Impact of the COVID-19 monetary policy toolkit in the Dominican Republic

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Abstract

As most central banks in both advanced and emerging markets, the Central Bank of the Dominican Republic (CBDR) reacted swiftly in response to the outbreak of the COVID-19 pandemic, where conventional interest rate reductions were accompanied by a set of non-conventional expansive monetary and financial measures. In this paper, we estimate a semi-structural macroeconomic model for a small-open economy with a financial block that captures the non-conventional set of instruments. Up to our knowledge, this is the first paper to assess the impact of the monetary policy measures implemented in response to the COVID-19 pandemic in the Dominican economy. Main results indicate that the combination of monetary policy instruments played an important role in mitigating the effects of the pandemic in the Dominican Republic. Moreover, given the lags with which the monetary policy transmission mechanism operates, the use of these complementary tools contributed to a more potent and expedite impact of monetary policy that facilitated a rapid recovery of the economy in the course of 2020 and a continued economic recovery during 2021.

Key words: Monetary policy, Macroeconomics

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I. Introduction

In response to the outbreak of the COVID-19 pandemic and its potential economic impact, most central banks reacted promptly and aggressively. The Central Bank of Dominican Republic (CBDR) was no exception, where conventional interest rate reductions were accompanied by a set of non-conventional expansive monetary and financial measures, such as reserve requirements reduction and liquidity provision facilities aimed at increasing financing for households and small and medium enterprises at low interest rates. Some of these instruments had been used previously, especially during episodes characterized by supply shocks. However, other instruments were designed and tailored during the pandemic. Overall, through several instruments the CBDR provided liquidity in national currency for a historical amount equivalent to around 5% of GDP.

Previous studies (Gratereaux et al., 2007; González, 2010; Jimenez et al., 2014; Perez, 2019) have analyzed the effects of conventional monetary policy shocks on growth and inflation for the Dominican Republic, identified mainly through interest rate shocks. For the Dominican case, the literature related to the effects of non-conventional monetary policy instruments remains scarce. In this paper, we estimate a semi-structural macro model for a small-open economy with a financial block, thus allowing for the introduction of the formerly mentioned set of instruments, as well as the financial regulatory measures. Up to our knowledge, this is the first paper to assess the impact on monetary conditions and economic activity of the monetary policy measures implemented in response to the COVID-19 pandemic in the Dominican economy.

Our model considers the impact of monetary policy through three main measures: (1) monetary policy rate reduction, (2) regulatory loan-loss provision forbearance, and (3) the liquidity provision facilities. Main results from the historical decomposition indicate that the combination of monetary policy instruments played an important role in mitigating the effects of the pandemic in the Dominican Republic. Moreover, given the lags with which the monetary policy transmission mechanism operates, the measures taken in the course of 2020 continued to foster economic recovery during 2021. It is worth mentioning that these results could be interpreted as a lower bound on the total policy impact, given that, in the absence of measures, heightened uncertainty could have led to more strained financial conditions and a more adverse macroeconomic outcome. In this sense, future policy challenges include an evaluation of the inclusion of the new unconventional instruments as part of the monetary policy toolkit and to determine under which specific conditions they would be deployed.

The rest of the paper is organized as follows: section II describes the monetary policy measures adopted in the Dominican Republic during the COVID-19 pandemic. Section III presents the empirical strategy used, and section IV contains the estimation method and data description.

Section V presents the results of the model, and chapter VI contains some policy lessons and concluding remarks.

II. Monetary policy in the Dominican Republic during the COVID-19 pandemic

The simultaneous supply and demand shock due to the COVID-19 pandemic outbreak required an exceptional policy response from central banks and governments. In the Dominican Republic, the CBDR began implementing a set of expansive monetary and financial policy measures in March 16, 2020 when the Monetary Policy Committee held an extraordinary meeting and, similar to other advanced and emerging economies, made use of multiple monetary policy instruments with the objective of mitigating the effects of the health crisis on the Dominican economy. These policies can be classified in five groups: (1) conventional monetary policy through interest rates, and the unconventional measures through (2) the liquidity provision program in local currency, (3) regulatory measures, (4) measures in foreign currency and (5) communicational policy. Policies (1) through (3) will be under the scope of this paper, that is the interest rate measures, liquidity provision program in local currency, and regulatory policies. The rest remain as possible extensions to this research and will be described in this section for a complete overview of the monetary response to the shock.

Regarding its conventional monetary policy measures, the CBDR cut its reference interest rate by 150 basis points between March and August 2020, reaching a historical minimum of 3.00 % per annum. In addition, the interest rate on the permanent expansion facility (one day Repos) was reduced by 250 basis points and the rate for interest-bearing deposits (Overnight) by 50 basis points, thus narrowing the interest rate corridor and hence, lowering funding costs for financial institutions (Figure 1).

The decisions on the monetary policy rate were reinforced by unconventional policies aimed at maintaining the smooth flow of funds in the financial system, mitigating excessive volatility of the exchange rate, while enhancing its communicational strategy in a context of increased uncertainty. Even when the combination of conventional and unconventional policies has been common in the Dominican Republic when facing supply shocks (Camacho & González, 2020) and most of the monetary policy instruments used to face this crisis were available before the COVID-19 shock, other facilities were created during this period.

In this regard, the monetary authority set forth a liquidity provision program in local currency through the release of the legal reserve requirements held by financial institutions at the Central Bank, to be granted as loans to households, productive sectors as well as micro, small, and medium-sized enterprises (MSMEs) with a maturity of up to four years. Additional liquidity was provided to financial institutions through repos of up to 360 days, backed by securities issued by the Central Bank and by the Ministry of Finance. Furthermore, the Central Bank created a Rapid Liquidity Facility (RLF) to provide funds for households, productive sectors and MSMEs, including debt restructurings, with a wider set of collaterals that included securities issued by the Central Bank and by the Ministry of Finance, as well as securities issued by the private sector and loans portfolio with the highest credit rating. Through these facilities, the total liquidity allocated was equivalent to around 5.0% of GDP (Figure 2).

In terms of financial regulation, the Monetary Board approved special measures to ensure high levels of liquidity and capitalization in the financial system. These included to maintain unchanged the credit ratings and provisions of debtors at the level outstanding as of February 2020, prior to the impact of the pandemic. Other measures were taken to facilitate debt refinancing and restructurings at lower interest rates, more favorable terms and keeping debtor's credit rating unchanged. Finally, financing granted through Central Bank facilities would be classified with risk category A, with zero provisions and with a zero-weight in the calculation of the solvency index.

The extent of the regulatory measures can be assessed by comparing the amount of loan-loss provisions that would have been required in absence of the measures as compared to those required given the forbearance. In this regard, as of December 2020, the required provisions would have been equivalent to 1.5% of GDP, almost double of the 0.8% of GDP that was effectively required (Table 1).

Figure 1. Monetary Policy Rate (MPR)
(%)

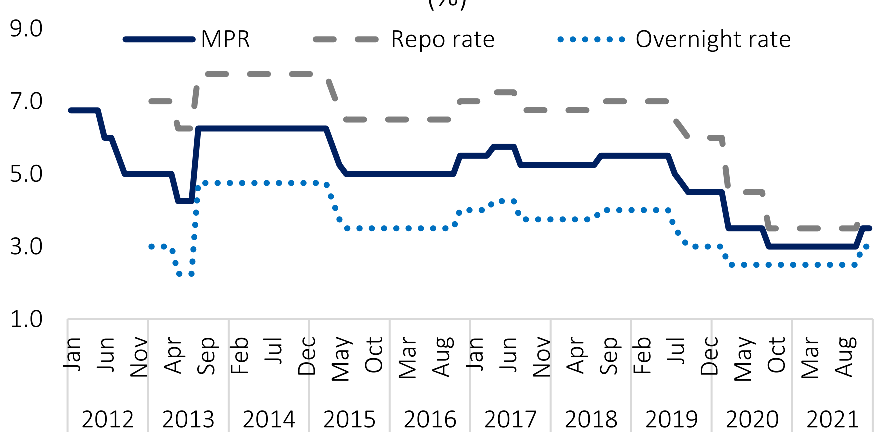
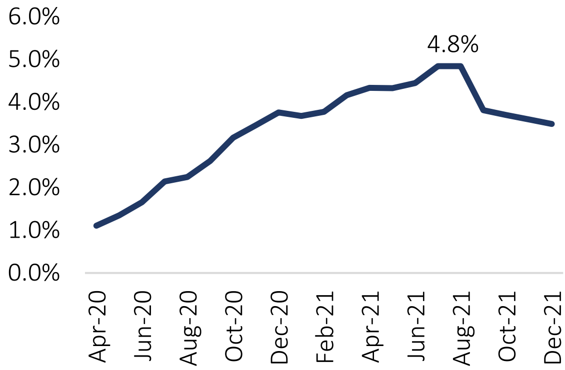


Figure 2. Liquidity provision facilities (% GDP)[1]



[1] 2020 GDP

Table 1. Financial system required provisions Dec. 2020

	Required in absence of measures	With COVID-19 measures	Impact
RD$ millions	65,350.7	33,997.8	31,352.9
% GDP[1]	1.5%	0.8%	0.7%

Other measures taken by the CBDR aimed to provide liquidity in foreign currency, through lower reserve requirements, a Repo facility, as well as an active participation of the Central Bank in the foreign exchange market through the Electronic FX Trading Platform and a currency hedging program using derivatives (NDFs) for domestic banks, firms and international investors. Also, the CBDR made a more intensive use of its communication tools. However, as mentioned earlier in this section, such measures are not a focus of this research.

As of July 2021, all resources provided in local currency were channeled through the financial institutions. In August 2021, the CBDR started a gradual plan for the normalization of its monetary policy, through an orderly return of the resources granted during the pandemic, as firms and households repay at maturity the loans granted through the liquidity facilities. Altogether, a regulatory normalization process began in April 2021 to gradually establish provisions for the aforementioned regulatory forbearance adopted during the pandemic. Finally, in November 2021 the Central Bank began a series of increases of its policy rate, in a context of a strengthened aggregate demand and more persistent external inflationary pressures stemming from the global supply shock. The 150-basis point increase in the CBDR's monetary policy rate between November and December placed the reference rate at 4.50% per annum, its pre-pandemic level.

III. Empirical Strategy

To analyze the role played by the set of monetary policies taken in response of the COVID-19, a semi structural macroeconomic model for a small open economy is estimated. This type of models, where the equations are log-linearized representations of the steady state solution of the structural model, are commonly used by central banks for policy analysis (see for example (Berg, Karam, & Laxton, 2006). The main model for forecast and policy analysis used in the Central Bank of the Dominican Republic is one example (see (Hamman, 2015) and (Checo & Ramírez, 2017)).

Traditionally, the baseline form of these models include four basic equations: 1) a Taylor rule for the monetary policy reaction, 2) an aggregate demand curve (IS curve), 3) a Phillips curve, and 4) an Unconvered Interest Parity condition. In this basic set up, the central bank reacts to deviations of the expected inflation rate from the target and the output gap by using its only policy tool, the monetary policy rate. However, as stated before, during the COVID-19 crisis the CBDR used a broader set of policy instruments that are not modeled in this simple baseline model. Therefore, the model is expanded with a financial block that explicitly takes into consideration the unconventional monetary policy measures implemented in response to the pandemic. This financial block feeds the macroeconomic block through the aggregate demand equation.

a. The model

The output gap (y_t) is defined as the log-difference between GDP (Y_t) and potential GDP (Y_t^{pot}):

$$y_t = Y_t - Y_t^{pot}$$

Potential quarter-over-quarter GDP growth (G_t^{pot}) is modeled as an error correction process as potential growth fluctuates around trend growth (G^{trend}):

$$G_t^{pot} = \delta_{gss} * G^{trend} + \left(1 - \delta_{gss}\right) * G_{t-1}^{pot} + \eta_{pot}$$

The aggregate demand is introduced as an IS curve that includes credit to allow for interaction with the financial block:

$$y_t = \beta_1 * y_{t-1} + \beta_2 y_{t+1} - \beta_3 \hat{r}_t + \beta_4 \hat{z}_t + \beta_5 y_t^* + \beta_6 \widehat{cr}_t + \eta_y$$

Where $\hat{r}_t$ represents deviation of the real interest rate from the neutral interest rate, $\hat{z}_t$ is the deviation of real exchange rate from its steady state level, y_t^* is the US output gap which captures external demand, $\widehat{cr}_t$ is the deviation of credit growth from its steady state level and η_y represents the aggregate demand shock.

The monetary policy rate is set by the central bank following an expectation-augmented Taylor rule, defined by:

$$(i_t^{mp} - i_t^n) = \phi_{tpm}(i_{t-1}^{mp} - i_{t-1}^n) + \left(1 - \phi_{mp}\right)\left(\bar{\imath} + \phi_\pi(E_t \pi_{t+1}^a - \bar{\pi}) + \phi_{\hat{y}} \hat{y}_t\right) + \eta_t^{mp}$$

Where i_t^n is the neutral nominal interest rate, $\bar{\imath}$ is the steady state nominal interest rate, $E_t \pi_{t+1}^a$ represents the annual inflation expectations, $\bar{\pi}$ is the inflation target, $\hat{y}_t$ is the output gap and

η_t^{mp} is the monetary policy shock. In this regard, the Central Bank's reaction shows persistence, reacting to expected inflation and the output gap.

The neutral nominal interest rate is defined as:

$$i_t^n = r_t^n + \bar{\pi}$$

Where r_t^n is the neutral real interest rate, which is determined by potential GDP growth:

$$r_t^n = c_{rn-pot} E_t\left[G_{t+1}^{pot} * 4\right] + \eta_t^{r^n}$$

This definition for the neutral real interest rate follows (Laubach & Williams, 2015) and following (Arroyo, Becerra, & Solorza, 2021) the parameter c_{rn-pot} , which measures the influence of the trend growth rate on the natural rate of interest, is calibrated using the trend growth ($\mathrm{G}^{\mathbf{trend}}$) and the long term real neutral interest rate ($\bar{r}$):

$$c_{rn-pot} = \frac{\bar{r}}{G^{trend}}$$

The inflation dynamics are modeled following a Phillips Curve equation augmented with inflation expectations:

$$\pi_t = \alpha_1 \pi_{t-1} + (1 - \alpha_1) E_t[\pi_{t+1}] + \alpha_2 y_t + \alpha_3 \hat{z}_t + \alpha_4 oil + \eta^\pi$$

In addition, this equation includes the oil price and the exchange rate pass-through, which have been identified as playing an essential role in determining inflation dynamics in the Dominican Republic ((Jimenez & Ramírez, 2015)).

The real exchange rate is determined through an uncovered interest rate parity condition:

$$\left(i_t^{mp} - i_t^n\right) = \phi_{UIP}\left(i_{t-1}^{mp} - i_{t-1}^n\right) + (1 - \phi_{UIP})(i_t^* + 4 * E_t[\Delta z_{t+1}] + risk_t) + \eta_t^{UIP}$$

Where i^* is the foreign interest rate and $risk$ is the country risk premium of Dominican issued bonds. The external sector variables are believed to be exogenous and are modeled as AR(1) processes.

In order to capture the credit channel and the effects of the wide range of monetary policy measures aimed at reducing financing costs and providing liquidity, a financial block is added to the model. Following Arroyo, Becerra, & Solorza (2021), we include the financial sector through equations that represent the financial intermediation activity of commercial banks, who intermediate resources between borrowers and lenders at a cost, expressed as a spread between the interest rate on loans (i_t^{loan}) and the monetary policy interest rate (i_t^{mp}):

$$spread_t = i_t^{loan} - i_t^{mp}$$

The dynamics of the loan rate are given by:

$$i_t^{loan} = \phi_1^{i^{loan}}\left(i_t^{mp} - i_t^{n}\right) + \phi_2^{i^{loan}} prov_t - \phi_3^{i^{loan}} LF_t + \eta_t^{i^{loan}}$$

In this specification, the market interest rate (i^{loan}) responds to variations in the financing costs faced by the banks. The interest rate is affected by the monetary policy rate (i^{mp}), which affects the cost of financing in the interbank market and through central bank repos. Additionally, an increase in the credit risk perceived by the banks, captured by the loan-loss provisions ($prov$), will push interest rates up as banks increase the rates of new loans to compensate lower recovery rates on loans. It is important to note that this spread can be influenced by financial market frictions, imperfect financial markets, and other costs that banks face which are not being considered in this model.

Finally, given the role that liquidity facilities (LF) provided by the Central Bank have played as a policy tool in the last decade, this variable is explicitly included in the model. In particular, the expansion of these liquidity facilities pushes interest rate down as it lowers the cost of financing by providing low-cost funds. This variable is modeled as an AR(1) process:

$$LF_t = \phi_1^{LF} LF_{t-1} + \eta_t^{LF}$$

We model a credit demand that is procyclical, while a higher interest rate spread reduces credit growth ($\widehat{cr}$):

$$\widehat{cr}_t = \phi_1^{cr}\widehat{cr}_{t-1} + \phi_2^{cr} y_t - \phi_3^{cr} spread_t + \eta_t^{cr}$$

Finally, credit risk is reflected through commercial banks' provisions. It is assumed that it depends on the expected economic activity and the credit growth:

$$prov_t = \phi_1^{prov} prov_{t-1} - \phi_2^{prov}\left(\frac{\sum_{i=1}^{4} y_{t+i}}{4}\right) + \phi_3^{prov}\widehat{cr}_{t-1} + \eta^{prov}$$

As explained by Arroyo, Becerra, & Solorza (2021), the idea behind this specification is that in periods of economic expansion the delinquency levels on loans are lower, given that debtors can meet their obligations. In the case of the credit gap, an acceleration of credit growth can be a signal of vulnerabilities for the banks, as new loans are more likely to be of low quality as the standards for credit approval are lowered during credit booms. As a precautionary measure, banks increase their provisions in response to this risk.

The rest of the variables of the model, in particular the ones associated with the external sector, are assumed to be exogenous, thus they are modeled as AR(1) process.

Given the set of equations mentioned above, the conventional monetary policy measures are captured in the macroeconomic block through the Taylor rule, while the financial block captures the unconventional policies of reducing reserve requirements and the lower required provisions.

IV. Estimation method

The estimation of the model's parameters is done using Bayesian methods. The use of this estimation method in structural and semi-structural models is a common approach (see for example Ireland (2004), Ruge-Murcia (2007), and Fernández-Villaverde, Rubio Ramírez, & Schorfheide (2016)). Bayesian estimation allows for the use of information outside of the sample to produce "priors" for the model's parameters. For instance, previous estimates could be used as priors of the parameter's distribution.

The prior selection is based on the existent literature for the Dominican Republic and is complemented with other sources. In particular, the macroeconomic block of the model follows the results on Hamman (2015) and Checo & Ramírez (2017), given the similarities between the models' structure. In the case of the financial block, which is absent from previous papers, the results of Arroyo, Becerra, & Solorza (2021) for the case of Chile are used as an initial approximation.

The model is estimated using 9 domestic variables and 4 foreign variables observed quarterly from 2006 to 2019. In the domestic data we include the monetary policy rate (MPR), commercial banks' loan rate, gross domestic product (GDP), consumer price index (CPI), nominal exchange rate (NER), commercial banks' credits to the private sector in local currency, liquidity facilities disbursements by the Central Bank, the commercial banks' credit provisions expenses and the Emerging Market Bond Index (EMBI) for the Dominican Republic. On the foreign side, we use data from the United States (Dominican Republic's main trade partner) on CPI, GDP, Fed Funds Rate; and the price of WTI oil.

These observable variables are transformed to fit the theoretical model definition. In general, variables are used as deviations from their sample mean or trend in the case of non-stationary variables. A detailed description of the transformations applied to the variables can be found in Appendix A.

Table 2 presents the prior distribution and the posterior estimation for the parameters of the model. In general, the results for the aggregate demand and the Phillips curve equation remain close to its prior values, concluding that the new data observed does not add new information to previous estimations found in the literature. The most notable exception in this case is the coefficient for the real interest rate in the aggregate demand curve (β_3), which is consistent with the addition of the credit channel in this equation, thus separating the interest rate and the credit mechanisms.

In the case of the financial block, the data is informative to update the priors, as can be seen in the posterior estimation for the loan rate, credit growth, provisions and liquidity facilities equations.

Table 2: Priors distributions and posterior estimation's results.

		Prior			Posterior		
Equation	**Parameter**	**Dist.**	**Mean**	**Std. Dev.**	**Mode**	**90% HDP interval**	
IS CURVE	β_1	Beta	0.70	0.02	0.70	0.69	0.72
	β_2	Gamma	0.05	0.01	0.03	0.02	0.04
	β_3	Gamma	0.10	0.05	0.02	0.01	0.04
	β_4	Gamma	0.05	0.01	0.06	0.05	0.06
	β_5	Gamma	0.07	0.01	0.07	0.07	0.08
	β_6	Beta	0.09	0.02	0.07	0.05	0.08
Phillips Curve	α_1	Beta	0.10	0.05	0.03	0.01	0.05
	α_2	Gamma	0.15	0.01	0.16	0.15	0.17
	α_3	Gamma	0.20	0.05	0.20	0.17	0.22
	α_4	Gamma	0.30	0.01	0.29	0.28	0.29
Taylor Rule	ϕ_{tpm}	Beta	0.70	0.10	0.87	0.83	0.91
Loan Rate	ϕ_1^{loan}	Normal	1.50	0.10	1.61	1.55	1.67
	ϕ_2^{loan}	Normal	2.50	0.05	2.43	2.40	2.48
	ϕ_3^{loan}	Normal	0.80	0.05	0.74	0.70	0.78
Credit Growth	ϕ_1^{cr}	Beta	0.50	0.10	0.73	0.67	0.80
	ϕ_2^{cr}	Normal	0.30	0.10	0.34	0.30	0.41
	ϕ_3^{cr}	Beta	0.20	0.05	0.25	0.22	0.27
Provisions	ϕ_1^{prov}	Beta	0.70	0.05	0.69	0.67	0.71
	ϕ_2^{prov}	Beta	0.20	0.03	0.19	0.18	0.20
	ϕ_3^{prov}	Beta	0.05	0.01	0.03	0.02	0.04
Liquidity Facilities	ϕ_1^{LF}	Beta	0.40	0.05	0.33	0.30	0.37
Auxiliar Equations	ρ_1	Beta	0.50	0.10	0.58	0.55	0.62
	ρ_2	Beta	0.50	0.10	0.78	0.73	0.84
	ρ_3	Beta	0.50	0.10	0.66	0.59	0.73
	ρ_4	Beta	0.50	0.10	0.62	0.58	0.66
	ϕ_{UIP}	Beta	0.40	0.10	0.49	0.45	0.53
	ϕ_{oil}	Beta	0.30	0.10	0.14	0.10	0.18
	δ_{gss}	Beta	0.50	0.10	0.71	0.65	0.76

V. Results

In order to assess the impact of the expansionary monetary policy measures amid the COVID-19 pandemic, the historical decomposition of shocks for key macroeconomic variables, such as loan rates, private credit, and output gap is presented. Figures 3 to 5 show the decomposition of these variables, as explained by the three group of monetary policy measures under the scope of this paper, that is, the effects of monetary policy rate reduction, loan-loss provision forbearance, and the liquidity provision facilities. The figures cluster the effects of other factors. The results for the impulse response functions are presented in Annex B.

The main results indicate that the combination of these monetary policy instruments played an important role in mitigating the macroeconomic effects of the pandemic in the Dominican Republic. Furthermore, the measures taken in the course of 2020 continued to foster economic recovery during 2021, given the transmission mechanism of monetary policy.

The financial conditions began to loosen with the implementation of the expansive monetary policy program. In particular, unconventional monetary policies such as loan-loss provisions forbearance and the liquidity facilities had an immediate impact on loan rates, evident by the first quarter of 2020 and providing further easing throughout the rest of the year. On average, loan rates would have been 10.40 percentage points higher in the absence of the monetary package. Likewise, the high dynamism of private credit during 2020 was mainly driven by the positive impact of the loan-loss provision forbearance and the RLF measures, explaining more than 75% of the monetary policy contribution. For private credit, monetary policy measures explain an average of 7.38 percentage points of the y-o-y growth during 2020. Without this support, credit growth would have been negative by the end of 2020, potentially disrupting financial flows and increasing distress in the banking system.

As for output gap, conventional monetary policy had a higher initial effect, as the reduction of the MPR explains around 50% of the total impact of monetary policy in 2020. Afterwards, unconventional measures show a higher incidence. Overall, output gap as a percentage of GDP was 1.0% less negative as a result of the monetary policy stimulus.

The effects of such extraordinary monetary package can be compared with previous successful episodes of monetary policy easing where unconventional measures were employed, such as 2017. In such period, monetary policy rate and reserve requirement reductions implied a loan rate that was, on average, 1.7 percentage points lower, a credit growth rate that was higher in 0.6% percentage points and a less negative output gap in 0.1% of GDP for the four quarters following the measures.

As for 2021, the incidence of the monetary policy measures over credit growth and output gap increased. The measures allowed for a private credit growth rate that was around 7.9 percentage points higher, while contributing positively to output gap in 1.72% of GDP. It is important to note that the MPR reduction made in 2020 had an increasing incidence in all variables throughout 2021, as the monetary policy transmission mechanism operates with lags. The impact on loan interest rates was higher at the beginning of the pandemic (-10.4 percentage points in 2020 vs -3.0 percentage points in 2021), which reflects the potentially high interest rates that would have been observed amid an elevated financial uncertainty at the beginning of the pandemic, in absence of the measures.

Our results reveal that the different instruments employed in response to COVID-19 operate with different timings and magnitudes, thus enhancing the effectiveness of the monetary policy intervention throughout the pandemic. As a result of financial conditions that remained favorable, the Dominican economy registered a faster-than-expected recovery, also aided by the improvement of the external sector due to a higher global demand and by the National Vaccination Plan against the COVID-19.

In this context of continued economic dynamism and more persistent inflationary pressures, the CBDR began to withdraw the monetary policy stimulus through the normalization of regulatory measures (April 2021), the gradual return of the resources granted through the liquidity facilities (August 2021), and a 150-basis point increase in the MPR (November-December 2021). With these measures, loan-loss provision and liquidity facilities began to restrain financial conditions, pushing loan interest rate upwards, while moderating the positive impact on private credit growth. As for output gap, the monetary policy measures continue to support economic activity, as the transmission mechanism of recent MPR decisions operates gradually.

It is worth noting that the results could be interpreted as a lower bound on the total policy impact, considering that, in the absence of measures, heightened uncertainty could have led to more strained financial conditions and a more adverse macroeconomic outcome. In fact, our lineal model does not capture some possible non-linearities observed during the COVID-19 shock, as well as contagion effects of financial disruptions on economic activity, which could have produced a sharper decrease in GDP and a slower recovery.

Figure 3. Loan rate
(%, demeaned)

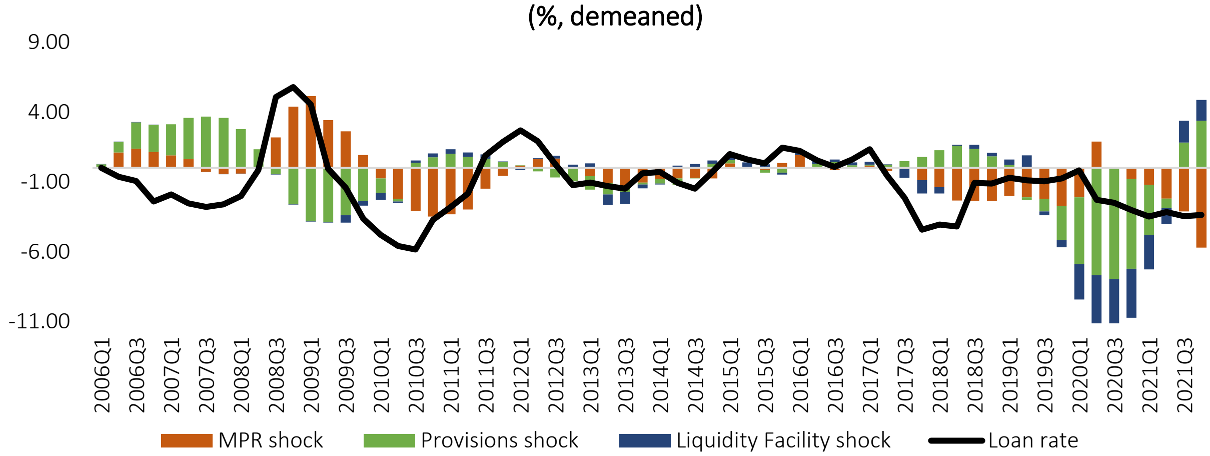


Figure 4. Credit gowth
(annual growth, %, demeaned)

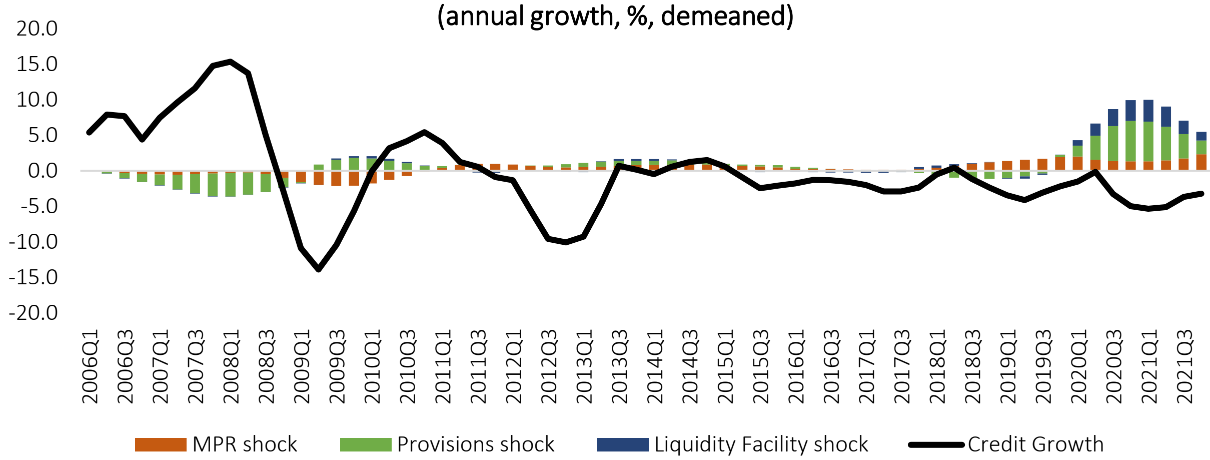
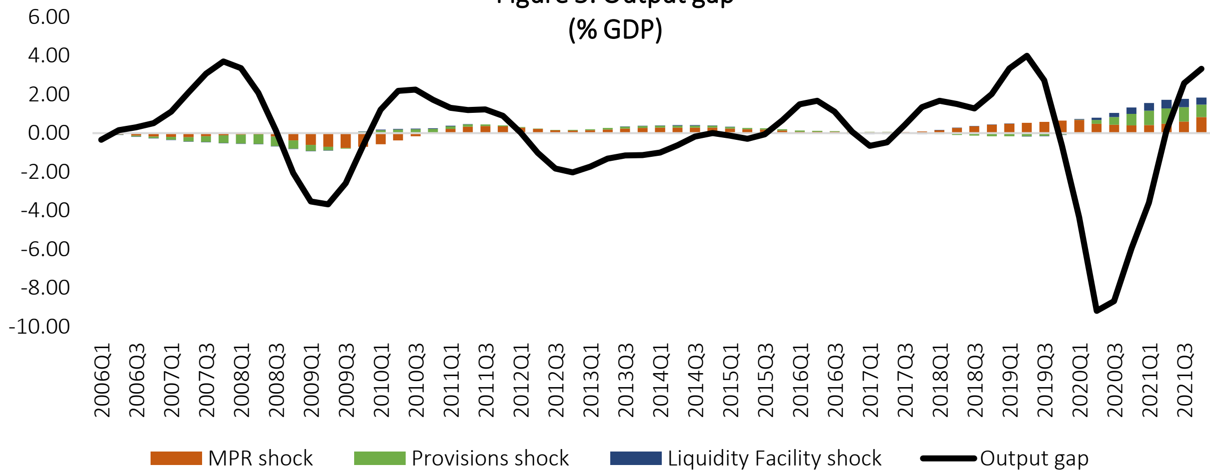


Figure 5. Output gap
(% GDP)



VI. Concluding remarks

The unprecedented shock caused by the COVID-19 pandemic, affecting both demand and supply conditions, led to a swift response from central banks of advanced and emerging economies through the implementation of conventional and non-conventional policies. In the case of the Dominican Republic, the central bank deployed a combination of interest rate reductions, liquidity provision facilities and regulatory measures that proved effective in mitigating the adverse shock through more favorable financial conditions and facilitating credit to household and firms.

The results in this paper show that the use of these complementary tools, along with a more explicit forward-guidance in the communication policy, contributed to a more potent and expedite transmission of monetary policy that facilitated a rapid recovery of the economy. In particular, after the implementation of the expansionary package, reductions in market interest rates were significantly larger than expected, and than the ones observed in past occasions, when exclusively conventional measures were applied. Likewise, the evidence suggests that private credit dynamism was mainly driven by regulatory and liquidity provision facilities, explaining around 75% of the monetary policies contribution. As for economic activity, the monetary package led to a higher output gap between a 1% and 2% between 2020-2021, specially through the interest rate channel.

In summary, the findings of this paper offer encouraging evidence of the use of non-conventional monetary policies during times of high uncertainty that could affect credit supply and distress financial conditions. A key element to take into consideration is the transitory nature of these unconventional policies in the Dominican Republic, with a gradual path that was communicated since the reversal policies were initiated. The clear guidance for normalization of monetary and financial conditions gave certainty to firms and households, while contributing to the anchorage of inflation expectations in a context of large shocks.

Looking forward, a few policy questions remain. First, the central bank should evaluate which of the unconventional instruments could remain as part of the monetary policy toolkit and hence determine under which specific conditions they would be deployed. The main challenge is that, if used in excess and without clear triggers, the multiple instruments could diminish the importance of the monetary policy rate as the principal tool and thus hamper communication policy. Finally, this research attempts to shed some light on the relevance of unconventional measures by modifying traditional semi-structural models. However, these effects do not take into consideration non-linear effects and contagion effects of a disrupted financial system. A possible future line of study should consider other frameworks, such as dynamic structural general equilibrium models, to assess the role of such policies, as well as the extraordinary circumstances and high level of uncertainty due to the pandemic.

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VII. Appendix

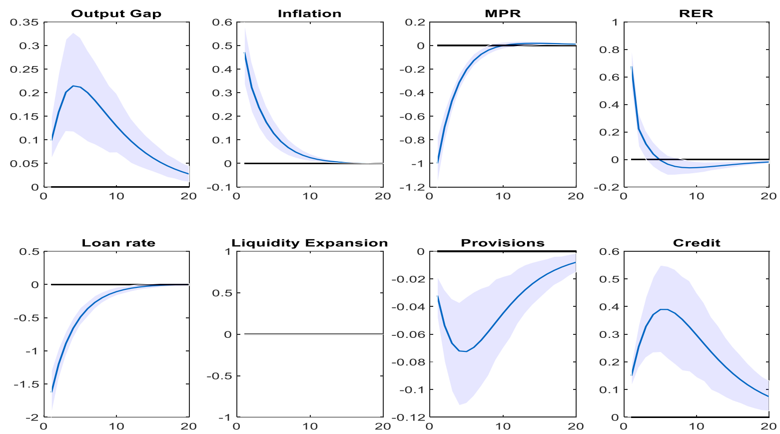
A. Variable definitions

The model is estimated using as observables the following variables and the detailed transformation in each case:

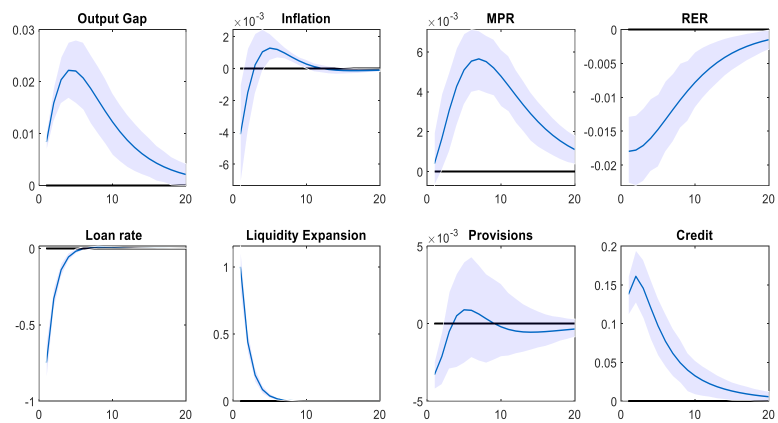
1. Monetary policy rate: quarterly average.
2. Commercial banks' loan rate: detrended using a 12-month moving average.
3. Gross Domestic Product: the seasonally adjusted natural logarithm of GDP is separated in its cyclical and trend components using the asymmetrical bandpass filter proposed by (Christiano & Fitzgerald, 1999). Then, output gap is computed as the logarithmic difference between observed and trend GDP. Additionally, quarterly growth of trend GDP is used as proxy of potential growth.
4. Consumer Price Index: demeaned quarter over quarter inflation rate.
5. Nominal exchange rate: demeaned quarter over quarter percent change.
6. Commercial banks' credits to the private sector: demeaned annual percent change.
7. Liquidity facilities disbursements: demeaned disbursements as percent of GDP.
8. Provisions: detrended provisions using HP filter.
9. EMBI: demeaned quarterly average.
10. United States GDP: the seasonally adjusted natural logarithm of GDP is separated in its cyclical and trend components using the asymmetrical bandpass filter proposed by (Christiano & Fitzgerald, 1999). Then, output gap is computed as the logarithmic difference between observed and trend GDP.
11. United States CPI: demeaned quarter over quarter inflation rate.
12. Federal Fund Rate: demeaned quarterly average.
13. WTI oil price: detrended using HP filter.

B. Impulse response functions

1. Monetary policy shock (1% decrease)



2. Liquidity provision shock (1 % GDP)



3. Provisions shock (1% of non-performing loans)