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The moderating effect of digitalization on the collapse of bank performance during the COVID-19 pandemic: The case of GCC banks

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Abstract

This paper focuses on the moderating impact of digitalization on the performance breakdown of the GCC banking sector during the outbreak of COVID-19. We observe 57 banks in Saudi Arabia, Kuwait, the UAE, Bahrain, Qatar, and Jordan during the period from 2004 to 2020. We use the fixed effect model, the random effect model, and the Hausman test to adopt the most suitable model for the sample study. We regress the return on assets on CAMEL variables measuring bank soundness and a dummy variable proxying the outbreak period. We test the moderating effects of efficiency, growth, and digitalization using cross-variables. Our findings show that bank performance in GCC countries depends significantly on capital adequacy and efficiency. Furthermore, we find evidence that the pandemic has decreased bank performance. This detrimental effect is moderated by the degree of digitalization, investment growth, and bank efficiency. Our findings should help policymakers assess feedback on their investment agendas, specifically their commitment to enhancing economic growth and resilience through the promotion of digitalization. These implications for this specific case study of GCC countries would also be beneficial not only for other emerging economies in Asia but beyond the Asian continent.

Keywords: Bank performance, Digitalization, Efficiency, Investment, Pandemic.

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1. Introduction

The pandemic COVID-19 severely impacted transportation, health care, the economy, and other industries. As a consequence of the confinement policy, population mobility fell dramatically, resulting in reduced spending power and a stagnant economy. At the global level, the COVID-19 outbreak triggered a sharp economic downturn. Many countries experienced severe corporate business failures and mass unemployment [1]. At the firm level, the outbreak had an impact on

the stock market [2-4] as well as firm and bank performance [1, 5, 6]. However, this detrimental impact has fueled a rise in financial technology [7]. Indeed, it offered unique opportunities and provided incredible challenges by transforming the competition ground towards embracing digital technologies. The COVID-19 outbreak has shifted from an accidental endurance test into a powerful catalyst for society's digitalization. Therefore, because of quarantine measures, households and firms used cashless transactions to pay for a large portion of purchases. As a result, banned physical trading and finance have shifted to online platforms. This innovative solution offered a costless and harmless way to overcome mobility and contact restrictions as money is electronically transferred. Many authors demonstrated the pandemic's negative impact on the banking system of developed countries [6, 8-11]. They did not, however, investigate the moderating effect of digitalization on bank failure in emerging markets. Furthermore, studies dealing with emerging countries are scarce. Regarding the specific case of the GCC countries, governments have set digital transformation at the center of their social and economic development strategies. Indeed, they have launched many important digital initiatives as a core component of their future investment plans. During the pandemic, they were constrained to act rapidly to secure the livelihoods and health of their citizens by developing new digital services. From 2016 to 2020, their Online Services Index increased by 10%. [12]. However, as far as we know, there is no study investigating the moderating effect of digitalization on bank failure in GCC countries. As a consequence, we set the following issues to contribute to closing these gaps.

1- Did the COVID-19 pandemic have an impact on GCC banking performance?

2- Does bank digitization have a moderating effect on bank performance during the COVID-19 pandemic?

This paper has many original implications. From a practical point of view, it aligns with GCC efforts to build digital infrastructures replacing their reliance on oil with technologically advanced economies. It investigates whether this commitment to technological priorities has generated sufficient banking digitization to strengthen their resilience to crisis and counterbalance their detrimental effect. From the theoretical standpoint, it adds knowledge to previous literature on COVID-19 by filling in the gap of the lack of studies highlighting the connection between digitalization and the outbreak. Furthermore, to the best of our knowledge, no study has been conducted on the impact of the COVID-19 breakdown on GCC bank performance and the role of bank digitalization in mitigating the adverse impact on bank performance.

2. Literature Review and Hypotheses

Several studies have investigated the economic impact of the pandemic. Some authors found that it significantly decreased stock market returns and increased volatility [13-17]. Other researchers showed a negative effect on the firm's performance [1, 5, 18-22].

As far as the banking system is concerned, Danisman, et al. [23] and Goodell [24] argued that the pandemic leads to substantial deposit withdrawals, as well as an increase in non-performing loans. This consequently induced a decline in the returns on investments of banks as well as a reduction in credit, a lack of liquidity, and an increase in non-performing loans and default rates [24-26].

Though scarce, authors focusing on this negative impact system regressed bank performance on bank characteristics and a proxy for COVID-19. Li, et al. [27] reported that U.S. banks having idle loan commitments at the beginning of the pandemic significantly increased their lending. Nevertheless, the total supply of credit did not change. Beck and Keil [28] documented an increase in loan loss provisions and non-performing loans of US banks. Hassan, et al. [29] argued that the syndicated loans increased as the lender became more exposed to epidemics. Demir and Danisman [10] found that stock returns of well-capitalized banks, with larger sizes, fewer non-performing loans, and higher deposits are more resilient to the pandemic. Dursun-de Neef, et al. [30] showed that poorly capitalized banks increased their credit supply significantly more during the pandemic. Elnahass, et al. [31] argued that COVID-19 significantly impacted financial performance across various performance and resilience metrics. Xiazi and Shabir [8] demonstrated that the outbreak has significantly reduced bank ROA and ROE in 85 countries. This negative impact is amplified in undercapitalized, smaller, and less diversified banks. Demirgüç-Kunt, et al. [6] proved that borrower assistance programs, liquidity support, and monetary easing all helped to mitigate the negative effects of the crisis, though their effectiveness varied greatly across banks and countries. Mirzaei, et al. [9] showed that the negative impact of the outbreak on bank stock returns is less severe in Islamic banks than in conventional banks in 48 countries. They found that this finding can be explained by pre-crisis levels of efficiency. Indeed, they documented a significant impact of pre-crisis levels of efficiency on Islamic bank performance during the crisis. However, this impact is not significant for CBs. Demir and Danisman [10] showed that for listed banks from 110 countries, lower non-performing loans, higher capitalization and deposits, and larger sizes moderated pandemic resilience. Fayman [11] demonstrates that the pandemic's negative impact is mitigated by politics. He found that banks with Democratic governors engendered lower earnings and had smaller liquidity positions than banks with Republican governors. Mativ, et al. [32] documented that bank performance and resilience to the pandemic are strongly associated with the market power and efficiency of MENA banks.

However, to our best knowledge, no studies deal with the pandemic's impact on bank performance in emerging markets, specifically GCC banks. We contribute to filling in this gap and we set hypothesis1

Hypothesis 1: The pandemic decreased bank performance of GCC banks.

Regarding evidence about the effect of digitalization on bank performance, many authors found that it improves bank performance by reducing operations costs and enlarging customer reach Begenau, et al. [33]. Cheng and Qu [34] documented that bank FinTech decreases credit risk significantly in Chinese commercial banks, and additional investigations show that the adverse effects of bank FinTech on credit risk are fairly weak among state-owned banks, large banks, and listed banks. Gössling [35] and Khin and Ho [36] found a positive impact of information technology on bank performance concerning flexibility, profitability, quality of service, market share and value, and process efficiency. Other authors demonstrated that

bank digitalization affects positively bank liquidity as a consequence of facilitating bank services and operations Gilbert and Loi [37]; Casey and Souvignet [38] and Jean, et al. [39]. Arner, et al. [40]; Müller-Seitz [41]; Casey and Souvignet [38] and Gössling [35] showed that the digitalization of operational forecasting and credit verification reduces liquidity and credit risks and therefore improves banks' financial wellness. Theiri and Alareeni [42] performed a survey of the CEOs of Tunisian banks to investigate their perception of whether digitalization helped sustain the impact of COVID-19. Their results showed that the banks that have invested and undergone in Fintech since 2017 were perceived as more able to withstand the crisis and resist change. They argued that digital transformation may be used as an innovative approach during the crisis. On the contrary, other authors suggested some negative impacts of digitalization on bank stability. Khattak, et al. [43] showed that digitalization induces bank instability. They add that banks benefit from digital transformation only in the case of low-income diversification. Also, Uddin, et al. [44] document that cyber tech spending reduces bank stability in case of crossing a threshold level of expenditure.

Concerning the connection between digitalization and the pandemic, Abidi, et al. [45] found that digitally-advanced firms showed about 4 percentage points less revenue decline during the pandemic compared to digitally constrained firms, inducing that digitization acted as a hedge during the outbreak. However, as far as we know, there is no research investigating the moderating impact of digitalization on GCC bank performance during COVID-19. We contribute to enriching literature and we set hypothesis2

Hypothesis 2: Digitalization moderates the negative effect of the pandemic on bank performance.

3. Methods

3.1. Sample

We predict GCC bank performance for the period 2004-2020 using bank annual financial data for the period 2003-2019. The countries considered are Saudi Arabia, UAE, Qatar, Bahrain, Kuwait, and Jordan. We collect all available data in the Bloomberg database and get 39 banks observed during 17 years. We obtain a sample of 663 observations.

3.2. Models

Our first prediction model is as follows:

Model 1: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \mu_i + \lambda_t + \varepsilon_{it}$ where i, j, t indicates the bank, country, and time. X_{it} is the vector of bank variables related to bank soundness and performance. Z_{jt} is a vector of country and market structure control variables. β, γ, and δ are the parameters of the model. Moreover, μ_i and λ_t are the bank and time effects and ε_{it} is the error term. $COVID_t$ is a dummy variable that takes the value 1 for the pandemic years 2019 and 2020 and 0 elsewhere.

As described in the literature, the bank variables (X_{it}) better predicting bank soundness and profitability can be best proxied by CAMEL variables, related to capital adequacy,assets quality, management, earnings, and liquidity. (Fraisse et al., 2018 ;Pelster et al., 2018; Huang et al., 2018; Bouwman et al., 2018; Boualam and Cororaton, 2019; Huang et al., 2020).

To investigate the moderating impact of efficiency, we use the second model

Model 2: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha EFF_{it} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$ where EFF_{it} indicates the bank efficiency.

To test the moderating effect of the investment, we set the third model

Model 3: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha INVEST_{it} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$ where $INVEST_{it}$ indicates the portion of investment in total assets.

To test the moderating impact of digitalization, we use Model 4, Model 5, and Model 6

Model 4: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha DIG_{jt} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$ where DIG_{jt} indicates the level of digitalization of the country.

Model 5: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha DIG_{jt} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$ where DIG_{jt} indicates the level of digitalization of the country.

Model 6: $ROA_{it} = \beta\ COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha CASHLESS_{jt} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$ where $CASHLESS_{jt}$ indicates the amount of cashless operations in the country.

3.3. Estimation Methods

We estimate the models of study with the fixed and random effects methods. Indeed, in the case of pooled data, the regression equation is $Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$. When using ordinary least squares, there is a problem of unobserved heterogeneity. We can deal with this problem by the fixed effects method that assumes this heterogeneity is captured in the fixed term $\square_i$. We can also use the random effects method that assumes this heterogeneity is captured in the random term ε_{it}. Hausman's test permits to adopt the model that is better suited to our sample study.

3.4. Variable Measures

3.4.1. Measures of Bank Variables X_{it}

We measure profitability by the return on assets and capital adequacy by the debt-to-equity ratio. We use the ratio of non-performing loans/assets to measure asset quality. Liquidity is measured using the ratio of deposits to total assets. Efficiency is measured by the ratio of bank expenses to net revenues. We account for size variations by including the logarithm of total assets. All these variables are collected from the Bloomberg database. We introduce a dummy variable to proxy the impact of the financial crisis of 2008. We control country differences by GDP growth.

3.4.2. Measures of the variables related to digitalization

Concerning the variables proxying digitalization, they are collected from official databases. The level of digitalization adoption is collected from the World Bank database. The percentage of digital payments is reported by the Global Findex Database. The amount of cashless operations in the country is collected from the BIS database on cashless payments.

3.5. Descriptive Statistics

Table 1 presents the descriptive statistics.

Table 1.
Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
lnassets	638	10.45	1.59	5.41	13.84
Nonperforming loans/assets	499	2.33	2.23	0.0276	21.40
Gdp growth	663	3.92	5.49	-8.85	26.17
ROA	629	2.02	1.51	-5.72	13.21
Deposits/assets	635	68.63	8.94	31.18	88.84
Efficiency ratio	634	39.60	15.56	13.19	165.75
Financial leverage	628	7.74	2.32	1.82	14.88
Level of digitalization	663	69.58	8.93	40	84.3

We remark that the standard deviations of all variables are superior to 1.5 reflecting a large variation among listed banks. Concerning the ROA, the negative minimum of -5.72 indicates that some banks reported bad performance. The average of 68.63 of the ratio Deposits/assets reflects a reasonable liquidity level. The standard deviation of logarithm assets is also elevated (1.59) indicating that the bank size varies greatly. The average Debt-Equity ratio is 7.74, which provides an appropriate level of leverage. The effic iency ratio varies between 39.60 and 165.75 reporting great differences among listed banks. Similarly, Table 2 documents elevated variation of the nonperforming ratio as it is between 0.0276 and 21.40. The average level of digitalization 69.58 indicates advanced digitalization. This level varies from 40% to 84%. The standard deviation of the percentage of digitalization is elevated (13.74) indicating a big variation across countries. The standard deviation of the amount of cashless operations for Saudi Arabia is very elevated (992) indicating a big shift across time.

4. Results and Discussion

Table 2 reports the results of the first hypothesis.

Model 1: $ROA_{it} = \beta\, COVID_t + \gamma X_{it} + \delta Z_{jt} + \mu_i + \lambda_t + \varepsilon_{it}$

Model 2: $ROA_{it} = \beta\, COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha EFF_{it} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$

Model 3: $ROA_{it} = \beta\, COVID_t + \gamma X_{it} + \delta Z_{jt} + \text{Total invest/assets}_{jt} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$

Table 2.
Results of the impact of COVID-19 on Bank performance.

Dependent Variable	**Returns on Assets**		
Independent variables	**Specification 1**	**Specification 2**	**Specification 3**
	Robust fixed effects	**Fixed effects**	**Robust random effects**
Total invest/assets			0 .008 (0.019) **
Total invest/assets * COVID-19			-0.058(0.03) *
Debt/equity	-0.112 (0.023) *	-0.105 (0. 000) **	-0.158 (0. 001) **
Nonperforming loans/ assets	-0.114 (0.111)	-0.104 (0.181)	-0.093 (0.116)
Deposits/ total assets	0.0067 (0. 174)	0.007 (0.360)	0.008 (0.443)
Efficiency ratio	-0.055 (0.003) **	-0.082 (0.000)**	-0.0562 (0.000)**
Efficiency *COVID		-0.059 (0.000)**	
GDP Growth	-0.0015 (0.922)	-0.001 (0.910)	-0.0432 (0.146)
LN Assets	-1.24 (0.000)**	-1.206 (0.000)**	-0.348 (0.001)**
Dummy Crises	-0.349 (0.053)	-0.310 (0.002)**	-0.0083 (0.953)
COVID-19	0.24 (0.05)*	-1.66 (0.013)**	-2.34 (0.039)**
Constant	18.21 (0.000)**	18.74 (0.000) **	7.85 (0.000) **
Residual	0 (omitted)	0 (omitted)	0 (omitted)
R^2	0.5283	0.5187	0.5050
Heteroskedasticity test	F(2,36) = 18.24**	F(2,36)= 0.1835(0.23)	F(2,36) = 41.02**
Wooldridge test for autocorrelation	F(1,36) = 26.187 Prob > F = 0.000	F(1,36) = 18.271 Prob > F = 0.000	F(1,36) = 26.154 Prob > F = 0.000
LR / Haussman test chi2	99.44	134.02	4.64
Prob>chi2	(0.0000)	(0.0000)	(0.86)

Table 2 shows that the results of the Wooldridge test for autocorrelation are significant for all specifications, rejecting the collinearity problem. Regarding the White test of heteroskedasticity, the results are significant for specifications 1 and 2. We do respectively robust fixed effects and robust random effect regressions as recommended by the results of the Hausman test. For the three specifications, the coefficients of the ratio of debt to equity are significant and negative, confirming that the bank's performance depends on capital adequacy. This finding is consistent with Shabir, et al. [52] that higher leverage is negatively associated with profitability. Similarly, the coefficient of the efficiency ratio is significant and negative. As shown also by Tu, et al. [53] and Korytowski [54] inefficient banks have lower profitability. However, the sign of the bank size is negative, which is contrary to Dang and Dang [55] showing that larger banks are more profitable. It is consistent with Barua and Barua [26] finding that larger banks are more vulnerable. Furthermore, the coefficient of the pandemic years is significant and negative, proving the negative impact on bank performance. Therefore, hypothesis 1 is confirmed. The pandemic decreased the bank performance of GCC banks. This finding is consistent with Beck and Keil [28]; Hassan, et al. [29]; Demir and Danisman [10]; Dursun-de Neef, et al. [30]; Elnahass, et al. [31]; Xiazi and Shabir [8]; Demirgüç-Kunt, et al. [6]; Fayman [11] and Mativ, et al. [32]. These authors proved also the performance breakdown of banks during the pandemic across many developed countries. This result can be explained by the propagation of the virus forcing authorities to undertake preventive measures including shutdowns and company lockdowns [56]. As a consequence, corporations have seen major revenue drops and cost increases, while consumers have seen job layoffs and revenue drops. Therefore, they were unable to meet their debts and decreased their demand for bank services. This in turn reduced bank income and assets quality and impacted severely bank solvency, liquidity, and profitability [13, 57].

Specification 2 reports the results of the moderating effect of efficiency. The coefficient of the interaction term Efficiency *COVID is negative and significant. This proves that the harmful effect of the pandemic is moderated by bank efficiency. This finding aligns with Mirzaei, et al. [9] who proved that more efficient banks faced fewer stock returns decrease. The mitigating effect of the growth perspective is proved in specification 3. Indeed, the coefficient of the interaction term total investment/assets*COVID is negative and significant. Therefore, higher investment reduces the damaging impact of the pandemic.

Table 3 investigates the moderating impact of digitalization.

Model 4: $ROA_{it} = \beta COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha DIG_{jt} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$

Model 5: $ROA_{it} = \beta COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha CASHLESS_{it} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$

Model 6: $ROA_{it} = \beta COVID_t + \gamma X_{it} + \delta Z_{jt} + \alpha CASHLESS_{it} * COVID_t + \mu_i + \lambda_t + \varepsilon_{it}$

Table 3.
Results of the moderating impact of digitalization on bank performance.

Dependent Variable	**Returns on Assets**		
Independent variables	**Specification 4**	**Specification 5**	**Specification 6**
	Robust fixed effects	Robust random effects	Fixed effects
DIG	-0.041 (0.000) **		
DIG* COVID-19	0.031 (0.048) *		
Debt/equity	-0.160 (0. 000) **	-0.001 (0.978)	-0.181 (0.026)
Nonperforming loans / assets	0.826 (0.490)	-0.084 (0.290)	-0.104 (0.471)
Cashless			-0. 007 (0.000) **
Cashless* COVID-19			0.007 (0.000)**
Percentage dig. payments		0.027(0.007)	
Percentage dig. payments * COVID-19		0-.112(0.048) *	
Deposits/ total assets	2.654 (0.015)*		0.007 (0.360)
Efficiency ratio	-0.058 (0.000)**	-0.026 (0.002)**	-0.039 (0.000)**
GDP Growth	-0.162 (0.146)	-0.0002 (0.982)	-0.011 (0.471)
LN Assets	-0.182 (0.005)**	-0.207 (0.000)**	-1.206 (0.000)**
Dummy Crises	-0.162 (0.146)		-0.310 (0.002)**
COVID-19	-2.34 (0.039)**	-8.16 (0.049)*	-0.724 (0.034)*
Constant	10.25 (0.000)**	3.798(0.272)	4.05 (0.000) **
Residual	0 (omitted)	0 (omitted)	0 (omitted)
R^2	0.5050	0.3249	0.5187
Heteroskedasticity test	F(2,38) = 47.00**	F(2,28) = 9.18**	F(2,36) = 0.18(0.23)
Wooldridge test	F(1,38) = 18.270**	F(1,28) =11.207	F(1,36) = 18.27**
LR / Haussman test chi2	99.44(0.000)	4.34(0.639)	81.44(0.000)

The results of the Wooldridge test reject the collinearity problem for all specifications. Regarding the White test of heteroskedasticity, the results are significant for specifications 3 and 4. We perform respectively robust fixed effects and robust random effect regressions as suggested by the results of the Hausman test. In specification 3, we proxy the variable digitalization by the digitalization adoption degree as reported by the World Bank. The coefficient of the interaction variable DIG* COVID-19 is significant and indicates a moderating impact of digitalization on performance collapse. In specification 4, we take as a measure of digitalization, the percentage of digital payment as reported by the Global Findex Database. The

coefficient of the interaction variable Percentage dig. payments * COVID-19 is significant and positive. This provides evidence of the moderating impact of digitalization on performance breakdown. Specification 6 concerns only Saudi Arabia as we proxy digitalization by cashless operations, which is only provided by this country in the Bis database. We find a significant positive coefficient of the interaction variable DIG* COVID-19 and support more evidence of the moderating effect of digitalization on bank performance collapse. Thus hypothesis 2 is confirmed. Digitalization moderates the negative effect of the pandemic. This result is consistent with Abidi, et al. [45] that digitalization mitigated the adverse impact of the pandemic by hedging the sales of the digitally-enabled firm against the adverse decline faced by digitally constrained corporations.

5. Robustness Check

We check our results in several ways. First, we investigate heteroskedasticity using the White heteroskedastic test and we do robust regression for heteroskedastic panels. Second, we test autocorrelation with the Wooldridge test. Third, we consider endogeneity problems and we perform the second-stage regression with the residual from the first stage added to test the null hypothesis that the residual coefficient is zero. Fourth, we examine the effect of the 2008 financial crisis using dummy variables. Fifth, we use random-effects models, fixed-effects models, and Hausman's test to adopt models that are better suited to our sample study. Sixth, we reperform the regressions using variant measures of the independent variables and we obtain the same results as shown in Table 4.

Table 4.
Results of the robustness check.

Dependent Variable	**Returns on Assets**	
Independent variables	**Specification 7**	**Specification 8**
	Robust fixed effects	**Robust random effects**
DIG	-0.041 (0.000) **	-0.0464 (0.005) **
DIG* COVID-19	0.031 (0.048) *	0.034 (0. 034) *
Equity/capital	0.013 (0.037) **	-0.001 (0.978)
Nonperforming loans / assets	-0.110 (0.116)	-0.060 (0.193)
Cash/ total assets	0.019(0.181)	0.014 (1.16)
Efficiency ratio	-0.057(0.005)**	-0.059(0.001)**
GDP Growth	-0.0015 (0.932)	-0.0002 (0.982)
LN Assets	-1.32 (0.000)**	-0.500 (0.002)**
Dummy Crises	-0.279 (0.066)	-0.267 (0.012)
COVID-19	-0.29(0.044)**	-2.58 (0.02)*
Constant	18.83(0.000)**	12.91(0.000)**
Residual	0 (omitted)	0 (omitted)
R^2	0.5275	0.4496
Heteroskedasticity test	F(2,36) = 57.61**	F(2,36) = 45.96**
Wooldridge test	F(1,35) = 26.310**	F(1,16) = 11.727**
LR / Haussman test chi2	89.19(0.000)	24.30 (0.002)

We measure liquidity by the cash ratio instead of the ratio of deposits to assets. We replace the measure of capital adequacy with the ratio equity of total capital. The significance of the coefficient is the same as for the original measures.

6. Conclusion

The pandemic COVID-19 severely damaged all country's economies because of the quarantine measures. It induced firm and bank performance breakdowns. Businesses shutdown and the lockdown have resulted in fewer physical transaction volumes. However digital connectivity ensured the continuity of economic activities in an alternative manner. Therefore, the confinement shifted the economy from cash to electronic payments. In this paper, we show the negative effect of the pandemic on bank performance in GCC countries. We document that this effect is moderated by bank efficiency and growth. Furthermore, we support evidence of the moderating effect of digitalization. Indeed, this technology helps banks overcome the quarantine measure reducing customers' mobility.

Our findings suggest many contributions. First, we investigate the case of emerging market banks, as most of the current literature is focusing on developed countries. Even though the West is at the forefront of digital transformation, Asian countries and especially GCC countries are increasing their digital adoption levels. Indeed, the GCC context is important because it boasts fast-growing economies. It also benefits from a large young population, which constitutes a natural breeding ground for technological innovation. Second, we highlight the core role of digitalization in managing breakdown risks and mitigating its adverse impact by reshaping the transaction features. These innovative patterns are irreversible and will continue to foster digital economies. This suggests several research perspectives on the reshaping of the economy after the pandemic, such as investigating the change in product innovation, distribution channels, and labor qualifications. Third, we help policymakers in GCC countries evaluate the feedback on their investment choices, mainly their commitment to strengthening economic growth and resilience through technological advancements. Indeed, GCC countries have invested in a robust digital infrastructure to accelerate digital transformation and develop a fintech ecosystem enabling the shift from oil

dependence to a modern digitized economy. Our findings confirm that this strategic choice helps reduce the crisis's economic and social costs by fostering bank resilience and recovery. These policy implications arising from the case of GCC countries could also be observed not only by other emerging economies in ASEAN but also by broader regions in the world. Our evidence would enhance policymakers in all countries to set digital strategy at the center of their political agendas. This would close the digital gap between all countries and promote the ability of the economies to withstand shock and get back quickly afterward. As a result, we suggest a research perspective investigating the effect of the pandemic on the potential shift of policy strategies toward digital investment commitments.

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