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The response of monetary policy to the COVID-19 pandemic in Turkey. The path of a credit-based economic recovery

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Abstract. *The goal of this paper is to investigate the reaction of monetary policy in Turkey to the coronavirus disease pandemic through the credit channel. For this purpose, the paper employs nonlinear smooth transition models considering nonlinearity. The empirical findings show a positive reaction of monetary policy to the confirmed cases and deaths. Therefore, the paper discovers the credit channel in Turkey is likely to play a critical role in the fast recovery of the Turkish economy during the pandemic period.*

Keywords: COVID-19 pandemic; monetary policy; credits; Turkey.

JEL Classification: C22, E51, E58.

1. Introduction

The novel coronavirus disease (COVID-19) which emerged in December 2019 in Wuhan, China has spread all over the world in a few months. As it has a specific ability in terms of being transmitted from one person to another quite simply (Shehzad et al., 2020), it became a global pandemic, with nearly 66.5 million cases and more than 1.5 million deaths as of December 5, 2020 (Worldometers, 2020).

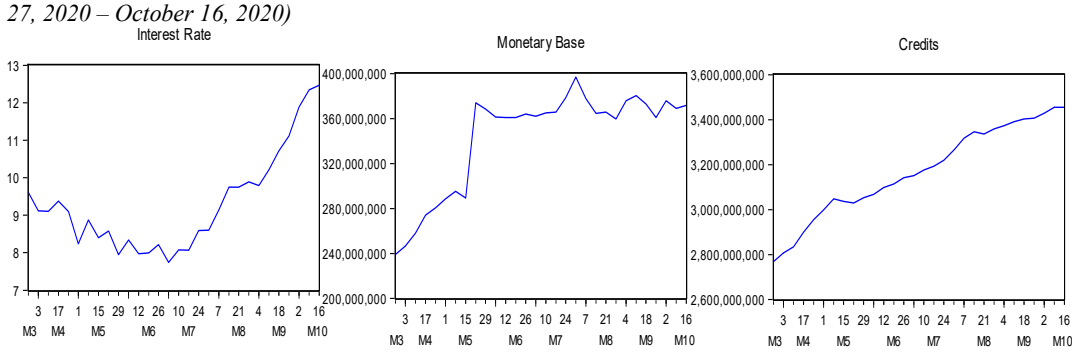
The COVID-19 pandemic has spread anxiety and fear among people (Mnif et al., 2020) and has severe impacts on economies (Rizwan et al., 2020). Accordingly, as Elgin et al. (2020) and Azimli (2020) denote, infected employees cannot join the workforce, leading to a serious decrease in activities in manufacturing and services sectors and an increase in layoffs and unemployment rates. Besides, increasing uncertainty and worsening expectations along with losses in stock markets result in a decrease in expenditures, which implies the demand-sides of economies are also damaged. In its most up-to-date World Economic Outlook in October 2020, International Monetary Fund (IMF) foresees that the global economy will contract by 4.4% in 2020 (IMF, 2020).

Policy makers around the world have applied stimulus packages to alleviate the negative impacts of COVID-19 and to restore investor confidence (Cepoi, 2020), namely injecting liquidity to banks and lowering interest rates (China), fiscal stimulus to support the businesses and decreasing interest rates (the USA), fiscal stimulus to enterprises and asset purchases from banks to supply liquidity (Europe), and lowering interest rates, fiscal stimulus to firms, and asset purchases from banks to provide liquidity (Canada) (Rizwan et al., 2020).

Before the COVID-19 pandemic, the policy makers in Turkey were very far from achieving macroeconomic stability. For instance, as per Turkish Statistical Institute (2020) data, the inflation and unemployment rates were respectively 11.8% and 13.7% at the end of the year 2019. Besides, GDP of Turkey diminished from the last quarter of 2018 to the second quarter of 2019, implying the Turkish economy suffered from a recession. After the emergence of the COVID-19, the policy makers in Turkey took some measures to lessen the impact of the pandemic just like policy makers in other countries did. From the fiscal policy side, on March 18, 2020, the Turkish government announced a stimulus package worth 100 billion Turkish Liras (TRY) mainly including the deferment of tax liabilities, social security premiums, and loan payments, the prohibition of layoffs, temporary income supports for employees working in firms that halt production, and temporary assistance for needy families, etc. On the other hand, the Central Bank of the Republic of Turkey (CBRT) lowered the policy rate from 9.75% to 8.25% during the period March-May. Additionally, the CBRT injected quite liquidity to the financial system to stimulate lending activities of banks to households and firms.

Figure 1 exhibits two main monetary policy indicators, namely the interbank rate (overnight interest rate set at the Borsa Istanbul Repo/Reverse Repo Market) and monetary base, along with total credits in Turkey.

Figure 1. *Interest rate (%), monetary base (thousand TRY) and TRY credits (thousand TRY) in Turkey (March 27, 2020 – October 16, 2020)*



Source: CBRT (2020).

One can observe from Figure 1 that from March to June while the interest rate decreased, monetary base and credits increased rapidly, implying an expansionary monetary policy of the CBRT. Specifically, the state-owned banks with their considerable shares in total assets in the Turkish banking sector lent to households and firms with lending rates which were lower than the interbank rate. Hence, the main policy measure to combat the economic impacts of the COVID-19 pandemic was to increase credits especially through the state-owned banks to support consumption and investment expenditures. Put differently, the credit channel in Turkey was tried to be effectively used during the pandemic. He/she can observe this rapid credit growth in Turkey during the pandemic period from Figure 1. This policy measure led the Turkish economy to recover rapidly and to grow by 6.7% in the third quarter of 2020 after contracting by 9.9% in the second quarter of 2020. On the other hand, because of the depreciation of TRY against foreign currencies stemming from expansionary monetary policy, the interbank rate increased depending on the increase in the policy rate of the CBRT and monetary base followed a horizontal path. However, credits proceeded to boost in Turkey.

With a special focus on credits, this paper examines the response of monetary policy to the COVID-19 pandemic in Turkey. More clearly, the paper examines the impact of the confirmed cases and deaths on the credit volume in Turkey. It uses weekly data from March 27, 2020 to October 16, 2020. This paper posits that linearity is a very strong assumption in a time series analysis as many time-series variables exhibit nonlinear behaviours (Enders, 2015). Moreover, in a nonlinear time series analysis, the transition between regimes is likely to be smooth rather than sharp. In other words, the parameters tend to slowly change in a nonlinear model. These models are defined as smooth transition models in the econometrics literature and are considered to be more realistic for economic time series data sets.

The remainder of the paper is organized as follows: Section 2 presents the methods while Section 3 gives the model and data. Empirical results are reported in Section 4. Section 5 concludes the paper.

2. Methods

2.1. Unit Root Test

Kapetanios et al. (2003, hereafter KSS (2003)) propound a unit root test to test for the null hypothesis of a unit root process against the alternative hypothesis of a nonlinear exponential smooth transition autoregressive (ESTAR) process that implies stationary. They begin with the following ESTAR model:

$$y_t = \beta y_{t-1} + \gamma y_{t-1}\left[1 - \exp\left(-\theta y_{t-d}^2\right)\right] + \varepsilon_t \quad (1)$$

Equation (1) can be restated as below:

$$\Delta y_t = \varphi y_{t-1} + \gamma y_{t-1}\left[1 - \exp\left(-\theta y_{t-d}^2\right)\right] + \varepsilon_t \quad (2)$$

where $\varphi = \beta - 1$.

They regard φ as 0 and d as 1 and produce the following specific ESTAR model:

$$\Delta y_t = \gamma y_{t-1}\left\{1 - \exp\left(-\theta y_{t-1}^2\right)\right\} + \varepsilon_t \quad (3)$$

They utilize a first-order Taylor series approach for the ESTAR model and use the regression below:

$$\Delta y_t = \delta y_{t-1}^3 + \varepsilon_t \quad (4)$$

They obtain the following t-statistic (t_{NL}) for $\delta = 0$ against $\delta < 0$ as follows:

$$t_{NL} = \hat{\delta} / s.e.\left(\hat{\delta}\right) \quad (5)$$

where $\hat{\delta}$ and s.e. $\left(\hat{\delta}\right)$ respectively stand for the ordinary least squares (OLS) estimation of δ and the standard error of $\hat{\delta}$. If t_{NL} statistic is greater than the critical values, the null hypothesis of a unit root is rejected, implying the series is stationary.

2.2. Cointegration test

Kapetanios et al. (2006, hereafter KSS (2006)) develop a cointegration test through nonlinear exponential smooth transition (ESTR) error correction models. They test the null hypothesis of no cointegration against the alternative of ESTR cointegration. They state that the small-sample performance of their nonlinear cointegration test is better than those of linear Engle and Granger (1987) and Johansen (1995) cointegration tests. After utilizing some mathematical and statistical models and making some assumptions[(1)], they use the following ESTR error correction model:

$$\Delta y_t = \phi u_{t-1} + \gamma u_{t-1}\left(1 - e^{-\theta(u_{t-1} - c)^2}\right) + \omega' \Delta x_t + \sum_{i=1}^{p} \psi_i' \Delta z_{t-i} + e_t \quad (6)$$

$$\Delta x_t = \sum_{i=1}^{p} \Gamma_{xi} \Delta z_{t-i} + \varepsilon_{xt} \quad (7)$$

$$\hat{u}_t = y_t - \hat{\beta}_x' x_t \quad (8)$$

where $\hat{\beta}_x$ denotes the OLS estimation of β_x. One of the tests statistics used by Kapetanios et al. (2006) is called F_{NEC}. They estimate the following model to develop the F_{NEC} statistic:

$$\Delta y_t = \delta_1 \hat{u}_{t-1} + \delta_2 \hat{u}^2_{t-1} + \delta_3 \hat{u}^3_{t-1} + \omega' \Delta x_t + \sum_{i=1}^{p} \psi_i' \Delta z_{t-i} + \varepsilon_t \quad (9)$$

The null hypothesis of no cointegration is defined as H_0: $\delta_1 = \delta_2 = \delta_3 = 0$. If the F_{NEC} statistic is greater than the critical values, the null hypothesis of no cointegration is rejected, implying there exists cointegration in the empirical model.

3. Model and data

The paper uses two indicators for the magnitude of the COVID-19 pandemic: confirmed COVID-19 cases and deaths originating from the COVID-19. Hence, the paper uses the following empirical models to measure the response of credits to the COVID-19 pandemic in Turkey:

$$\ln CRE_t = \alpha_0 + \alpha_1 \ln CASE_t + \varepsilon_t \quad (10)$$

$$\ln CRE_t = \beta_0 + \beta_1 \ln DEATH_t + \varepsilon_t \quad (11)$$

where CRE, CASE, DEATH, and ε respectively stand for TRY credits, confirmed COVID-19 cases, deaths stemming from the COVID-19 pandemic, and the error term. All variables are in their natural logarithms described by ln. The data are weekly and cover the period March 27, 2020-October 16, 2020. While data for the COVID-19 pandemic are sourced from the Republic of Turkey Ministry of Health (2020), data for credits are obtained from the CBRT (2020).

4. Results

For the empirical analysis, the paper first performs the Broock et al. (1996, hereafter BDS) nonlinearity test of which the null hypothesis is linearity. Table 1 exhibits the results for the BDS test. As is seen, the null hypothesis of linearity is rejected for all variables, implying nonlinear models must be utilized.

Table 1. *BDS nonlinearity test*

Variable	Dimensions				
	2	3	4	5	6
lnCRE	0.192* (0.000)	0.328* (0.000)	0.424* (0.000)	0.493* (0.000)	0.543* (0.000)
lnCASE	0.127* (0.000)	0.232* (0.000)	0.309* (0.000)	0.350* (0.000)	0.374* (0.000)
lnDEATH	0.096* (0.000)	0.191* (0.000)	0.243* (0.000)	0.257* (0.000)	0.272* (0.000)

Notes: * illustrates 1% significance level. Values in parentheses show prob. values.

The results for the KSS (2003) unit root test are depicted in Table 2. Accordingly, the null hypothesis of a unit root cannot be rejected at level, whereas it can be rejected at first difference for all variables. Hence, the KSS (2003) unit root test yields that all variables are integrated of order one and that the cointegration relationships in the models can be examined.

Table 2. *KSS (2003) unit root test*

Variable	Test statistic	
	Level	1st difference
lnCRE	6.285	-1.938***
lnCASE	-0.002	-2.937*
lnDEATH	0.125	-2.370**

Note: *, **, and *** respectively illustrate 1%, 5%, and 10% levels of significance.

The outputs of the KSS (2006) cointegration test are reported in Table 3. Accordingly, panel A and panel B respectively show the findings for the first and the second empirical models established in the previous section. As is seen, the null hypothesis of no cointegration is rejected for both models, implying parameters can be estimated. Besides, the coefficients of lnCASE and lnDEATH respectively are 2.968 and 5.859 and both are statistically significant.

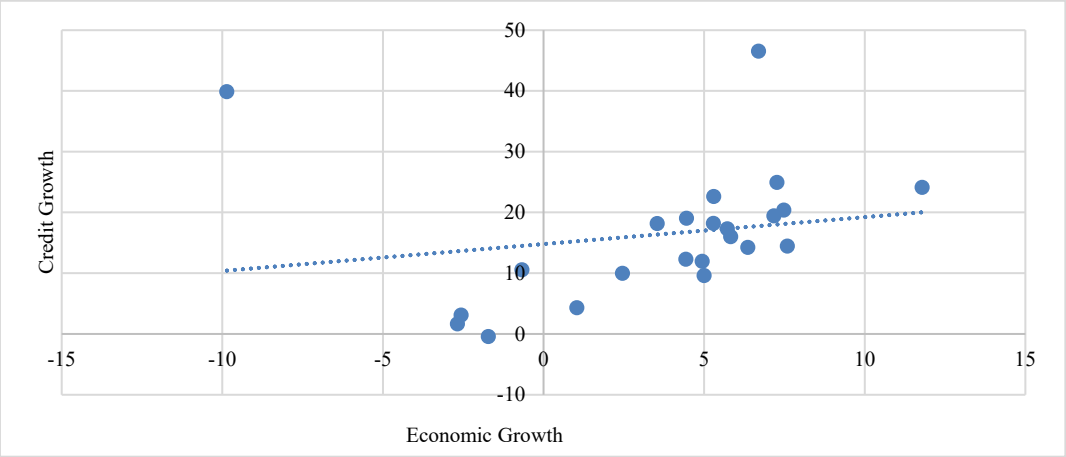
Table 3. *KSS (2006) cointegration test and parameter estimation*

Panel A: lnCRE-lnCASE relationship			
Panel A1: Cointegration test			
Test statistic		28.117*	
Panel A2: Parameter estimation			
Variable	Coefficient	Std. error	t-statistic
lnCASE	2.968*	0.032	91.192
Panel B: lnCRE-lnDEATH relationship			
Panel B1: Cointegration test			
Test statistic		34.168*	
Panel B2: Parameter estimation			
Variable	Coefficient	Std. error	t-statistic
lnDEATH	5.895*	0.203	29.001

Note: * illustrates 1% level of significance.

Therefore, the empirical findings explore that monetary policy in Turkey responded to the severe effects of the COVID-19 pandemic through the credit channel. Put differently, as the COVID-19 pandemic deepened through cases and deaths, credits increased in Turkey to support expenditures of households and firms and to alleviate the negative impacts of the pandemic on economic activities.

Figure 2. *Quarterly economic growth and credit growth rates in Turkey (2015:Q1 – 2020:Q3, %)*



Source: CBRT (2020).

Figure 2 exhibits the relationship between annual economic growth and credit growth in Turkey during 2015-2020. As is observed from the figure, there exists a positive relationship between economic growth and credit growth in Turkey, meaning the credit channel is an important tool to influence economic activities in Turkey. Overall, this paper yields that the credit channel in Turkey seems to result in a rapid economic recovery during the pandemic period if the empirical findings of this paper are considered along with the positive nexus between credit growth and economic growth rates.

5. Conclusion

This paper examined the reaction of monetary policy in Turkey to the COVID-19 pandemic using the credit channel. The findings of the nonlinear smooth transition models discovered a positive reaction of monetary policy to the confirmed cases and deaths. Hence, the paper explored the credit channel in Turkey appeared to lead the Turkish economy to rapidly recover during the pandemic period.

It should be noted that the fast credit growth in Turkey led to an increase in macroeconomic imbalances in Turkey. For instance, TRY seriously depreciated against foreign currencies in the last months, which can negatively affect the Turkish economy with high foreign debts. Second, lending to households and firms with lending rates that are lower than the interbank rate is likely to result in a deterioration in the balance sheets of the state-owned banks in Turkey. Hence, the policy makers in Turkey should take these imbalances into account in the following period not to suffer from financial instability and a possible financial crisis.

Note

(1) See Kapetanios et al. (2006) for the details of the cointegration test.

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