The Effects of the Confidence in the US Banking Sector to the Economic Growth: An Application of the Smooth Local Projections Method for Estimating Impulse Responses

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Abstract

The confidence is a belief and has a psychological origin but investigated interactively within the framework of behavioral analysis. Banking sector transactions are also based on the confidence and has consequences over the economy. Therefore, there is a need for objectifying the concept; especially, measuring it is not easy and requires a specific work. Gallup Confidence in Banking Index just in case aims to measure and quantify this belief. This paper tries to analyze the effects of the confidence in the banking sector on the economic growth for the US which has an open economy and a low share of banking sector within the financial market by utilizing that index. Its contribution to the existing literature is applying the smooth local projection method for estimating the parameters. This method has several advantages over the other methods such as vector autoregressive model and local projection method. Findings reveal that a positive confidence shock increases the economic growth in the US economy. Due to its binding role for the economy, the governmental authorities and the banking sector should take precautions such as improving regulations, enrichen education and designing seminar programmes by focusing on moral values and constructive communication channels to increase the confidence level. Banks should also find new ways to increase their confidence scale such as environment friendly banking, safe technology and employing highly educated workers.

Keywords: Confidence in banking, economic growth, smooth local projections method

JEL Codes Classification: G21, O47, C58

1. Introduction

Classical theories go to great length to explain the economic growth by inputs such as the capital, the labor and the technology. Exogenous or endogenous assumptions about the technology tried to explain the unexplained part of the deviation. In course of time, economists have included other factors to account for the economic growth identity. The role of institutions such as the rule of law, ethics and moral values are kept in view, and the term confidence takes place in the scope of the last one.[2]   For instance, there are several papers pointing out to the general trust in the society, and its effects on the economic growth such as Roth (2009, panel regression), Horvath (2013), Carl (2014, several countries including Spain, Italy and the US, correlation analysis) Niazi and Hassan

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[2] See Jones and Vollrath (2013) for the basic economic growth theories.

(2016, panel regression), Miniesy and Abdelkarim (2021, MENA countries, pooled ordinary least squares).

To be more sector specific, the banking sector has widely put into growth figures under the nexus literature. These papers try to measure the development and efficiency properties of the sector. For instance, Petkovski and Kjosevski (2014) estimate a panel model of Central and South Eastern Europe countries and find a positive effect of the banking sector development on the economic growth. Lucchetti, Papi and Zazzaro (2001) measure the effect of the banking sector inefficiency on the economic growth. Developed banking system improves the real per capita GDP growth according to Levine (1999). However, this paper considers the evidence of the United States (US) economy, which has an open economy and a low share of the banking sector in its integrative financial market, and tries to analyze the effects of the confidence in the banking sector on the economic growth.

Since the concept of confidence is considered under behavior finance and economics; its investigation for a possible relationship with the economic growth is not novel. However, the number of studies specific for the confidence or trust in the banking sector is restricted, especially benefiting from contemporary time series methods. One can refer to Sahin (2021) and the references cited in for a detailed explanation of the confidence term in particular appertaining to the banking system. Sahin (2021) also tried to demystify the importance of the confidence in the banking sector for the economic growth in detail and provided empirical evidence using the quantile regression method for a small open economy, Turkey, which has a banking sector intensive financial structure. Barbu and Boitan (2018) relate the confidence in the banking sector, and economic variables such as output and estimate coefficients for Europe using a panel regression. The contribution of this paper to the applied macro-finance literature is based on its utilization of the smooth local projections method to the topic.

An investigation of a possible interaction between sensorial and real sector variables is meaningful since, as seen in Figure 1, there is a positive correlation with a coefficient 0.3993 and *p*- value [0.0107] amongst the confidence in the banking sector and the economic growth rate for the US economy between the years of 1980 and 2019. The data ends in the year 2019 because, as of August 28, 2021, this is the available data. Following the economic and financial crisis originating from the problems of the banking sector, the confidence in the banking sector shrinks substantially and takes time to pick up. The raw data has a unit root and persistency parameter measured by the autoregressive regression with on lag is 0.8724 with a *p*- value of [0.0000]. Therefore, an increase in the confidence in the banking sector would stimulate the economic growth *ut infra* under favor of the smooth local projections method.
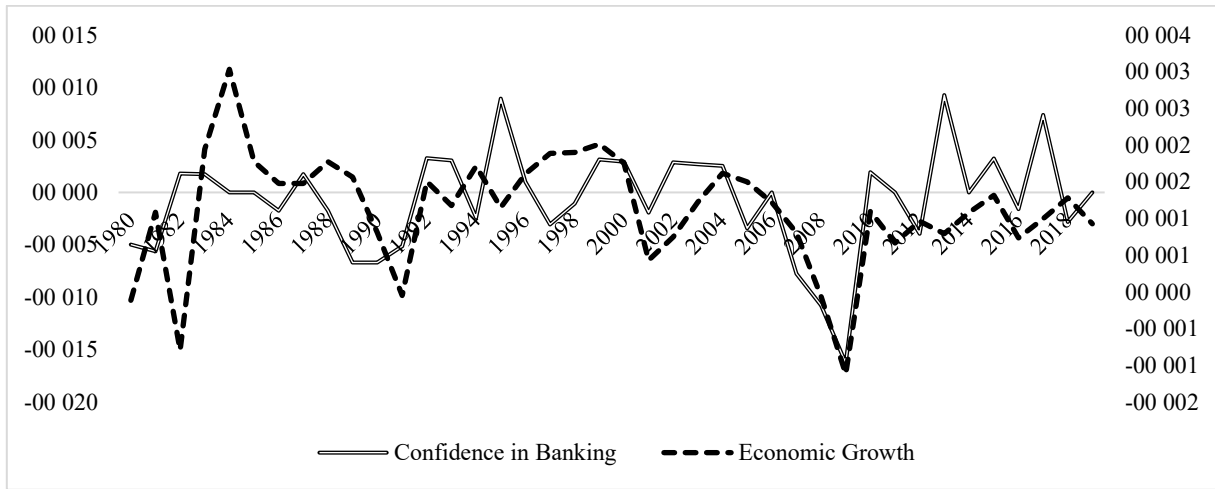
Note: The sources of the variables in the graph are explained in the data section of the text.

Figure 1. The Positive Correlation between the Confidence and the Economic Growth

There is a wide range of methods to ascertain the response of the economic growth. In econometrics, the vector autoregressive model (VAR), the Jorda's (2005) local projection method (LP) and Barnichon and Brownless's (2019) smooth local projection method (SLP) are alternating ones. Superiority of the computer graphing through following control points in terms of generating impulse response function (IRF) are underlined by contemporary research papers. Brugnolini (2018) compares the IRFs obtained from the VAR and local projections, and claims that LP is superior to VAR. By virtue of the fact that inefficient results due to misspecification is one of the common roots of this odyssey. According to Harding and Klein (2022), LP has advantages towards VAR in terms of being robust to model misspecification and not carrying implicit dynamic restrictions. Besides, as mentioned by Abbritti, Equiza-Goni and de Gracia and Trani (2020), LPs empower nonlinearities where they benefit from them to estimate the effects of oil price shocks on macroeconomic variables. Passos and Modenesi (2021) estimate the effects of the monetary policy interest rate on the output and the inflation rate using LP and claim that the credit level of banks may act as a state for the results. Lakdawala and Singh (2019, p. 11) call LP as the horizon specific regression (direct forecasting) and VAR as iterated forecasting because of iterating further periods. Kolb (2017) benefits from LP to estimate the effect of the Fed's action and communication shocks on the output and prices by the US monthly 1994-2008 data. They also investigate the effect of capital requirements of the banking sector on variables such as the output and loans. Berg, Curtis, Lugauer and Mark (2021) benefit from LP and estimate the response of different age groups' consumption to the monetary policy shock for the US economy. Lennard (2020) examines the economic policy uncertainty on the several British macroeconomic data and benefits from LP. Husted, Rogers and Sun (2020) compare VAR results with several other methods including LP for evaluating the response of the output to the monetary policy uncertainty.

SLP has several advantages towards VAR and LP. As of July 29, 2021, Barnichon and Brownless's (2019) SLP had been cited as 94 times according to Google Scholar database. It is recently applied in several fields of economics and finance. For instance, Franta and Gambacorta (2020) benefit from SLP and the quantile regression method (QR) to estimate the effects of changes

in the loan-to-value limits and loan loss provisions rules on the Growth-at-Risk by the panel data. According to their findings, tightening macro-prudential policies decrease the possibility of economic recessions. Garin, Lester and Sims (2019) estimate the response of the output to productivity using SLP for the US economy. Funashima (2021) applied SLP to the 1985-2007 US data and tried to estimate the effect of the monetary policy shock on monetary policy uncertainty. They distinguish between tight and ease monetary policies, and the tight monetary tightening shock does not have a significant effect on the monetary policy uncertainty but the monetary easing shock decreases the monetary policy uncertainty. Mitchener and Lopez (2018) employed SLP to measure the effects of the economic uncertainty on the inflation rate for several European countries. Lopez and Mitchener (2021) benefit from the historical European data and estimate the effect of the uncertainty on the inflation using SLP. Anna, Eyquem and Poilly (2021) analysis the effect of the government uncertainty on the share of equity in the portfolio investment. Stolbov and Shchepeleva (2021) divide European countries data into quantiles for the period spanning the years of 1997 and 2019 and try to analyze the effects of economic policy uncertainty on output and financial stress. Stolbov, Shchepeleva and Karminsky (2021) analyze the interaction between macroprudential monetary economics and the output using SLP. Lewis, Makridis and Mertens (2020) use LP and SLP and show that the Gallup's economic confidence index responds negatively to negative changes in the macroeconomic variables and monetary policy announcements. They also consider nonlinearity in terms of monetary policy shocks over the economic confidence index.

The following section describes the data and VAR, LP and SLP methodologies employed in the paper. The third section presents the results. The fourth section is devoted for the discussion, and the last section concludes the paper.

2. Data and Methodology

Sahin (2021) claimed that the banking sector stock prices reflect the confidence in banking sector and one may use them that as a proxy if the data is not available.
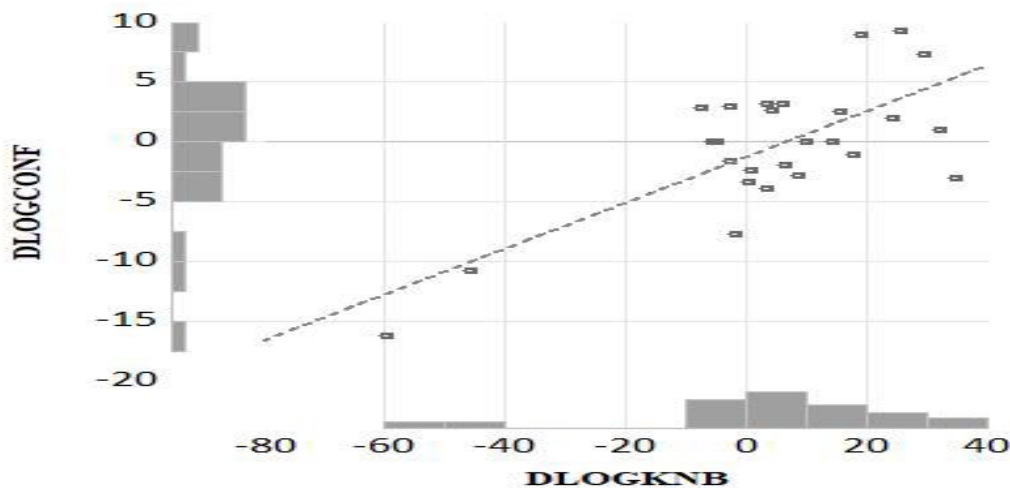

Figure 2. The Confidence in the Banking and the Banking Sector Stock Prices

There is an advantage for the researchers due to availability of the data for the US economy since Gallup Confidence in Banking Index measures the confidence in the banking sector, it also has a positive effect of KBW Nasdaq Banking Index[2] (*DLOGKNB*) with a coefficient of 0.1913 and *p*- value of [0.000] on the confidence in the banking sector (*DLOGCONF*). The positive correlation may be observed from the Figure 2 for the years 1994-2019 in the US economy where they duly shrink together in the midst of 2008 banking sector crisis.

The sources of data used in models are provided in Table 1. Logarithmic first difference of the variables is taken to achieve the stationarity; therefore, overall, there are 40 observations in each variable for the 1980-2019 period in all models.

Table 1. Definitions of the Variables

Variable	Explanation	Source	URL	ADF	ADFFD	
CONF	Confidence in Banking, Now I am going to read you a list of institutions in American society. Please tell me how much confidence you, yourself, have in each one -- a great deal, quite a lot, some or very little?	Gallup	https://news.gallup.com/poll/1597/confidence-institutions.aspx	-2.0595	-5.0266	***
GDPCA	Real Gross Domestic Product, Billions of Chained 2012 Dollars, Annual, Not Seasonally Adjusted, Yearly Percentage Change	Fed Fred	https://fred.stlouisfed.org/series/GDPCA	-0.0873	-3.5618	**
INT	Lending interest rate (%), FR.INR.LEND	World Development Indicators	https://data.worldbank.org/indicator/FR.INR.LEND?locations=US	-3.4554	-4.1191	***
LABOR	All Employees, Total Nonfarm, Thousands of Persons, Monthly, Not Seasonally Adjusted	Fed Fred	https://fred.stlouisfed.org/series/PAYNSA	-1.4357	-4.6344	***
CAPITAL	Gross Fixed Capital Formation in United States, United States Dollars, Quarterly, Seasonally Adjusted	Fed Fred	https://fred.stlouisfed.org/series/USAGFCFQDSMEI	0.8547	-3.5903	**
TFP	Total Factor Productivity at Constant National Prices for United States, Index 2017=1, Annual, Not Seasonally Adjusted	Fed Fred	https://fred.stlouisfed.org/series/RTFPNAUSA632NRUG	0.1696	-6.4174	***

Notes: ***, **, and * is for rejecting the null of no unit root at 1%, 5% and 10% significance levels respectively.

As shown in Table 1, some of variables are not stationary that is inspected by Augmented Dickey Fuller Test (ADF with constant); therefore, differences of the variables are taken for stationarity. ADFFD refers is for ADF with constant and first difference form. The subscripts starting with "D" indicates the first difference of a variable. "DLOG" is for the logarithmic first difference. Table 2 presents the descriptive statistics of variables.

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[2] Its logarithmic first difference is taken while estimating the classical regression model by ordinary regression method. KBW Nasdaq Banking Index is gathered from Yahoo Finance Available at: https://finance.yahoo.com/quote/%5EBKX/history?p=%5EBKX (Accessed: August 14, 2021). See the website of Nasdaq for the explanation of the index. Available at: https://indexes.nasdaqomx.com/Index/Overview/BKX (Accessed: August 14, 2021).

VAR is classified into several types. Linear VARs are simply exponible as traditional and structural VARs. See Stock and Watson (2001) and Blanchard and Quah (1989) for the structural VAR models. Following Hamilton (1994, pp. 57-58), unrestricted VAR (p) can be shown by (1):

$$y_t = c + \Phi_1 y_{t-1} + \Phi_2 y_{t-2} + ... + \Phi_p y_{t-p} + \varepsilon_t \tag{1}$$

where y_t is a vector has a length of ($nx1$); $\varepsilon_t \square\ i.i.d\ \ N(0,\Omega)$; so $E(\varepsilon_t) = 0$, $E(\varepsilon_t \varepsilon_t^{'})$ is positive definite; $E(\varepsilon_t \varepsilon_{t'}^{'}) = 0$ for all $t \neq t'$ (Pesaran, 2015, p. 507); $c : (nx1)$ vector of constants; $\Phi_j : (nxn)$ matrix of autoregressive coefficients for $j = 1, 2, …, p$. When VAR is written as a moving average form:

$$y_t = \mu + \varepsilon_t + \psi_1 \varepsilon_{t-1} + \psi_1 \varepsilon_{t-2} + ... \tag{2}$$

the matrix $\psi_1 = \dfrac{\partial y_{t+s}}{\partial \varepsilon_t}$ shows IRF at time t for the lag one (Hamilton, 1994, p. 318).

$$\Delta y_{t+s} = \frac{\partial y_{t+s}}{\partial \varepsilon_{1t}} \delta_1 + \frac{\partial y_{t+s}}{\partial \varepsilon_{2t}} \delta_2 + ... + \frac{\partial y_{t+s}}{\partial \varepsilon_{nt}} \delta_n = \psi_s \delta \text{ where } \delta = (\delta_1, \delta_2, ..., \delta_n)' \tag{3}$$

Table 2. Descriptive Statistics

	DINT	DLOGCAPITAL	DLOGCONF	DLOGGDPCA	DLOGLABOR	DTFP
Mean	-0.3826	2.1037	-0.7526	1.1246	0.5620	0.6052
Median	0.0000	2.2953	0.0000	1.2010	0.7204	0.6305
Maximum	42.607	6.5893	9.2754	3.0343	1.9989	2.4882
Minimum	-36.801	-6.1336	-16.272	-1.1159	-1.9178	-1.9007
Std. Dev.	18.5985	2.0659	4.9585	0.7772	0.6978	0.9166
Skewness	-0.1077	-1.5397	-0.6203	-0.7403	-1.2138	-0.4850
Kurtosis	2.5890	7.8620	4.3267	4.4067	5.5977	3.9170
Jarque-Bera	0.3588	55.201	5.4986	6.9515	21.068	2.9695
Probability	0.8358	0.0000	0.0640	0.0309	0.0000	0.2266
Sum	-15.305	84.146	-30.103	44.983	22.478	24.209
SSD	13490	166	958	23	18	32
Obs	40	40	40	40	40	40

Notes: *p*- values are given in the brackets.

VAR models are explained even clearly in the internet such as D'Amico's (2021) YouTube Channell. This paper assumes that six variables are ordered such as [*DLOGCONF DLOGLABOR DLOGCAPITAL DTFP DLOGGDPCA DINT*].[3] Granger causality tests are also considered for the

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[3] Although Lewis, Makridis and Mertens (2020) supposed that the Fed's interest rate decision has a contemporaneous effect on the Gallup's Economic Policy Index, it is assumed during ordering in this paper that the Gallup's Confidence in Banking Sector Index does not respond contemporaneously to the Fed's interest rate decisions. It takes substantial amount of time and lag to influence the confidence in banking.

ordering the variables besides the economic ideas. For instance, Granger causality Wald Test indicates that *DLOGGDPCA* does not Granger-Cause *DLOGCONF* but *DLOGCONF* Granger causes *DLOGGDPCA*. Therefore, we can use past values of *DLOGCONF* to predict *DLOGGDPCA*. Following the logic of the Cholesky decomposition of Stock and Watson (2001), it is assumed that *DLOGCONF* has contemporaneous effect on *DLOGGDPCA* but *DLOGGDPCA* does not have a contemporaneous effect on *DLOGCONF*. Therefore, putting the confidence in the banking sector before the economic growth is meaningful since it would take time to increase the confidence in banking even the overall economic growth booms. As mentioned by Husted, Rogers and Sun (2020, p. 25), slow-moving variables are ordered as the first in the VAR Cholesky ordering. Classically, *DINT* is ordered as the last; therefore, Taylor Rule has been satisfied. The slowest moving variable is assumed to be *DLOGCONF* since it takes a long time to increase the confidence in the banking sector. The growth variable is ordered after production factors ensuring the Cobb-Douglas specification.

LP can be specified following Jorda (2005), Abbritti, Equiza-Goni, de Gracia and Trani (2020), Stolbov, Shchepeleva and Karminsky (2021) and Harding and Klein (2022) for twenty horizons and one lag as:

$$y_t = \alpha_{(0)} + \beta_{(0)}x_t + \gamma_{1(0)}w_{1t} + u_{(0)t} \qquad (4a)$$

$$y_{t+1} = \alpha_{(1)} + \beta_{(1)}x_t + \gamma_{1(1)}w_{1t} + u_{(1)t+1} \qquad (4b)$$

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$$y_{t+20} = \alpha_{(20)} + \beta_{(20)}x_t + \gamma_{1(20)}w_{20t} + u_{(20)t+20} \qquad (4c)$$

x, y and w are stationary, and w is the vector of control variables and includes lagged values of x_t and y_t. To give an example: $\beta_{(1)}$ is the response of y at time $t+1$ to the shock at time t and they implement impulse responses. Note that, for the last horizon ($h = 20$), total number of regressions would be ($h = 20+1 = 21$). $u_{(1)t+1}$ is the prediction error term. LP coefficients can be estimated by least squares or penalized regression methods (see Li, Plagborg and Wolf, 2021, pp. 19-20). One can refer to Adammer (2019) for R programme codes of LP.

Partial derivatives may be so rigid that by the time being, trying to smooth coefficients of regression are popular among researchers. Barnichon and Brownless (2019) decreased the fluctuations of the impulse response coefficients by considering prior information as mentioned by Swanson (2021). Stock and Watson (2001, p. 929) claim that smoothness priors or restrictions shrink the responses. Besides, Harding and Klein (2022) claim that local projections may be erratic due to the loss of efficiency and for longer horizons they may show high variability. El-Shagi (2019) suggested a method to smooth the impulse responses without a need of prior information

like Barnichon and Brownless (2019). SLP can be written following Funashima (2021), Stolbov and Shchepeleva (2021) and Stolbov, Shchepeleva and Karminsky (2021) in general form as:

$$y_{t+h} = \alpha_{(h)} + \beta_{(h)}x_t + \sum_{i=1}^{p}\gamma_i(h)y_{t-i} + \varepsilon_{(h)t+h} \; ; \; \beta_{(h)} = \sum_{k=1}^{K}b_k B_k(h) \tag{5a}$$

for $h = 0$ and $p = 1$ it can be written as:

$$y_t = \alpha_{(0)} + \beta_{(0)}x_t + \gamma_1(0)y_{t-1} + \varepsilon_{(0)t} \tag{5b}$$

for $h = 1$ and $p = 1$ it can be written as:

$$y_{t+1} = \alpha_{(1)} + \beta_{(1)}x_t + \gamma_1(1)y_{t-1} + \varepsilon_{(1)t+1} \tag{5c}$$

If $\beta_{(0)} = b_1 B_1(0) + b_2 B_2(0)$, for the $h = 1$,

$$y_t \approx a_1 B_1(0) + b_1 B_1(0)x_t + b_1 B_1(1)x_t + c_{11}B_1(0)z_{1t} + c_{11}B_1(1)z_{1t} + u_{(0)t} + u_{(1)t+1} \tag{6a}$$

and in general form it can be shown by (6b):

$$y_{t+h} \approx \sum_{k=1}^{K}a_k B_k(h) + \sum_{k=1}^{K}b_k B_k(h)x_t + \sum_{i=1}^{p}\sum_{k=1}^{K}c_{ik}B_k(h)z_{it} + u_{(h)t+h} \tag{6b}$$

$B_k(0)$ and $B_k(1)$ are basis splines (B-splines) used in SLP in the forecast horizon $h=20$. Note that the parameters are estimated in uniform B-splines due to the knot vector's uniform space property. One can refer to Shiach's (2016a) YouTube presentation for a brief explanation of B-splines and Bezier curves where these two have very common properties a head of local and global path. b_k are the scalar parameters for $k = 1, \dots, K$. $\varepsilon_{(h)t+h}$ is the prediction error term. $\beta_{(h)}$ is again the dynamic multiplier and ($p = 1$) is the lag length of the specification. Barnichon and Brownlees (2019) benefit from B-splines to obtain IRFs. As mentioned by Anna, Eyquem and Poilly (2021), B-spline function approximates these coefficients. Since the efficiency is an essential problem of the LP method, it is tried to be solved by a B-spline and ridge regression by Barnichon and Brownless's (2019) SLP. For SLP, generalized ridge regression is used to obtain $\beta_{(h)}$.[4] As mentioned by Nguyen and La Cava (2020, p. 7); VAR, LP and SLP have different efficiency levels, and polynomial functions of forecast horizons in SLP increase the efficiency in SLP. Note that, there are two possible identification strategies. One may benefit from control variables to determine the path of the curve like past values of the economic growth and the confidence in banking sector. The other alternative is using an instrumental variable two stage ordinary least squares method. Since there is a data for the control variable such as the confidence, the first approach is used in the paper.

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[4] One can refer to YouTube Channell StatQuest with Josh Starmer for a simple explanation of a ridge regression. Available at: https://www.youtube.com/watch?v=Q81RR3yKn30 (Accessed: August 12, 2021).

Most of the papers benefit from the Newey-West method to estimate standard error terms to take into account the possible heteroscedasticity and the autocorrelation. Since LP residuals have a potential to exhibit autocorrelation, following the suggestions like Lusompa (2020, p. 2), Newey-West standard errors are used in several papers. Comparison between VAR and LP in terms of econometrics is done by Lusompa (2020) in detail. However, Lusompa (2021) claims that if IRF parameters obtained from LP are estimated by OLS with HAC standard errors, they would be worse compared with IRF coefficients obtained from the generalized least squares method (GLS) in terms of efficiency. According to Bretscher, Hsu and Tamoni (2022), SLP sustains a balance between efficiency of VAR and robustness concerning model misspecification of the LP. Following Jorda's (2005) VAR methodology, IRFs have been questioned widely especially by comparing LPs and VAR IRFs. However, there was a need for theoretical and econometric study to justify the LP method. Moller-Plagborg and Wolf (2021) tried to fill this gap, and claimed that one can obtain similar SVAR results by using appropriate control variables and one can obtain similar LP results by using appropriate ordering in SVAR. Therefore, they mention that they have the same estimand; however, have different finite-sample properties, stressing the importance of the lag length. It is also interesting to see that using an instrument variable in LP is equivalent to ordering the instrument variable first in the VAR model according to them. Since they compare results of VAR and LP; there is still a need for a theoretical study to compare VAR, LP and SLP.

3. Results

Figure 3 panel a presents the standard VAR IRFs and their standard errors are obtained by analytical replications, and they show that the one standard deviation shock on *DLOGCONF* to *DLOGGDPCA* is statistically significant for the first three periods. The variance decomposition indicates that the *DLOGCONF* explains 30% of the change in *DLOGGDPCA*. The inverse roots of the AR characteristic polynomial indicates that all roots are within the unit cycle; therefore, all of the modulus are less than one signalizing a stability in the VAR model. All autocorrelations of residuals are within the two standard error bounds and VAR Residual Serial Correlation LM tests fail to reject the null hypothesis of no serial correlation.

One may impose a long-run restriction on the economic growth effect of the confidence and construct a structural vector autoregressive model (SVAR, see Blanchard and Quah (1989) and Enders and Lee, (1997)), accumulated responses in the Figure 3 panel b indicates that the effect of the confidence shock (Shock 1) on the economic growth is positive and persistent by the time being. The variance decompositions also indicate that the confidence explains 10% of the variation in the economic growth. Figure 3 panel c includes a comparison graph for the standard VAR and LP. The dotted line is IR obtained from the VAR model and the line is for LP.[5] VAR and LP may give different results as mentioned by Lusompa (2021, p. 1). Figure 4 presents IRF results for LP and SLP. SLPR is for the cubic theoretical specification. As it can be noticed, Figure 4 panel b and panel c; SLP gives smoother results than LP. Its volatility is lower and seems healthier than LP.

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[5] They are all obtained using Eviews 10.

Figure 4 is obtained by Matlab codes of Barnichon and Brownless (2019).[6] As one observes from the Figure 4, panel a, SLP is superior to other methods.[7]
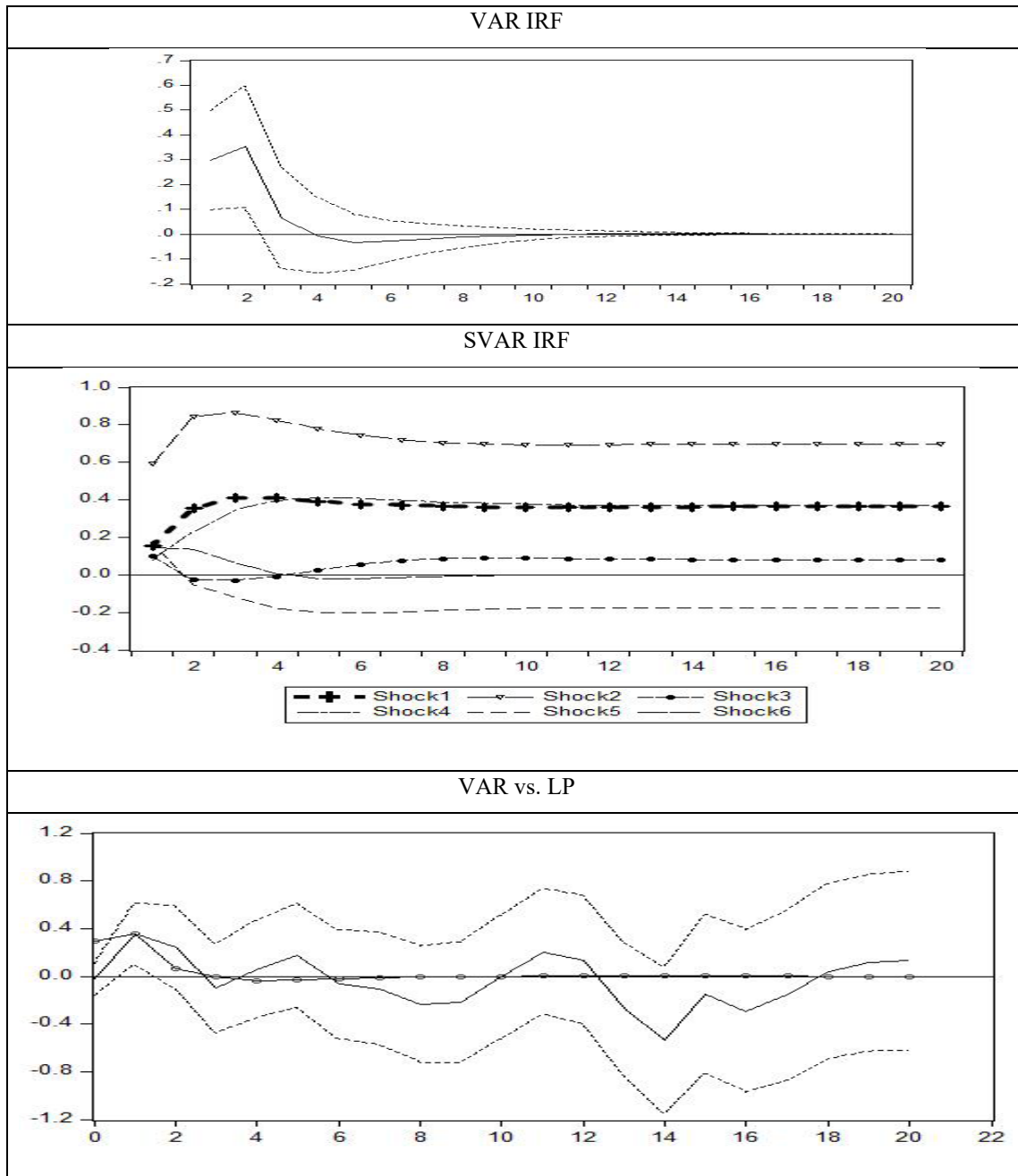

Figure 3. Impulse Response Function Graphs

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[6] The Matlab codes can be downloaded from Barnichon, Regis and Brownlees, Christian, 2018, "Replication Data for: "Impulse Response Estimation by Smooth Local Projections", https://doi.org/10.7910/DVN/8KQJBJ, Harvard Dataverse, V1. Available at: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/8KQJBJ (Accessed: July 29, 2021).
[7] For LP and SLP, the optimum lambda is chosen as 400 and its degree changes the results for the smoothness.
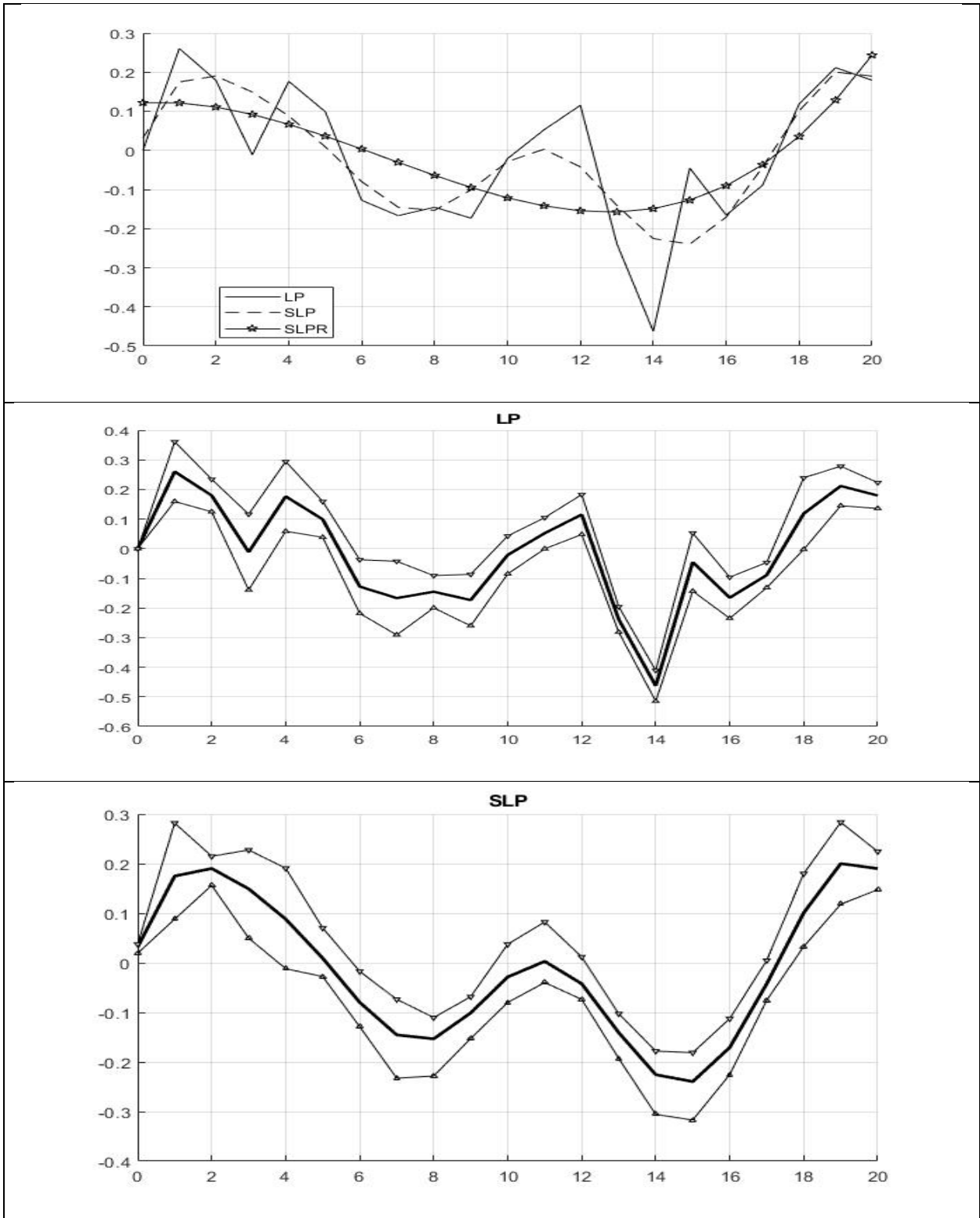
Figure 4. Comparison of Impulse Response Functions

4. Discussion

Confidence matters for the banking sector and its behavior, intercalarily consumers make a distinction in the midst of them.[8] Over and above, on the demand side, restoring the confidence of costumers may need an extra effort due to rigidities and irrational persistency of behavior. Sundry studies such as Adamyk, Srirka, Snihur and Adamyk (2019) analyze determinants of the confidence in banking using variables kind of education, age, and benefiting from methods linear regression, logistic regression and random forecast model. Kamason (2020) tries to analyze the determinants of confidence in banking using several factors such as emotion and behavior. Fungacova, Hasan and Weill (2019) claim that sociodemographic factors play an essential role on determining trust or confidence in the banking sector using the panel data of plenty of countries. Some studies benefit questionnaires to measure the confidence in banking such as Jere, Ndamba and Mupambireyi (2016) for Zimbabwe and according to them; deposit protection and bank supervision and regulation are some of the factors affecting the confidence in banking.

As mentioned by Lewis, Makridis and Mertens (2020, p. 10, Table 1), negative economic events such as the Lehman Brothers bankruptcy on September 16, 2008 or debt ceiling crisis in the US on July 27, 2011 decreased the Gallup's Economic Confidence Index for the US economy. The positive correlation is also valid for the confidence in banking sector and the economic growth relationship in the US. During the times of turbulences and crisis, the confidence in banking shrinks substantially as in the case of at the beginning of the 20th century (see Mackay, 2015 and the literature cited in). If households and firms trust more to banks, the next stage will stimulate the confidence in the banking sector. They would engage more transactions with banks, will deposit their savings to these institutions. High confidence in the banking sector would increase deposits level in banks (Plokarz, 2020). As mentioned by Basaran and Bagheri (2020), the confidence in the banking sector is essential for the financial macro-stability. To sustain the channel, Basel committee and local governments took an action to increase the robustness and stability of banks. They augmented the capital requirements of banks and guaranteed deposits to boost the confidence in the sector. One can refer to Sahin (2021) for explanations of the risk measures and regulations towards banking as well as possible confidence decreasing behavior in the banking sector.

Following these international standards, countries in transition try to reform their banking sector, attract foreign investors, and according to Fink, Haiss and Varendorff (2007, p. 630), these increased the deposits in banks as a reflection of the confidence in banking.

5. Conclusion and Policy Recommendations

The confidence in a country as a whole, its sectors, firms and households is gold enchasing for counterparts. Since its value-based chain role in the economy, shadow axis would like to measure or observe it. Banks benefit from grades, risk reports for each costumer before issuing a loan. On the other side, costumers would like to know more about the financial status of banks. Following 2008 economic and financial crisis in the US economy, the demand side became as important as the liquidity providers. They seek more information due to the problem since according to the Edelman Trust Barometer, the banking sector is one of the least trusted sectors in

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[8] Silipo, Verga and Hlebik (2017) use the US banking sector data for the years spanning from 2000 to 2013, and try to estimate the effects of banking sector indicators on overconfident and underconfident banks.

the economy that shrinked substantially following the 2008 global economic and financial crisis (Hurley, Gong and Waqar (2014, Figure 2-3, pp. 350-351). Financial reports may give some idea; however, they would like to believe more about the ratios. If numbers on pages are not equal to expected ones, this may cause a trust and confidence problem. As shown in this paper, an adverse confidence shock may worsen the overall economic growth rate. Since its persistent self-behavior, automatic stabilizers or market mechanism may not solve it. If the confidence has such a powerful effect on the economy, what should governmental authorities and banks do to increase it. If a country has a problem of confidence in the banking sector, this should be able to be measured to observe its solid consequences. The US economy has a Gallup confidence in the banking sector index that reflects the ups and downs following economic and financial turbulences. Therefore, the problem in the applied macro-finance can be easily be identified. Banks may produce more bank-based indices to increase transparency and measure it more frequently.

On the governmental side, regulations would improve the vision but the effective treatment would be an adaptation and inspection of them. As stated by Amable, Chatelain and Debandt (2002), regulations such as the deposit insurance may increase the stability in the banking sector and the economic growth. This is essential since the regulations in the banking sector increased the stability in the banking sector, and this stability improves the economic growth in the banking sector as mentioned by Stewart and Chowdhury (2021).[9] The inspection of illegal banking transactions would decrease by the time, and the confidence in banking would be improved.

As a supplement to the regulation, economic education in high schools and universities may include moral values. Values have an amazing accelerating power on the economy, creating an effective environment. As mentioned by Sahin (2021), values have an essential role in the economy with the technology. Production factors like high values-based confidence would increase the economic growth as shown in this paper. Education and seminar programmes to middle and high schools have a role to improve it. Since it is structural, its solution needs modification in the economic education. Moral values should be taught creatively with striking narratives. Sahin (2021) proposed moral values and empowered ethics to improve the confidence in the banking sector. Note that undesirable actions inside the banks may be due to loss of ethical standards and enforcement (Montague, Larkin and Burgess, 2016). Rather than making suggestions on the solution to the confidence in banking problem; this paper goes for the fences about its growth enchasing properties.[10]

Banks should find new ways to increase their confidence scale such as environment friendly banking, safe technology[11] and employing well educated workers. Creating less selection bias in

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[9] Masoud and Albaity (2021) benefit from generalized method of moments (GMM) method and find that by using World Values Survey's confidence in the banking sector survey question, where the confidence in banking in the US (0.403) and Turkey (0.404) have similar degrees (see Masoud, Albaity, 2021, Table 1), the confidence in banking decreases nonperforming loans of banks. Therefore, the papers in the literature also supports the findings of this paper.
[10] Pratt, Ademosu, Adamolekun, Alabi and Carr (2011) propose to increase ethical behavior in Nigeria for to increase the confidence in the banking sector by increasing the education of the banking sector workers.
[11] According to Cisco Umbrella's DNS Security Report, as of 2020, financial services are one of the sectors being negatively affected by DNS traffic to capture the private information of the costumers in the word (Younes, 2021). Therefore, banks may give more importance to information security through empowering their internet banking. Digitalization following the Corona-19 crisis (see Karabag, 2020) should also be considered by banks.

the employment and ensuring quality and high standards of workers benefiting from artificial intelligence and machine learning techniques may also be added. Since an artificial intelligence is not sufficiently powerful in terms of pattern recognition and common sense as stated by Kaku (2021, p. 2021); they may give more importance to governance for refining on the confidence in the banking sector as mentioned by Ansell (2016). Public advertisement may also be included since the sector is not perfectly competitive, this may increase costs but the effective advertisement may help to improve. This would be reflected in the economic growth figures and the overall welfare of the society would be improved. Lying and stressing untrue points by the worker would harm the whole sector. Transparency during the lending steps would increase the confidence and not being influenced from political pressures would also improve it. There is a huge asymmetry between the costumer and the bank worker. If the bank worker lies to the costumer, it is really hard to detect it. The costumer would like to trust to the worker and there should be a confidence-based relationship between them. The worker may conduct an embezzlement action from the costumer's account. The worker my lie to the costumer and may also tell a lie in the court. Even it is very hard for a court to detect the lie of the worker. The fMRI machine that is mentioned in the Kaku (2021, pp. 74-75) may use some indicators from the brain activity but even it cannot detect perfectly, and there is a possibility that its results may not be true. This paper used contemporary time series methods to explore the increasing effect of the confidence in the banking sector on the economic growth for the US economy but researchers may analyze the relationship by panel and survey methods. Besides, a nonlinear VAR may be an interesting tool to study whether there is a sign and magnitude asymmetry between the confidence in banking and the economic growth.

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