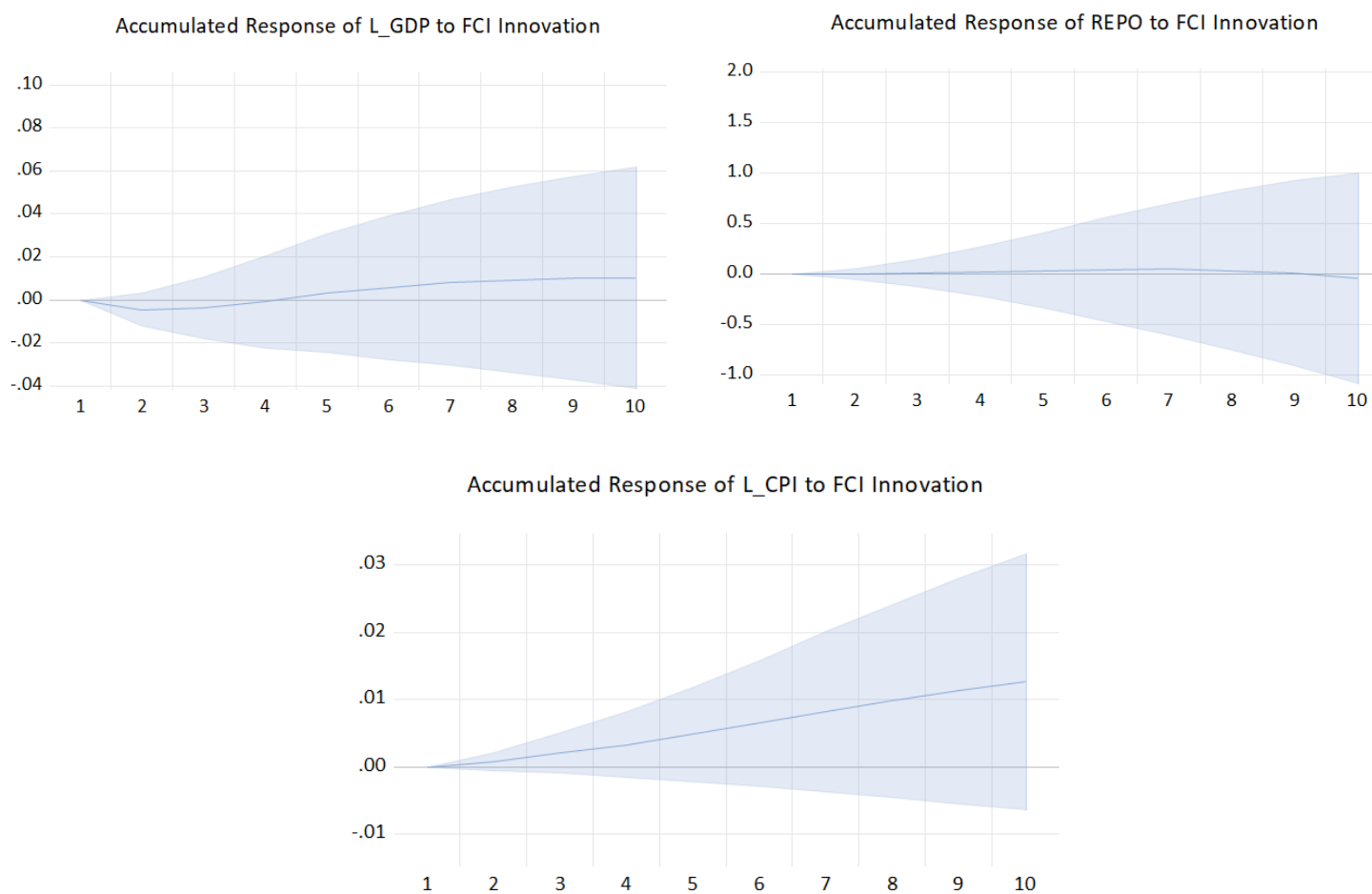
	LR	NEW_LOANS_ALL	NEW_LOANS_EUR	NPL	ROA	CAR	ALL_EUR	ER_VOL	HPI	TOTAL_ASSETS
Mean	49.201	12.529	17.358	12.3	0.923	17.699	-0.611	0.001	7.938	9.113
Median	46.914	9.412	9.429	11.1	0.935	17.377	-1.069	0.001	7.817	8.032
Maximum	73.888	137.063	154.179	24.9	1.800	30.063	11.417	0.004	44.220	25.720
Minimum	36.680	-40.161	-45.216	2.333	-0.140	14.642	-9.251	0.00038	-11.200	-1.084
Std. Dev.	8.952	29.389	39.608	7.261	0.512	2.459	3.435	0.001	10.305	6.708
Skewness	1.402	1.517	1.038	0.292	-0.237	2.794	0.661	0.956	0.547	0.687
Kurtosis	4.271	6.896	4.021	1.735	1.725	13.144	5.090	2.756	4.080	2.668
JB	29.23	75.21	16.52	5.988	5.708	413.60	18.87	11.474	7.292	6.163
Prob.	0.000	0.000	0.0002	0.050	0.057	0.000	0.00008	0.003	0.026	0.045
Sum	3640.9	927.2	1284.5	914	68.31	1309.76	-45.271	0.127	587.4	674.3
Sum Sq. Dev.	5851.199	63054.95	114526.4	3849	19.20	441.65	861.56	9.08E-05	7752.7	3285.5
Obs.	74	74	74	74	74	74	74	74	74	74

	10Y_AL_VOL	10Y_EA_VOL	10Y_AL	10Y_EA	2Y_AL	3M	SPREAD_2Y_3M	SPREAD_10Y_3M	NEW_LENDING_EUR	NEW_LENDING_ALL
Mean	0.463	0.277	-0.148	-0.038	6.485	4.324	2.160	6.293	6.634	10.545
Median	0.431	0.272	-0.178	-0.063	7.876	5.253	2.164	6.496	7.233	11.466
Maximum	1.003	0.450	1.400	0.595	12.030	9.040	3.799	8.360	8.766	15.600
Minimum	0.122	0.165	-2.100	-0.674	1.586	0.657	0.650	3.911	3.766	5.666
Std. Dev.	0.232	0.068	0.551	0.295	3.085	2.338	0.870	1.149	1.664	3.024
Skewness	0.545	0.967	-0.266	0.010	-0.286	-0.220	-0.039	-0.583	-0.562	-0.329
Kurtosis	2.597	3.533	4.921	2.542	1.725	1.849	1.796	2.477	1.760	1.579
JB	3.7	11.07	10.93755	0.577	5.368	4.173	3.999	4.488	7.700	6.736
Prob.	0.15	0.004	0.004216	0.749	0.068	0.124	0.135	0.105	0.021	0.034
Sum	30.6	18.3	-9.8	-2.5	428.0	285.4	142.5	415.3	437.8	696.0
Sum Sq. Dev.	3.522	0.305	19.793	5.682	618.817	355.477	49.200	85.873	179.997	594.603
Obs.	66	66	66	66	66	66	66	66	66	66

Table 3A. Stationarity test results summary

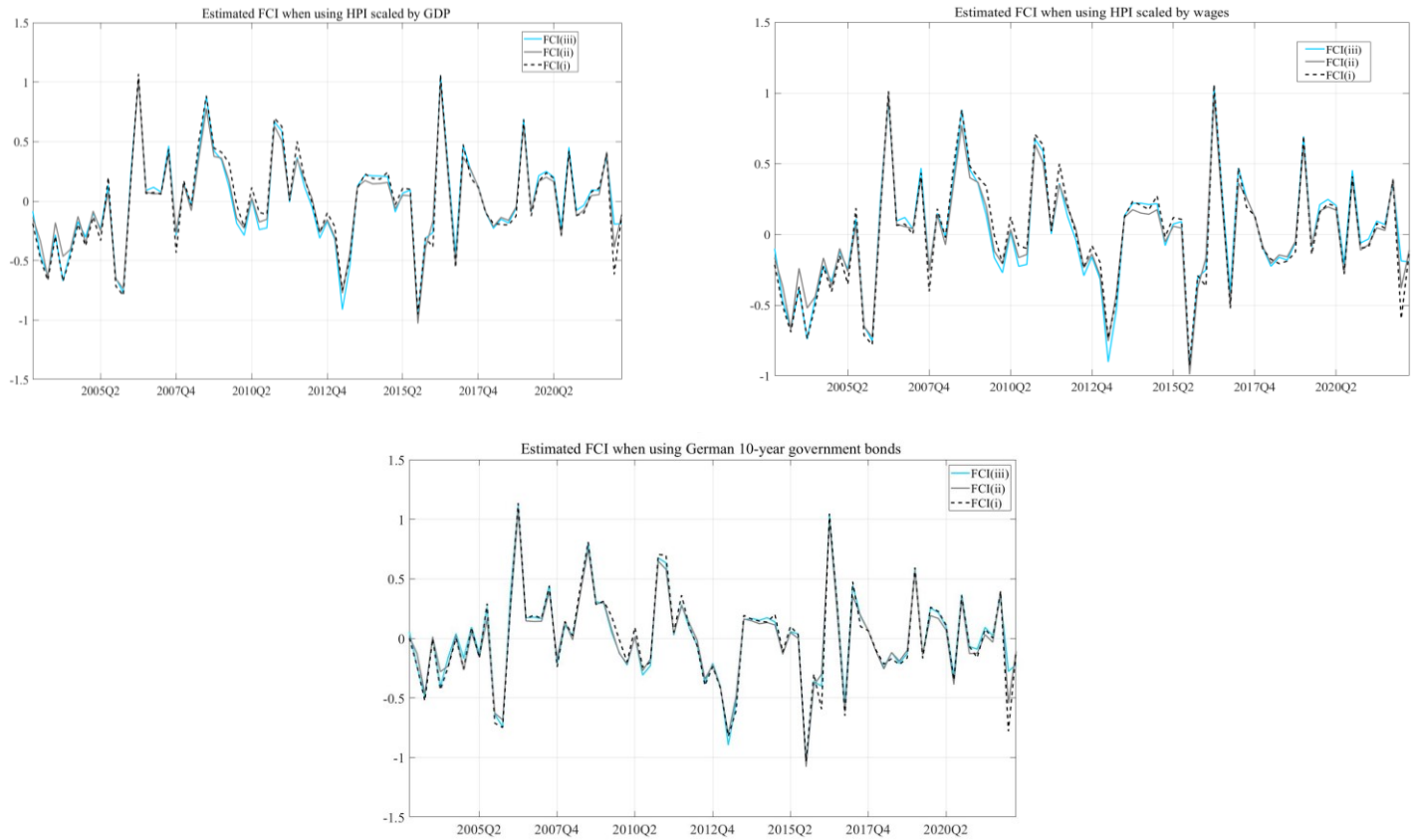
VARIABLE	ADF test results (p-value)		TRANSFORMATION IN THE MODEL
	In level	In 1 st difference	
New loans to total private sector (y-o-y) (EUR)	0.0420	0.0000	In level
New loans to total private sector (y-o-y) (ALL)	0.0000	0.0000	In level
Interest on new lending (ALL)	0.8941	0.0000	In first difference
Interest on new lending (EUR)	0.8578	0.0001	In first difference
10y bonds yield (q-o-q)	0.000	0.0000	In level
10y bonds volatility	0.3325	0.0000	In first difference
2y bonds yield	0.6598	0.0000	In first difference
3m Treasury bills	0.3027	0.0000	In first difference
10y bonds yield EA (q-o-q)	0.000	0.0000	In level
10y bonds volatility EA	0.3507	0.0670	In first difference
Term spread (2y - 3m)	0.4083	0.0000	In first difference
Term spread (10y - 3m)	0.6915	0.0000	In first difference
Country's sovereign spread (Country 10-year bonds - Euro-Area (EA) 10 year bonds)	0.8077	0.0000	The difference in yields between Albania's 10-year government bonds and the corresponding Euro-Area (EA) 10-year government bonds
ER (y-o-y)	0.0604	0.0000	In level
ER volatility	0.0000	0.0000	In level
House Price Index (y-o-y)	0.0453	0.0000	In level
ROA (%)	0.0044	0.0000	In level
NPL (%)	0.6949	0.0016	In first difference
Capital Adequacy Ratio (%)	0.0000	0.0000	In level
Banks' liquidity ratio (%)	0.0606	0.0000	In level
Total assets growth (y-o-y)	0.4008	0.0008	In first difference
FCI	0.0000	0.0000	

Figure 3A. Time-invariant parameter impulse responses.



Source: Authors' computations.

Figure 4A. Estimated FCI when using HPI scaled by GDP; HPI scaled by wages and sovereign spread against German government bonds, respectively.



Source: Authors' computations.

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