What lessons does the COVID-19 pandemic teach us about banking liquidity and information share in the CEMAC zone?

Djimoudjiel, Djekonbe and T. Rostand, Dany Dombu and MBATINA NODJI, NDILENGAR

University of N'Djamena (Chad); Centre of Research in Economic and Inclusive Development (CREDI), Independent Researcher, Yaounde (Cameroon)

5 January 2024

What lessons does the COVID-19 pandemic teach us about banking liquidity and information share in the CEMAC zone?

By

Djimoudjiel Djekonbe[1]*,

University of N'Djamena (Chad); Centre of Research in Economic and Inclusive Development (CREDI)

Dany Dombu T. Rostand,

Independent Researcher, Yaounde (Cameroon)

&

NDILENGAR MBATINA NODJI

University of N'Djamena (Chad); Centre of Research in Economic and Inclusive Development (CREDI)

Summary

The objective of this study is to assess the effect of COVID-19 on the situation of excess liquidity in the CEMAC zone. The results are obtained using Bayesian estimates of VAR models on monthly data on banks ranging from 2000 to 2020 for countries in CEMAC. The main results suggest the shock generated by the COVID-19 pandemic on the economy of the sub-region has contributed to bogging down the situation of excess liquidity. Indeed, on the one hand, the shock on bank liquidity is greater in the short than in the long term. On the other hand, the situation under COVID-19 led to an increase in credit in the first 6 to 8 months of 2020 followed by a drop in the level of risk hedging capital. The health policies adopted and the ensuing recession, on the other hand, significantly affected the level of bank deposits. The main recommendations consist of reducing the climate of information asymmetry by encouraging the implementation of credit registers and establishing policies to help borrowers.

Key words: Excess liquidity; Information sharing ; COVID-19; BVAR; CEMAC.
JEL Classification: E50; D82; C23; O55.

1. Introduction

The Covid-19 crisis is quite special compared to other crises that have affected the world economy in general and that of CEMAC countries in particular. First, it has an origin and evolves according to factors that are mainly non-economic; second, it is global in scope. Thus, depending on the region of the world where you are and its particularities, its effects on the economy can vary.

The global economy has been hit hard, and the financial sector has not escaped it. In general, the impact of the crisis is mainly directed towards the stock markets. With the main channels being that of securities and the volatility of shares and other financial assets; acting directly on market liquidity (Gormsen and Koijen, 2020; Landier and Thesmar, 2020). Indeed, the attention

[1] Corresponding author *djimoudjiel_djekonbe@yahoo.fr*

of economists is primarily occupied with showing how such a shock, accompanied by the associated financial policies, affects the value of companies. Ramelli and Wagner (2020)explain, for example, that outward-looking companies performed poorly. As the crisis spread, corporate debt and cash also became important determinants of corporate value. For example, Landier and Thesmar (2020) showed that analyst forecast revisions explained most of the decline in corporate stock values at the very beginning of the health crisis (between January 2020 and mid-May 2020). . More specifically, the work of Gormsen and Koijen (2020), analyzing data from aggregated equity and dividend futures markets have managed to quantify investors' expectations for economic growth following the evolution of the health crisis. Thus, they came to the conclusion that the news about the fiscal stimulus measures at the start of the crisis boosted the stock market and long-term growth in the United States, Japan and the European Union.

While the effect of the pandemic on Western finance is accentuated on stock markets, it may not be the same in developing countries such as those in the CEMAC sub-region where stock markets are morose and almost not volatile (Nzomo and Dombou, 2017). A sluggishness explained among other things by a high prevalence of information asymmetry, a cause of inefficiency in the financial sector (Stiglitz and Weiss, 1981; Pagano and Jappelli, 1993). Indeed, it developed in CEMAC well before the crisis, the paradox of excess liquidity in a situation of credit rationing (Avom and Eyeffa, 2007). A situation that marks the inefficiency of banks in the sub-region in financing the economy, unlike Western banks before the onset of the crisis. Indeed, on the Western money market, the prudential response to the crisis consisted in encouraging banks to use their capital reserves in order to maintain credit flows. In addition, regulators have not adopted new positions of tightening monetary policies (Borio 2020). This policy was able to work because Western banks went into recession with strong balance sheets. Nevertheless, the crisis has negatively affected liquidity. Indeed, the defaults of borrowers affected by the crisis could increase. The challenge in the West is therefore to replenish the reserves.

On the CEMAC side, the measures implemented came in a context of excess liquidity in a situation of credit rationing. A situation which, in the midst of a crisis, tends to further reduce the efficiency of banks. Yet, to reduce the adverse effect of the pandemic on the economy, banks must absorb the shock by offering a sustainable source of funding. (Acharya and Steffen, 2020; Borio, 2020). It is from there that the monetary authorities can implement measures going towards the same objective. Thus, some of their measures during the pandemic aimed to mitigate the sudden tightening of short-term financing conditions, or to support the flow of credit granted to companies by easing the constraints on banks by using reservations (Demirgüç-Kunt et al., (2021).

In CEMAC, certain measures implemented by the regulator as of March 2020 have been maintained, others suspended and new ones taken. This mainly involved the maintenance of weekly active injections on the money market, long-maturity liquidity injection operations, the suspension of the non-renewal of the government securities buyback program, and the new reorganization of the terms allocation of liquidity in the compartment of BEAC interventions in the money market.

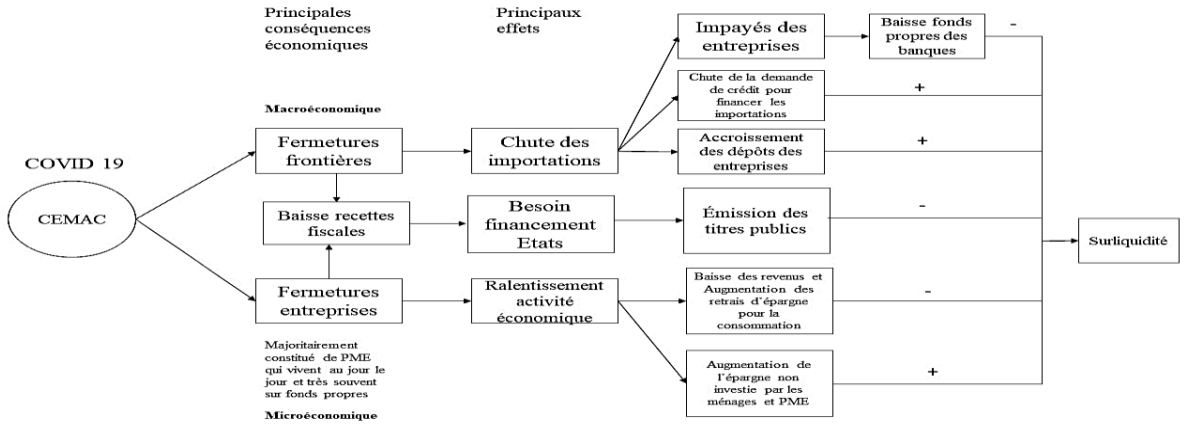
However, in general, two main effects were observed. First, expectations of a deterioration in the quality of their portfolios prompted credit institutions to further tighten their lending conditions. With the risk of affecting bank liquidity. Secondly, the expected deterioration in public accounts and the anticipation of a drop in external financing have prompted States to issue massive amounts of public securities (Bacale 2021).

In view of the particularities of local economies and the actions taken by the regulator, it is useful to wonder about the possible effects of the shock of the pandemic linked to Covid-19 on the situation of excess liquidity in CEMAC.

2. Potential transmission channels of the effect of COVID-19 on the CEMAC banking sector

In general, economists agree that in CEMAC, excess liquidity has had two sources depending on the period. From 1995 to 1999, government deposits were the main source of excess liquidity. However, from 2000 to 2008, excess liquidity was fueled by income from the surge in oil prices on the international market(Calvin, 2008; Danielson and Scott, 2004). Nevertheless, it is possible to cite a probable third source associated with the 2020s: the COVID-19 health crisis. Indeed, despite the current context, the prospects for exits or post-COVID-19 economic recovery propose, given the excess liquidity, the promotion of financial inclusion, access to credit, and support through financing for the private sector (AfDB, 2021)[1]. The pandemic has negatively affected many companies, preventing them from meeting their commitments (Onomo 2021). Indeed, while the rate of non-performing loans in the zone stood at 22.2% at the end of December 2019, it stood at 21.8% at March 31, 2021, to peak in June 2020 (24.1%). This situation has reinforced banks' risk aversion towards them. Consequence: in the midst of a health crisis, where companies are struggling to access financing, banks are in excess of liquidity. The graph below provides an illustration.

Chart 1: Contribution of the economic shock linked to COVID-19 on bank excess liquidity in CEMAC



Source: Authors

The crisis forced the BEAC to overhaul its interventions on the money market. Indeed, it was forced to suspend its liquidity withdrawal operations initiated at the start of 2020 in favor of injections. According to Bacale (2021), the main risk here lies in the pursuit of a durably expansionary monetary policy in an overliquid system. This excess bank liquidity, combined with the lack of credit in the midst of post-crisis recovery, shows, among other things, that banks do not have confidence in borrowers in CEMAC. This lack of confidence reflects the state of information asymmetry that prevails in the credit market in the sub-region. However, in such circumstances, the sharing of reliable information on debtors is a panacea to the pangs of information asymmetry.(Stiglitz and Weiss, 1981; Pagano and Jappelli, 1993).

[1]Report available on the linkhttps://www.webmanagercenter.com/2021/07/02/470047/la-bad-approve-le-project-dsupport-au-secteur-financier-de-la-cemac/

Unfortunately, the size of the informal sector and the absence of an operational private credit registry in CEMAC are factors that will accentuate the effects of the crisis on information asymmetry. Ultimately, with an impact on excess liquidity.

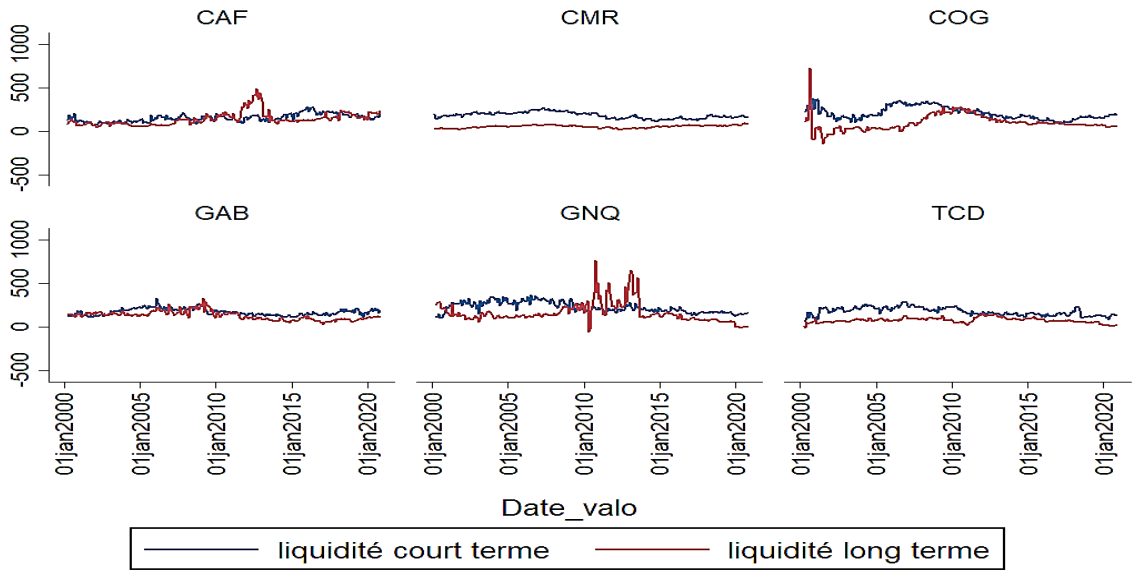
Chart 2:link between information asymmetry and excess liquidity

Source: Authors

Indeed, the low coverage rate of public information-sharing structures in CEMAC and the absence of private ones would have contributed to accentuating credit risk during the COVID-19 pandemic. (Triki and Gajigo, 2012; World Bank, 2020).

The structure of the banking sector is no exception. The dominance of short-term liquidity affects the economy's finance over the long term.

Chart 3: Evolution of short-term vs. long-term liquidity until the start of Covid-19



Source: Authors based on BEAC data

The graph above shows the dominance of short-term liquidity over long-term liquidity in CEMAC. In addition, at the dawn of the health crisis, it is possible to generally observe a decline in long-term liquidity. This suggests that it is possible that the health crisis has had an effect on liquidity depending on its nature.

This study aims to explain one of the main transmission channels of the crisis to the sub-regional financial system and to draw implications for economic policy.

The central hypothesis of this study is the following: the shock generated by the COVID-19 pandemic on the economy of the sub-region would have contributed to the situation of excess liquidity.

3. Methodological approach

In order to appreciate the impact of the COVID-19 pandemic on the financial system in CEMAC, we will estimate an autoregressive model. Given the combination with the arranged

data and the information known a priori on the behavior of the excess liquidity variables studied, the structural equation model will be estimated by the Bayesian approach (BVAR), considering the empirical approach of Ghenimi et al., (2018). The choice of a priori information will be made thanks to the Minestosa prior, due to the homogeneity of monetary policy decisions and the simultaneity of the adoption of measures relating to the COVID-19 pandemic in CEMAC. Under the random shocks approach, the classical VAR specification model can be defined as follows:

$$e_t = A_0^{-1}\varepsilon_t \,(1)$$

Ao is the residual matrix of the reduced form of the specification. With and the residual vector. In matrix and reduced form the equation becomes:

$$e_t \cong \begin{pmatrix} e_t^{Drlb} \\ e_t^{Dpcr\_npl} \\ e_t^{Dcredit} \\ e_t^{Dequity} \\ e_t^{Ddépôt} \\ e_t^{Dcovid} \end{pmatrix} = A_0^{-1} \begin{pmatrix} \varepsilon_t^{Drlb} \\ \varepsilon_t^{Dpcr\_npl} \\ \varepsilon_t^{Dcredit} \\ \varepsilon_t^{Dequity} \\ \varepsilon_t^{Ddépôt} \\ \varepsilon_t^{Dcovid} \end{pmatrix} (2)$$

The central assumption of the VAR estimate and of this specification is based on the endogenous nature of the variables taken into account. Contrary to the classic VAR estimation, the choice of the Bayesian estimation lies in the distribution of the parameters assumed to be proportional to their likelihoods. In the dynamics of Ganics and Odendahl (2019), the BVAR model can be specified as follows:

$$y_t = B_o + \sum_{i=1}^{p} B_i y_{t-i} + A^{-1}\sum_{t}^{\frac{1}{2}} e_t \;\; (3)$$

$$\sum t \equiv diag(\sigma_{1,t}^2, ..., \sigma_{k,t}^2) \;\; (4)$$

$$\log \sigma_{k,t}^2 = \log(\sigma_{k,t-1}^2) + \eta_{k,t} \;\; (5) \text{ for k=1,……, K}$$

Stochastic volatility is taken into account, which significantly improves the density forecasts of the BVAR model. By integrating the operator dig (.) we generate the variance-covariance matrix according to the law $N(\mu, \phi)$. As part of this work, we assume an a posteriori distribution of the parameters to be estimated according to Bayes' theorem:

$$f(\Phi, \Omega | Y_t) = \frac{F(Y_t | \Phi, \Omega) \times \mathrm{P}(\Phi, \Omega)}{F(\mathrm{Y}_t)} (6)$$

Formally, the parameters are determined from the following specification:

$$y_t = B_o + \sum_{i=1}^{p} B_i y_{t-i} + \varepsilon_t \;\; (7)$$

With Zt the format vector [(np+1)*1] of endogenous variables containing the constant term. Indeed, the endogenous variables considered are made up of Cap_Per, Covid, info_share Couverture_Des_Risques_, Doubtful_Creations, Liquidity_Long, Liquidity_Court, Funds_Propres, Deposits, Credit_Brut, Creances_Souff[1].

[1]In the first part of the analysis, the sharing of information (info_share) will be taken into account to the detriment of the consideration of the severity variable of COVID.

In matrix form, the equation becomes:

$Y_t = \Phi' Z_t + \varepsilon_t$ (8)

With unknown parameters defined by:

$$Z_t \equiv \begin{pmatrix} 1 \\ y_{t-1} \\ y_{t-2} \\ ..... \\ y_{t-p} \end{pmatrix} \text{ and } \Phi \equiv \begin{pmatrix} c \\ \beta_1 \\ \beta_1 \\ .... \\ \beta_p \end{pmatrix} \quad (9)$$

$\Omega \equiv E(e_t e'_t)$ denotes the variance-covariance matrix of the residuals of the model. $F(\Phi, \Omega | Y_t)$ and $P(\Phi, \Omega)$ are respectively the likelihood of the model and the assumed a priori distribution of the probabilities of the parameters to be estimated. Indeed, this distribution of probabilities is conditioned by a priori information made on the model. With $F(Y_t)$ data density or marginal likelihood.

We will use the Minnesota prior to integrate the a priori information on the stationarity or not of the variables of the model (Ganics and Odendahl, 2019) and on the autoregressive characteristic of order greater than or equal to 1 of the variables(Bikai and Essiane, 2017). The choice of the Minnesota prior in the context of this study takes into account the rate of spread or severity of the pandemic assumed to be non-stationary due to the often heterogeneous effects of the restrictions. The priors of SIMS and ZHA cannot be chosen since the stationarity or not of the variables can in some way create the absence of cointegration at the same order of the variables of the model. The values of the vector of the hyperparameter of the residuals of the Minnesota prior expressing a certain belief in the behaviors of the variables, are defined as such that $\lambda_1 = 0,1;\ \lambda_2 = 0,99;\ \lambda_3 = 1;\ \lambda_4 = 100$.

In order to test the robustness of the results obtained using the Minnesota priors, we will use the cointegration test. The model which will be used as a basis for this test by the staggered delays will be the ARDL specification; the one to be estimated will be the error correction model or a VECM in the case of different orders of stationarity and cointegration of the variables.

4. Results

4.1.Descriptive statistics

Table 2 (see appendix) of the descriptive statistics shows that, out of the total of 1488 observations, permanent capital covers on average 12.5% of the total balance sheet of banks. The equity risk coverage ratio averaged 13.16 points with a minimum of 58.5 points. Doubtful debts, equity, deposits, gross credits and non-performing debts constitute respectively on average 0.7%, 12.8%, 74.17%, 57% and 0.9% of the total balance sheet. The banks' long- and short-term transformation capacity remains significant. They reach 109 points (for long-term liquidity) and 186 points (short-term liquidity). The COVID severity index has a very high average (97.22) and a low of 27.78. The most affected countries are Congo and Chad.

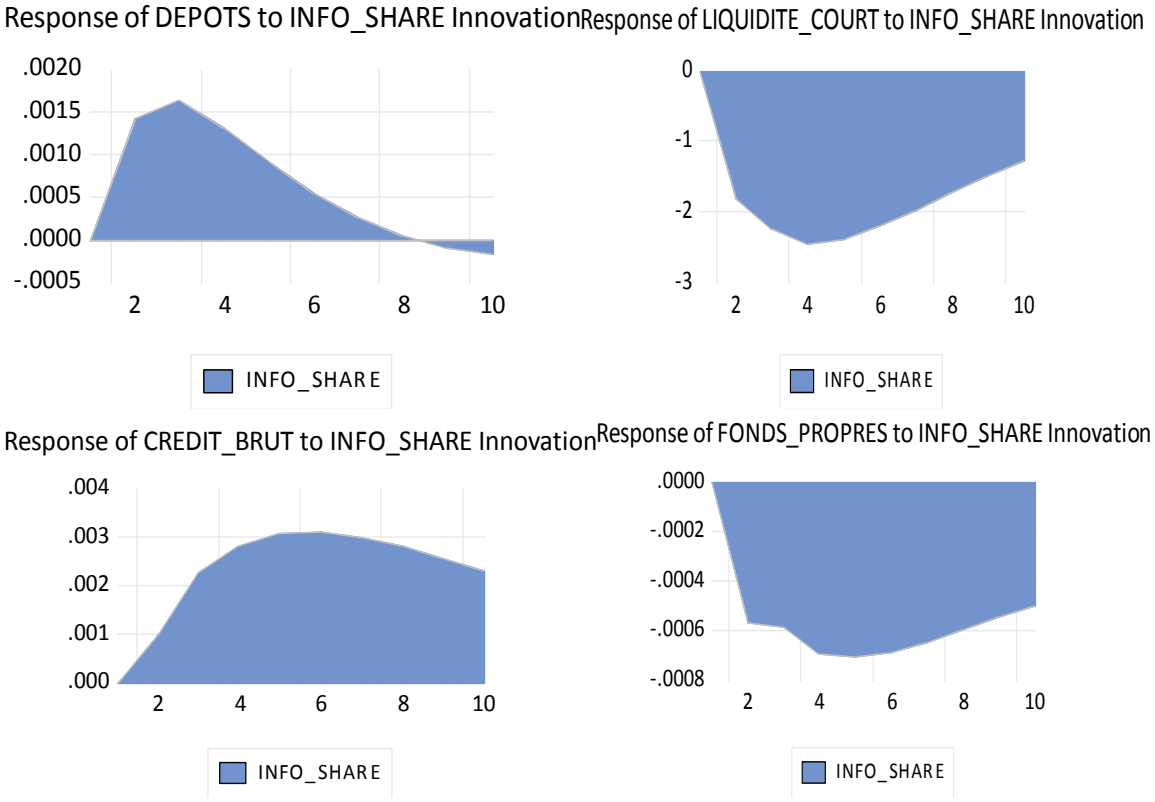
4.2.Impulse responses following shocks on information sharing

The first results of impulse shocks cover the period before COVID. The objective is to show the contribution of sharing information on the liquidity situation in CEMAC before the pandemic. Two situations can be observed.

First, the positive shock on information sharing similarly leads to an increase in customer deposits causing an increase in gross credit to the economy. Thus, the sharing of information influences excess liquidity over the long term by dissipating the asymmetry of information that pushed banks to ration the supply of credit. Information sharing can lead to reducing excess liquidity before the pandemic in the long run.

Secondly, in the sense of Saxegaard (2006), the reliability of shared information can constitute an element likely to lead to credit rationing. Indeed, it appears from Figure 1 that the positive shock on information sharing negatively affects short-term liquidity and bank equity. In a competitive market trend the information shared is weak and less reliable; therefore, the asymmetry increases and banks ration their credit supply (Pagano and Jappelli, 1993; Jappelli and Pagano, 2002; Djankov, McLiesh, and Shleifer, 2007).

Chart 3: impulse responses following shocks on information sharing



Source: Authors

4.3.Impulse responses following shocks on the severity of COVID-19

The results are primarily content to identify the shocks orchestrated by the pandemic on the behavior of banks. These behaviors include the ability of the latter to convert deposits and offer them in the form of short and long credit; capital adjustments for risk coverage; management of doubtful and overdue debts.

In order to manage the concern for the endogeneity of the variables, the imposition of the constraints of the shocks make it possible to give an economic meaning to the identified shock. Thus, rationally the pandemic is supposed to impact financial indicators, so the converse is false. To do this, we identify and classify the shocks of the pandemic under two (2) criteria: shocks on banking activity and those on adjustments in prudential behavior.

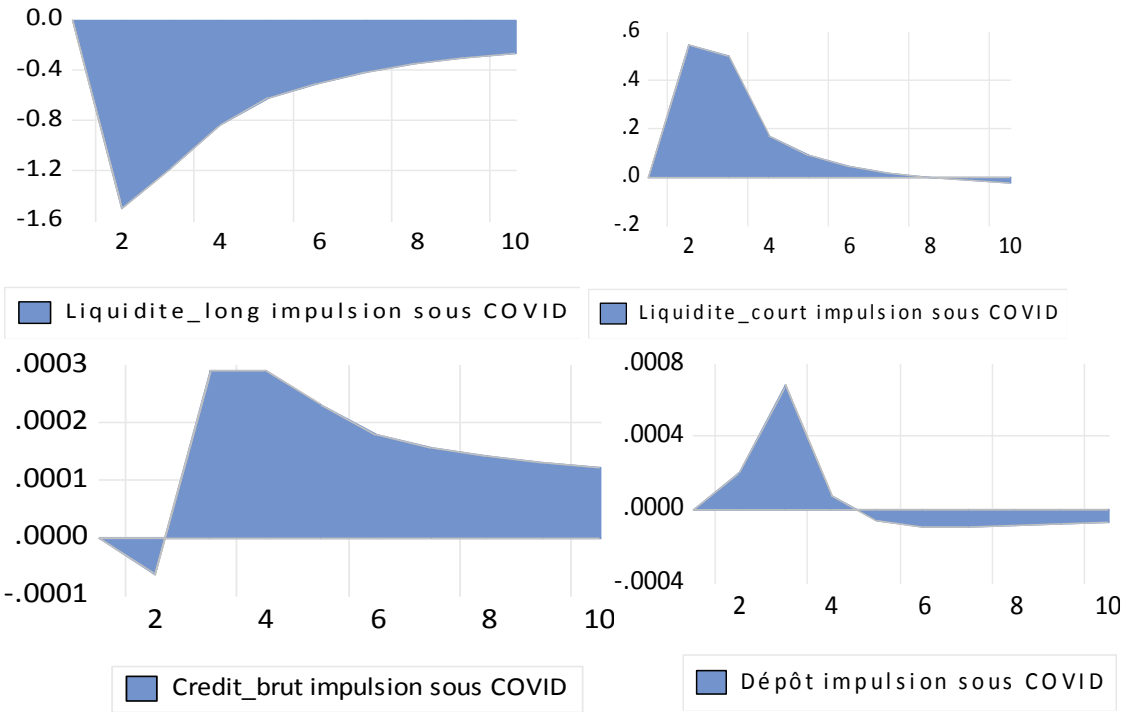
- **Shocks on the severity of COVID-19 and the effects on banking activity**

By distinguishing banks by category, depending on whether they are public banks, small or large banks Demirgüç-Kunt et al. (2021), it is concluded that the latter have largely suffered from the decline in their yields under COVID-19. In addition, it has been shown that the assistance in strengthening liquidity on the market made it possible to bear the said effects: in other words, they guaranteed the banks' rents.

The case of the CEMAC countries matched through the graphs below makes it possible to identify trends of substitutability between the processing capacities of short and long-term credits. The results show that a 1% increase in the severity of the COVID-19 pandemic simultaneously affects (short term) the ability of banks to transform deposits into long-term credit. In return for this trend, there is a positive effect on the first three (3) months following the shock of the pandemic on short-term liquidity. The economic recession due to the health decisions adopted to limit the spread of the pandemic has led banks to convert more to short-term domestic credit offers than to those of investment credits (or other long-term credits) .

Unlike Pagano and Jappelli (1993) and Mamatzakis and Kalyvas (2017) who, according to them, the excess liquidity of banks is linked to information asymmetries, the current case forces this conclusion to be put into perspective. It can thus be noted that the pandemic has contributed to the reduction of the excess liquidity of CEMAC banks via the facilitation of access to credit (short-term liquidity). This situation can be explained by the BEAC's decision to no longer reconnect with the liquidity drains adopted in early 2020 (BEAC, 2021).

Chart 4:impulse responses to COVID-19 shocks



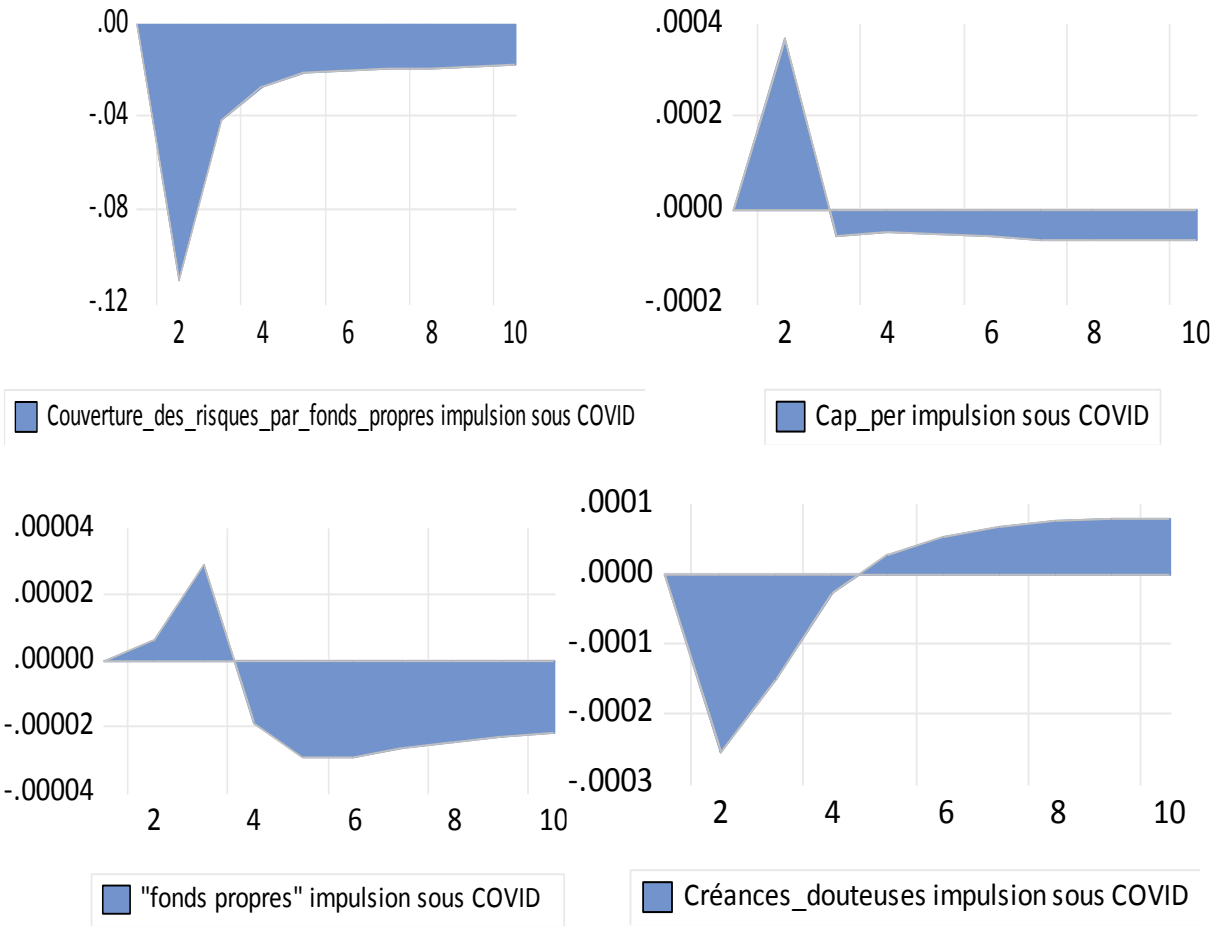
Sources: Authors

In the short term, an increase in the severity of the COVID-19 pandemic is reflected at the overall level of the sub-region by a decline in domestic credit and an increase in bank deposits. The effect of the shock on credits is only observable at the beginning of the months of 2020. In addition, from the 3rd month the banks in a certain way terminate their activity consisting in responding somehow to requests loanable funds. This trend is maintained despite the severity of the pandemic and the drop in medium-term deposits. The contribution of banks in this circumstance should make it possible, according to Andrianarison and Nguem (2020), to compensate for the declines and losses in household income; the difficulties of companies in

being able to honor their obligations with regard to the tax authorities in view of the drop in demand. From the 1st to the 3rd month of 2020 (in the short term), the shock orchestrated by the pandemic on the economies generally led to a steady increase in bank deposits. The impact of the increase in the severity of the pandemic orchestrating a slowdown in economic activities in the medium term (from the 4th month) is reflected in a drop in deposits.

In developed economies and more particularly those considered in the studies by Demirgüç-Kunt et al. (2021), interventionist policies, in order to support the effects of COVID-19, focused on borrower assistance (facilities), monetary policies, liquidity support and prudential measures. Regarding prudential measures, CEMAC banks were largely exposed.

Chart 5: Shock on prudential indicators



Source: Author

The result of a decrease of at least 0.11% in the risk coverage ratio by equity for the first two months would be the result of a 1% increase in the severity rate of COVID-19. In fact, two scenarios are possible. First, an increase in customer risk prompted by the economic downturn (or pandemic). Secondly, a not insignificant drop in equity, resulting from the drop in deposits mentioned above from the 3rd month. Periods of economic recession are a priori materialized by a strong procyclicality of bank equity or regulatory capital (Pessarossi and Weill, 2015). Indeed, in a period of economic recession correlated with an upsurge in default risks,

The risky situation of the financial system explained by the high level of bad and non-performing loans (BEAC, 2016) could not improve under COVID-19. Similarly, in relation to the pandemic context, we can more particularly index the health containment policies and

border closures explaining the decline in equity, resulting from the ensuing recession. This drop in equity is observable from the 4th month, combined with an upsurge in bad debts.

The existence of short- and long-term cointegration relationships between the variables makes it possible to reconfirm the previous results obtained from the error-correction model (in the appendices). Indeed, it thus appears that in the long term, the persistence of the COVID 19 pandemic will have a significant effect on the short-term and long-term liquidity of CEMAC banks. However, the restoring force coefficient (appendix) shows that the imbalance between the desired level of liquidity and the actual level can be adjusted up to 38%.

4.4.Classical and historical variance decompositions

The analysis of the classic decomposition of the variance makes it possible to confirm three essential scenarios of the behavior of financial activity during the period of COVID-19 in the CEMAC zone. It thus appears that the shock of the pandemic seems to influence more particularly short-term liquidity, gross loans and bank equity. Over the first ten (10) months, the shock of the pandemic explains at least 10% of the variation in gross loans in CEMAC. The share of the contribution of COVID-19 in the variances of equity and the ability of banks to transform deposits into short-term credit despite its weakness estimated at 5% reconfirms the effects highlighted above.

The historical decomposition of the variance shows that the shocks on the severity of the pandemic appear more on the supply of gross credits to the economy and the level of bank capital in the sub-region. While banks are trying to maintain the level of gross credit to the economy over the first ten months of 2020, equity has experienced a decline sustained by the decrease in deposits (due itself to the economic slowdown). In general, the figures (cf annex 4) reveal that banking activities in CEMAC have been more affected by COVID-19 from the ninth (9) of 2020.

Conclusion

The objective of this study is to assess the contribution of COVID-19 to the situation of excess liquidity in the CEMAC zone. Assuming that the situation of excess liquidity would be due to the low sharing of information on credit registers, we empirically highlighted this situation before confirming the case of the effects of COVID. The results are obtained using Bayesian estimates of VAR models on monthly data on banks from 2000 to 2020. It appears that the shock caused by the COVID-19 pandemic on the economy of the sub-region has the over-liquidity situation. The pandemic has helped promote the reduction of short-term bank excess liquidity. In the same way, the severity of the COVID-19 pandemic led to a drop in risk hedging capital and an increase in bank deposits. The main recommendations consist of reducing the climate of information asymmetry by encouraging the implementation of credit registers and establishing policies to help borrowers.

Bibliographic references

Acharya, V., and S. Steffen. "The risk of being a fallen angel and the corporate dash for cash in the midst of COVID." *Rev. Corp. Finance Stud* 10 (2020): 430–471.

Andrianarison, Francis, and Blaise Ehowe Nguem. "Effets socioéconomiques potentiels du COVID- 19 au Cameroun : une évaluation sommaire." *Rapport PNUD*, 2020.

Avom, Désiré, and Ekomo Sylvie Marie-Louise Eyeffa. "Quinze ans de restructuration bancaire dans la CEMAC : qu'avons-nous appris ?" *Revue d'économie financière*, no. 89 (2007): 183-205.

Bacale, Ivan. "La politique monétaire de la BEAC à l'épreuve de la crise : Quelques risques à relever." *BEAC Lettre de la Recherche*, 2021.

Banque Mondiale. "Doing Business." Washington, 2020.

BEAC. *Lettre de Recherche, 2e semestre.* Yaoundé: BEAC, 2021.

BEAC. *Situation du système bancaire de la CEMAC au 31 Décembre 2016.* Yaoundé: Banque des Etats de l'Afrique Centrale (BEAC), 2016.

Bikaï, J. Landry, and Patrick-Nelson Daniel Essiane. "Politique monétaire, stabilité monétaire et croissance économique dans la CEMAC : une approche SVAR bayésienne." *BEAC Working Paper, N° 08/17*, 2017.

Borio, C. "The Prudential Response to the COVID-19 Crisis." *Bank of International Settlements*, 2020.

Calvin, A. "Surliquidité des banques dans la CEMAC et rationnement du crédit aux PME : que faire face à ce paradoxe ?" Ngaoundéré: BEAC - Université de Ngaoundéré, 2008.

Claessens, S., G. Dell'AAriccia, and L. Laevens . "Lessons and policy implication we have learnt from the global financial crisis." *economic policy fiftiefth panel meeting, University Van Tilburg*, October 2009: 23-24.

Danielson, M.G., and J.A. Scott. "Bank Loan Availability and Trade Credit Demand." *The Financial Review* 39 (2004): 579-600.

Demirgüç-Kunt, Asli, Alvaro Pedraza, and Claudia Ruiz-Ortega. "Banking sector performance during the COVID-19 crisis." *Journal of Banking and Finance, 133*, 2021.

Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer. "Private credit in 129 countries." *Journal of Financial Economics* 84 (2007): 299–329.

Doumbia, Soumaila. "Surliquidité bancaire et « sous financement de l'économie » une analyse du paradoxe de l'UEMOA »." *revue tiers monde*, no. 205 (2011): 151-170.

Ganics, Gergely, and Florens Odendahl. "Bayesian VAR Forecasts, Survey Information and Structural Change in the Euro Area." *Banque de France, Working paper N° 733*, 2019.

Ghenimi, Ameni, and Mohamed Ali Brahim Omri. "Les déterminants du risque de liquidité dans les banques islamiques : cas de la région MENA." Edited by Elsevier. *La Revue Gestion et Organisation* 10 (2018): 127-136.

Gormsen, Niels Joachim, and Ralph S. J. Koijen. "Coronavirus: Impact on Stock Prices and Growth Expectations." *Becker Friedman Institute for Economics Working Paper* 22 (2020).

Jappelli, Tullio, and Marco Pagano. "Information sharing, lending and defaults: Cross-country evidence." *Journal of Banking & Finance* 26 (2002): 2017–2045.

Landier, Augustin, and David, Thesmar. "Earnings Expectations in the COVID Crisis." *HEC Paris Research Paper*, no. 1377 (2020).

Nzomo, Joseph, and Dany Dombou. "Stock markets, volatility and economic growth: evidence from Cameroon, Ivory Coast and Nigeria." *Panorama Economico* 12, no. 24 (2017): 145-175.

Onomo, Julie. "Les prêts non performants, indicateurs de stabilité financière en zone CEMAC." In *Lettre de la Recherche de la BEAC*, by BEAC, 11-13. 2021.

Ouédraogo, Salifou. *Impact de la réglementation bancaire sur le comportement des banques de l'Union Economique et Monétaire Ouest Africaine (UEMOA).* Burkina Faso: Thèse de Doctorat, Université Ouaga II, 2014.

Pagano, Marco, and Tullio Jappelli. "Information Sharing in Credit Markets." *The Journal of finance* XLVIII, no. 5 (1993).

Pessarossi, Pierre, and Laurent Weill. "Les exigences de fonds propres influencent-elles l'efficience des banques? leçon d'une expérience naturelle en Chine." *revue économique, Vol 66, No. 3, Risque systémique et politiques*, 2015: 505-520.

Ramelli, Stefano, and Alexander F. Wagner. "Feverish Stock Price Reactions to COVID-19." *Review of Corporate Finance Studies* 9, no. 3 (2020): 622–655.

Saxegaard, M. "Excess Liquidity and Effectiveness of Monetary Policy: Evidence from Sub-Saharan Africa." Edited by FMI. *IMF Working Paper*, no. WP/06/115 (2006).

Stiglitz, J, and A Weiss. "Credit Rationing in Markets With Imperfect information." *The American Economic Review* 71, no. 3 (1981): 393-410.

Triki, Thouraya, and Ousman Gajigo. "Credit Bureaus and Registries and Access to Finance: New Evidence from 42 African Countries." *African Development Bank Working Paper Series*, no. 154 (2012).

Valla, N., B. Saes-Escorbiac, and M. Tiesset. "Liquidité bancaire et stabilité financière." *Revue de la stabilité financière* (Banque de France), no. 9 (2006): 93-110.

Appendices

Appendix 1: The following table shows the expected results and signs.

Variable	Definition	Source	expected sign
Cap_Per	Ratio of permanent capital to the bank's total balance sheet	BEAC	-/+
Covid	Monthly index of the severity of COVID 19. This index is calculated from the consideration of several indicators, namely: cases of infection, total deaths due to COVID, total number of vaccinated, density of population, GDP per capita, etc.	Stringency Index (SI) available at https://ourworldindata.org/covid-stringency-index	+
Coverage_of_Risks_P	Ratio of banks' net equity to risk-weighted assets	BEAC	-/+
Doubtful debts	Ratio between bad debts and total balance sheet of the bank	BEAC	-/+
Liquidity_Long	Ratio between customer deposits and total balance sheet of the bank	BEAC	-/+
Liquidity_Short	Short-term liquidity ratio which makes it possible to assess the liquidity situation at 30 Days	BEAC	-/+
Equity_Funds	Bank equity as a percentage of total Bank balance sheet	BEAC	-/+
Deposits	Deposit of bank i compared to the total balance sheet of the bank	BEAC	-/+
Credit_Gross	The amount of credit granted to the private sector compared to the balance sheet total	BEAC	-/+
Claims_Souff	Non-performing receivables as a percentage of the bank's total balance sheet	BEAC	-/+
info_share	Sharing of information captured by the Coverage rate of public credit registers.	Doing Business	-/+

Source: authors

Annex 2: Table of descriptive statistics of the data

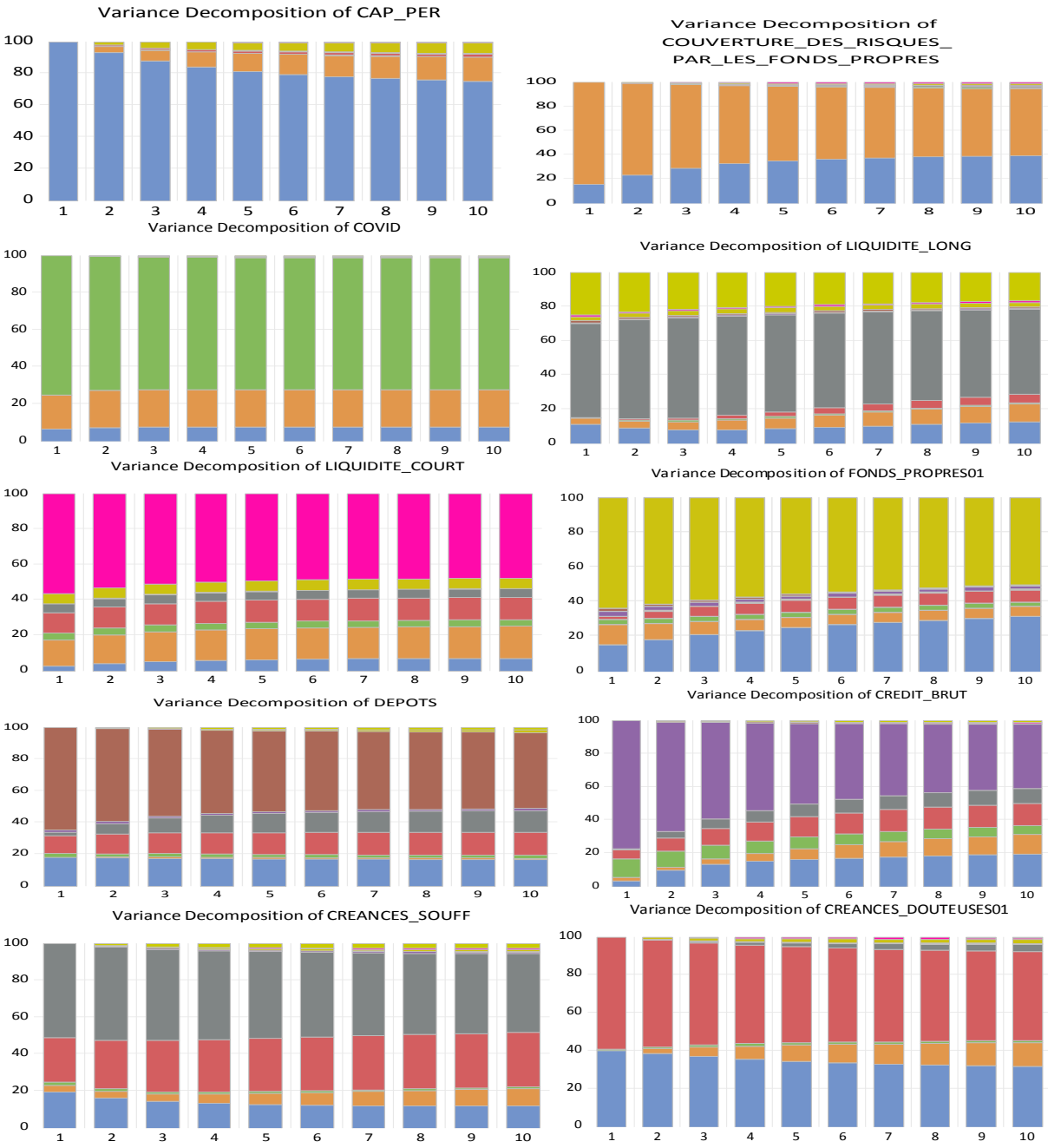
	Average	Max	Minimum	Standard. Dev.	Obs
Cap_Per	0.125	0.259	0.018	0.045	1488

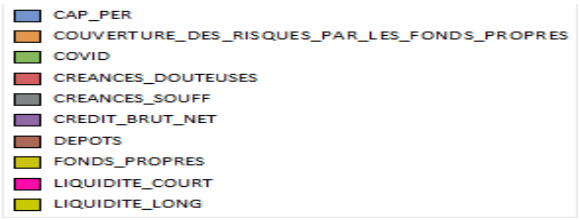
covid	64.31	97.22	27.78	15.43	40
Hedge_risks_fp	13.16	43.03	-58.47	8.04	1488
Doubtful debts	0.07440	0.3707	-7.29E-05	0.0645	1488
Liquidity_Long	109.27	761.73	-144.29	80.720	1488
Liquidity_Short	186.34	375.55	64.32	56.51	1488
Equity_Funds	0.128	0.285	0.018	0.047	1488
Deposits	0.7417	0.9087	0.2406	0.0876	1488
Credit_Gross	0.576	1.135	0.101	0.169	1488
Claims_Souff	0.097	0.402	0.000	0.078	1488
info_share	8.106	53.80	0.00	12.56	94

Source: authors

Appendix 3: Classical and historical decompositions of the variance

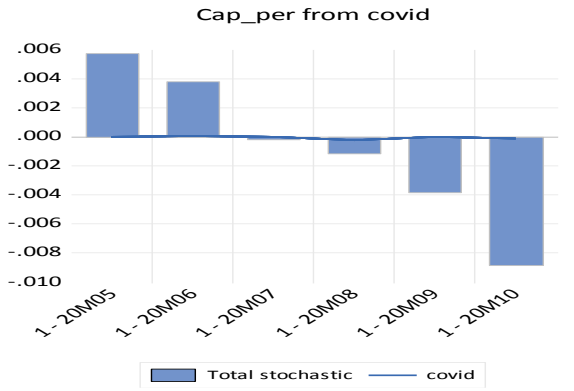
- ***Classic decomposition***

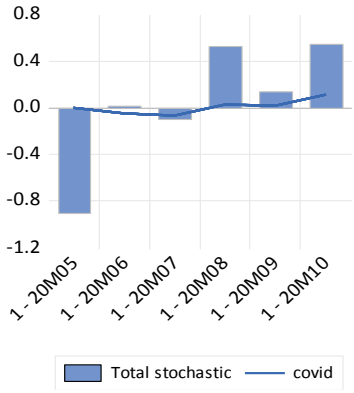


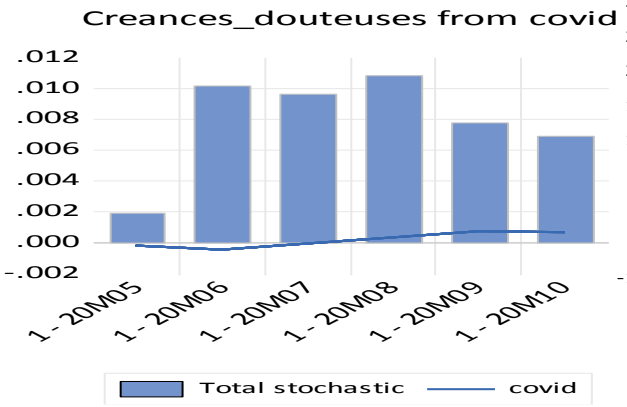


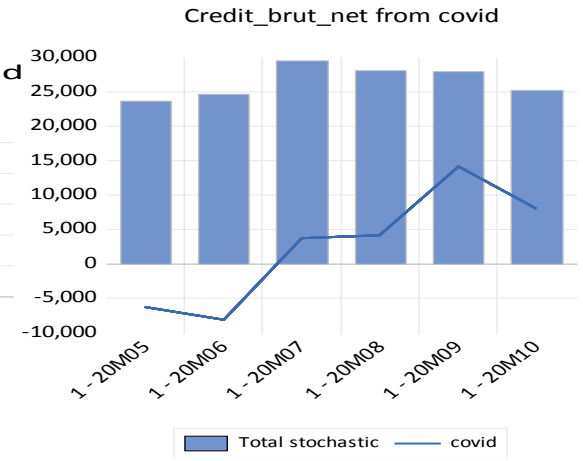
- ***Historical variance decomposition***

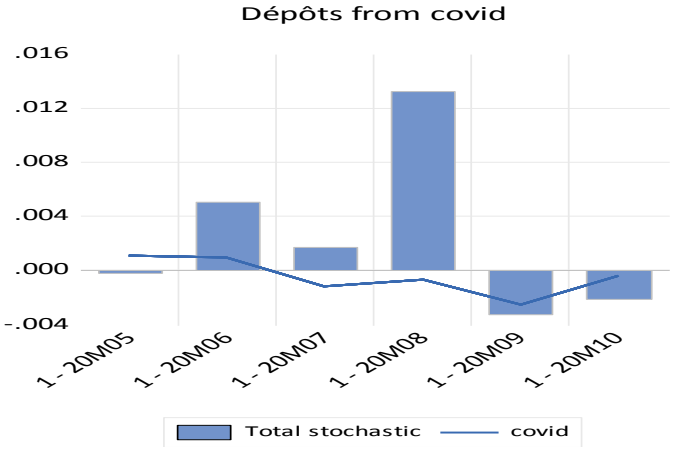
Couverture des risques par les fonds propres from covid

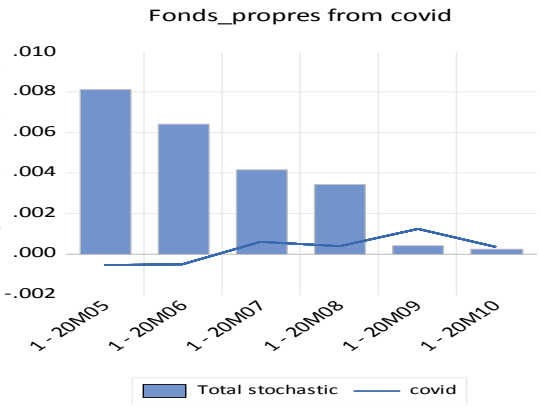


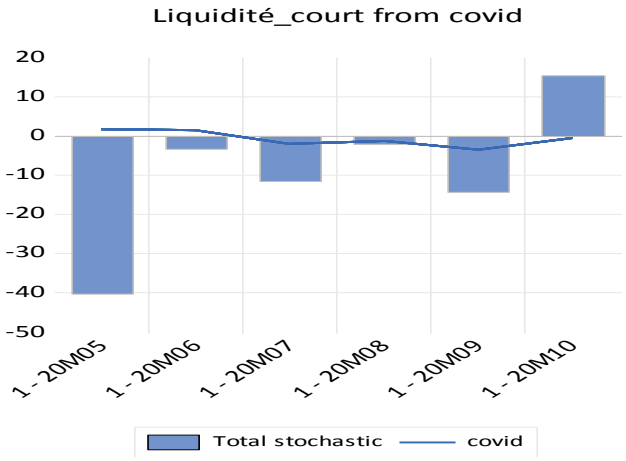


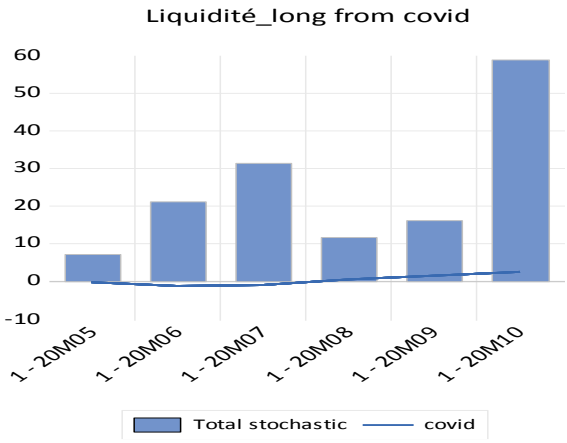












Stationarity tests:

variable	Level		First difference		stationarity
	ADF	Phillippe-Perron/PP	ADF	Phillippe-Perron/PP	
Cap_per	20.15 (0.06)				I(0)
Covid		34,016 (0.00)			I(0)
Hedge_risks_fp	19.68 (0.07)				I(0)
Doubtful debts	5.29 (0.94)		286.47 (0.00)		I(1)
Liquidity_Long	26.63 (0.00)				I(0)
Liquidity_Short	20.23 (0.06)				I(0)
Equity_Funds	28.71 (0.00)				I(0)
Deposits	38.37 (0.00)				I(0)
Credit_Gross	19.10 (0.08)				I(0)
Claims_Souff	3.87 (0.98)		274.05 (0.00)		I(1)
info_share	2.21 (0.99)		123.36 (0.00)		I(1)

VAR Lag Order Selection Criteria
Endogenous variables: LIQUIDITE_COURT LIQUIDITE_LONG INFO_SHARE CAP_...
Exogenous variables: C
Date: 03/29/22 Time: 19:37
Sample: 2000M02 2020M10
Included observations: 1476

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-11108.40	NA	1.65e-06	15.06558	15.10147	15.07896
1	6990.714	35928.45	4.23e-17	-9.323461	-8.928692*	-9.176277
2	7315.297	639.9284*	3.12e-17*	-9.627773*	-8.874122	-9.346784*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Cointegration test

Date: 03/29/22 Time: 21:21
Sample (adjusted): 2000M05 2020M10
Included observations: 1470 after adjustments
Trend assumption: Linear deterministic trend
Series: LIQUIDITE_COURT LIQUIDITE_LONG COVID CAP_PER COUVERTURE_DES_RISQUES_PAR_LES_FONDS_PROPRES CREANCES_DOUTEUSES01 CREANCES_SOUFF CREDIT_BRUT...
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.109337	546.2438	285.1425	0.0000
At most 1 *	0.066017	376.0342	239.2354	0.0000
At most 2 *	0.050798	275.6383	197.3709	0.0000
At most 3 *	0.042226	199.0019	159.5297	0.0001
At most 4 *	0.035139	135.5808	125.6154	0.0107
At most 5	0.025967	82.99754	95.75366	0.2715

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.109337	170.2095	70.53513	0.0000
At most 1 *	0.066017	100.3960	64.50472	0.0000
At most 2 *	0.050798	76.63643	58.43354	0.0004
At most 3 *	0.042226	63.42108	52.36261	0.0026
At most 4 *	0.035139	52.58323	46.23142	0.0093
At most 5	0.025967	38.67535	40.07757	0.0713

Normalized results of cointegration

1 Cointegrating Equation(s): Log likelihood 3770.425

Normalized cointegrating coefficients (standard error in parentheses)

LIQUIDITE_...	LIQUIDITE_L...	COVID	CAP_PER	COUVERTU...	D(CREANCE...	D(CREANCE...	CREDIT_BRUT	DEPOTS	FONDS_PR...	D(INFO_SHARE)
1.000000	0.476874	9.074634	-1717.105	-14.92918	-333528.2	329429.7	0.349131	411.2528	3338.201	177.4624
	(0.59812)	(4.28659)	(3381.99)	(7.37571)	(15779.7)	(12227.9)	(330.266)	(648.617)	(3148.22)	(34.6229)

Annex reminder:

Error Correction:	D(LIQUIDIT...	D(LIQUIDIT...	D(COVID)	D(CAP_PER)	D(COUVER...	D(CREANC...	D(CREANC...	D(CREDIT ...	D(DEPOTS)	D(FONDS ...	D(INFO_SH...
CointEq1	0.000446	0.000582	-0.000270	4.56E-07	-2.61E-05	4.71E-07	-3.74E-06	9.20E-07	-2.08E-07	3.37E-07	-0.000169
	(0.00057)	(0.00104)	(8.6E-05)	(2.3E-07)	(6.3E-05)	(1.9E-07)	(2.5E-07)	(8.6E-07)	(6.2E-07)	(2.2E-07)	(5.7E-05)
	[0.77967]	[0.55826]	[-3.14359]	[1.97008]	[-0.41729]	[2.44362]	[-14.9193]	[1.06438]	[-0.33694]	[1.53079]	[-2.97864]
D(LIQUIDITE_COURT(-1))	-0.389636	-0.129436	-0.003095	-6.94E-06	-0.010866	-8.60E-06	9.30E-06	6.01E-05	-9.30E-06	2.22E-06	0.001029
	(0.03054)	(0.05574)	(0.00460)	(1.2E-05)	(0.00335)	(1.0E-05)	(1.3E-05)	(4.6E-05)	(3.3E-05)	(1.2E-05)	(0.00304)
	[-12.7562]	[-2.32220]	[-0.67316]	[-0.56088]	[-3.24542]	[-0.83509]	[0.69405]	[1.30011]	[-0.28237]	[0.18855]	[0.33865]
D(LIQUIDITE_COURT(-2))	-0.180214	0.174108	0.003048	-4.31E-06	0.000182	-2.14E-05	-2.43E-05	-5.51E-05	3.85E-05	-7.99E-06	-0.000449
	(0.03072)	(0.05605)	(0.00462)	(1.2E-05)	(0.00337)	(1.0E-05)	(1.3E-05)	(4.6E-05)	(3.3E-05)	(1.2E-05)	(0.00306)
	[-5.86721]	[3.10632]	[0.65926]	[-0.34627]	[0.05393]	[-2.06248]	[-1.79988]	[-1.18549]	[1.16144]	[-0.67464]	[-0.14702]