# DO INSTITUTIONAL ACTS AS 'BULLET-PROOF' FOR DUAL BANKING SECTOR DURING COVID-19 PANDEMIC? EMPIRICAL EVIDENCE FROM SELECTED HIGH- AND MIDDLE- INCOME COUNTRIES

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## ABSTRACT

The global faced another pandemic, which is COVID-19 that created panic amongst the economics sector including banking sector. The pandemic either weakens or enhances the institutional in order to sustain banking performance in terms of financial stability. Pandemic and institutional level in particular countries may give an impact to the banking sector as new regulations and policies were introduced to curb the COVID-19. Dual Banking sector comprises conventional and Islamic banks in high- and middle- income countries are significant to their economics performance. Main question is does pandemic influence institutional in order to sustain financial stability? This study comprises data from 2012 to 2022. System Generalized Method of Moments (GMM) is employed. Financial stability indicated by Z-score, institutional variables are extracted from World Governance Index (WGI), and dummy for year of pandemic (2020 & 2021). The findings indicate that pandemics do not have an impact on the financial stability in high- income countries regardless of the level of institutional. On the contrary, the pandemic lowered financial stability in middle- income countries that have better institutional environments. It shows that middle- income countries should issue new policies prudently during pandemics to achieve financial stability.

*Keywords:* Dual Banking, Financial Stability, Institutional Quality, Market Power, Efficiency

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## 1. INTRODUCTION

Pandemic COVID-19 impacted globally and this is different from the financial crisis. The pandemic influences the decision-making of governments, and regulators to sustain the economics performance. Institutions are one of the prominent aspects in maintaining the economics and banking sector. Bermpei, Kalyvas, and Nguyen (2018) state that financial stability is influenced by institutional quality. It implies that institutional quality interrelates to the banking performance in terms of financial stability. The performance of the banking sector has gained attention after the financial crisis because the collapse of the banking sector influenced the whole economic agents (Mutarindwa, Schafer, & Stephan, 2020). It has shown that the banking sector is vital to the economy. Fang, Hasan, and Marton (2014) found that banks' stability can be increased when the countries improve institutional factors. In other words, institutions, regulations, and policies are significant to financial stability. It is supported by Bermpei, Kalyvas, and Nguyen (2018) where the author emphasizes the importance of institutional quality and regulations on banking performance in terms of financial stability. Hence, it is important to assess whether institutional quality improves the financial stability or otherwise. In addition, financial stability is often associated with competition. This can be reflected in the 'competition-stability/fragility' view. Therefore, this study observes competition in the dual banking sector. Dual banking sector comprises conventional and Islamic banks. Several countries implement specific regulations or laws for the Islamic banking sector. It implies that Islamic banking sector complies with different regulations. This is called 'spins-off' regulations or laws. Due to differences in the banking system, it is interesting to observe spins-off regulations in the dual banking sector amid the pandemic.

However, institutional responded differently in the midst of the pandemic in order to sustain the financial stability in the dual banking sector. In the midst of the COVID-19, the authorities and regulators introduce new regulations to minimize the detrimental impact from COVID-19 on banking performance. For instance, credit extension for the public is introduced which affects the banking performance and decision-making of the banks. This implies that credit risk of the banks may increase due to credit extension and 'lock-down'. The countries may have a better institutional, but it is still weakened by external factors such as pandemics and affects the financial stability. Financial crisis in the past have shown the importance of institutional as it can act as a barrier to crisis (Bermpei et al., 2018) and improve economic growth (Boulanaour, Alqahtani, & Hamdi, 2021). International Monetary Fund (IMF) (2021a) mentions that the aim of credit extension during the pandemic is to ease the burden of the economic sector and public. This decision will eventually affect the structure of the banking sector (IMF, 2021a).

Recovery phase during a pandemic differs as reflected in the performance of economics sector. The new regulations and policies issued by the regulators and governments influence economic sectors. According to the IMF (2021b), the pandemic era has been challenging for the government to tackle various economic issues including the banking sector. Besides, the recovery phase may differ based on the distribution of the COVID-19 vaccines, number of COVID-19 cases and these indicate there is a gap between developed and developing countries (IMF, 2021b). In addition, institutional quality in high- and middle- income countries are different due to socio-economic landscape and geographical location. The response of economic agents in those countries may

differ based on the level of development. Therefore, the banking performance of high- and middle-income countries may be influenced by the level of institutional quality and pandemic of COVID-19. Dual banking is chosen in this study due to several reasons. Firstly, the dual banking sector consists of two types of banking system, conventional and Islamic. The nature of business between conventional and Islamic are obviously differs including the operational. Hence, it is interesting to study whether the institutional quality in high- and middle- income countries create a different performance of the dual banking sector. Secondly, the previous empirical studies are found to have mixed evidence related to institutional quality and financial stability. In this study, the impact of institutional quality on financial stability is observed as different levels of institutional quality in high- and middle- income countries may affect the financial stability.

This paper elaborates on literature review on research area in section 2, data and methodology in section 3 whilst the findings are explained in section 4. Section 5 concludes the findings and recommendation based on new evidence from the empirical results.

## 2. LITERATURE REVIEW

Institutions are established to monitor and prevent unexpected situations such as crises as it can deteriorate economics sector including banking sector. Banking sector is known as one of the contributors to the economics sector. New institutional economics (NIE) theory emphasizes the relationship between institutions and organization. It refers that institutions can influence organization and affects the decision-making including performance of the organization. Hence, it is crucial for institutions to monitor the performance of the organization. According to NIE, individuals faced difficulties because of incomplete information such as uncertainty. Incomplete information leads to the problem of information asymmetry and adverse selection influence negative on performance of the banking sector. Therefore, the establishment of regulations, and policies are needed to reduce the transaction cost and risks. It is crucial for countries to have advance financial institutions for financial stability and economic growth. Guru and Yadav (2019) state that financial development can reduce the cost of acquiring information to attract the capital with efficient execution of contracts. For instance, regulations and policies can monitor the information asymmetry and moral hazard problem.

According to Tran, Nguyen and Nguyen (2023), countries with high institutional quality can absorb shocks through implementation of efficient policies compared to countries with low institutional quality. Additionally, Cecchetti and Schoenholtzon (2020) mention that financial institutions are vulnerable to economic shocks compared to financial crises. It is because the prominent role of banking in economics sector. Pandemic or economic shocks affect the banking sector as most of the countries implemented 'lock-down'. Hence, institutional quality or policies that are introduced during the pandemic have an impact on the economics agent. For instance, credit extensions that were introduced by the authorities trigger the performance of the banking sector in terms of credit risks. The most common contributor to the financial instability is bad credit (Cernohorska. 2015). The higher amount of bad credit negatively affects the stability and state of the banks.

There are numerous previous empirical studies relating to institutional and banking performance in ASEAN (Chan, Aktan, Burton & Koh, 2021; Chan, Koh, Zainiar, & Yon, 2015; Nguyen, 2022), Asia (Zhou, 2018), Southeast Asia (Mortadza, Purwaningsih, Trinugroho, Mulyaningsih, & Lukman, 2024; Noman, Gee, & Isa, 2018), MENA (Elfeituri, 2022), Gulf Cooperation Countries (GCC) (Boulanaour, Alqahtani, & Hamdi, 2021), and Europe (Noulas, 2001; Nguyen, 2021). The findings indicate mixed findings of institutional quality and financial stability. Institutional quality positively impacts financial stability (Apergis, Aysan, & Bakkar, 2021; Bermpei, Kalyvas, & Nguyen, 2018; Boulanaour et al., 2021; Nguyen, 2022; Zhou, 2018).In contrast, others found institutional quality weakens financial stability such as rule of law (Bermpei et al., 2018), and government effectiveness (Boulanaour et al., 2021). Based on these findings, it implies that the impact of institutional quality on financial stability differs based on the sample and geographical location.

Besides, there are several factors that contribute to financial stability such as competition, and efficiency. These factors are found significance in determining the banking performance based on previous studies. There are views reflect competition and financial stability which is 'competition-stability/fragility'. 'Competition-fragility' indicates that banks that operate under a competitive environment tend to increase their risks. In other words, risk-taking behavior of the banks increases under high competition in banking sector. It is because the banks become competitive to attract customers and maintain performance. As mentioned by Keeley (1990), the prudential behavior of the banks are related to the franchise value. During high competition environment, the franchise value tends to decrease. Another factor that leads to financial instability during the high level of competition is the problem of adverse selection. The problem of adverse selection may increase because of the lack of monitoring and screening of the customers.

In contrast, 'competition-stability' refers to banks increasing their risk-taking under a concentrated market or less competitive environment in the banking sector (Boyd, De Nicolo, & Al Jalal, 2009). Alternatively, there is a positive relationship between competition and financial stability. High profit is earned due to lending rates charged by dominant banks in a concentrated market, influencing the default loans which leads to credit risk. Therefore, financial instability will occur. It is aligned with Caminal and Matutes (2002) where loan exposure in a concentrated market causes high default loans.

Competition in the banking sector is often explored with financial stability based on previous studies. For instance, in ASEAN (Noman, Gee, & Isa, 2017), Southeast Asia (Islam, Ebenezer, Sobhani, & Shahriar, 2020), and Asia Pacific (Fu, Lin, & Molyneux, 2014). In addition, there are previous studies focus on dual banking sectors by Risfandy, Tarazi, and Trinugroho (2020), Alam, Hamid and Tan (2019), and Ibrahim, Salim, Abojieb, and Yeap (2019). Based on empirical previous studies, the findings indicate that competition contributes to financial stability in Southeast Asia (Islam, et al., 2020), ASEAN (Noman et al., 2017). This is consistent with 'competition-stability' where competition improves banking performance in terms of financial stability. Under a competitive environment, borrowers are capable of settling their loans due to competitive interest rates. Hence, the amount of default loans is reduced and financial stability is improved.

Previous crisis has become a lesson to the regulators and banking sector to maintain the banking performance. For instance, the financial crisis in 1997/98 and the global crisis in 2008. Financial crisis creates a significant impact on the banking sector. However, different from the COVID-19, the source of the health crisis is the non-financial elements. The spread of the COVID-19 has caused countries practicing 'lock-down' and the authorities introduce measures to support the economic sectors. 'Lock-down' has affected the economic sector including the public that have to work from home to mitigate the spread of the virus. Elnahass, Trinh, and Li. (2021) mention that agents of the economic sector such as suppliers, and consumers are significantly affected amid pandemic. Since the health crisis influencing banking performance, several studies have been done regarding the impact of COVID-19 on banking performance.

Shabir, Jiang, Wang and Isik (2023) studied the impacts of pandemics on the banking sector from 2016 to 2021 quarterly. The findings indicate that pandemic indeed have adverse effects on the financial stability. Interestingly, the authors found better institutional environment and efficient regulations improve the resilience of the banks. The results aligned with NIE theory, emphasize the importance of institutions to control the impact of the crisis. Le, Ho, Nguyen and Ho (2022) did a study on performance of Islamic banking sector and examined the effects of pandemic. From the findings, it was found that pandemic contributes negatively to Islamic banking performance, however, diversification has found a significant role in alleviating the effects of the pandemic. It postulates that diversification is one of the prominent elements to sustain the banking performance during the pandemic. Demirguc-Kunt, Pedraza, and Ruiza-Ortega (2021) also examined the performance of banking sector and found pandemic has negatively impacted the banking sector. The effects on the banking sector are varied across the sample of the study. Nevertheless, it has shown that the pandemic of COVID-19 influenced negatively on the banking performance.

Therefore, in this study, the effect of pandemic is observed to identify whether pandemic weaken or strengthen the institutional quality for the banking sector. Previously, there were numerous studies of the financial crisis on banking performance and determinants of financial stability are identified. Nevertheless, limited study the performance of banking performance and institutional in the midst of a pandemic. The source of pandemic and financial crisis is utterly different, meanwhile the impacts are enormous to the global economic sectors. Pandemic has forced the authorities and regulators implement new policies to recover the economics sector. On the other hand, institutional quality may influence the performance of the banking sector either improve or sustain the performance amid the pandemic. Therefore, it is crucial to know whether pandemic COVID-19 strengthens or weakens the institutional quality to achieve financial stability.

## 3. DATA AND METHODOLOGY

The data consists of conventional and Islamic banks in selected high- and middle- income countries. Countries that represent dual banking in high- income countries are Bahrain, Qatar, Saudi Arabia, and United Arab Emirates whilst for middle- income countries are Bangladesh, Egypt, Indonesia, Jordan, and Malaysia. The total number of banks in this study are 207 banks. Most of the countries in the sample include muslim-majority population as the dual banking sector

consists of conventional and Islamic banks. In addition, data in this study are balanced panel data from 2012 to 2022. Some of the Islamic banks are established in 2013 also included in the sample.

### 3.1 Methodology

GMM is employed to measure the effects of institutional, and pandemic on financial stability in the dual banking sector. The advantage of GMM is it can eliminate the endogeneity in the regression model as the characteristics of our data are dynamic. Two-step GMM is used for the regression as it is more efficient. Under GMM, the validity of regression model is tested through Sargan. If the null hypothesis is not rejected, it shows our regression model is valid. Besides, under GMM, autocorrelation is needed to test. First autocorrelation should be rejected but second autocorrelation to proceed GMM. General empirical model is below:

$$STAB_{ijt} = \beta_0 + \beta_1 EFF\text{-}LI_{it} + \beta_2 CE_{it} + \beta_3 INST_{it} + \beta_4 INST*PANDEMIC_{it} + \beta_5 \quad SPINSOFF_{it} + \beta_6 PANDEMIC_{it} + \beta_7 BANKS + \beta_8 MACRO_{it} \quad (1)$$

STAB is the Z-score of return of asset (ROA) to indicate financial stability of dual banking. Z-score is computed based on a three-year rolling window. The calculation of Z-score is similar to Soedarmono, Machrouh, and Tarazi (2013), and Noman, Gee, and Isa (2018). Z-score refers to the distance of probability of defaults of the banks. The higher the z-score, the banks are stable. EFF-LI is efficiency-adjusted Lerner Index that measure the competition and market power of the banks. EFF-LI is chosen to measure as its advantage is to reduce the bias between efficiency and market power compared to conventional Lerner Index. CE is the cost efficiency based on Stochastic Frontier Analysis (SFA). Cost efficiency is calculated based on Battese and Coelli (1995) model, this model captures 'unobserved' factors and cost inefficiency (Dong, Hamilton, & Tippet, 2014). Institutional quality is INST which represents institutional quality of each country. Then, this study creates several specific empirical models below where INST comprises government effectiveness (GE), regulatory quality (RQ), rule of law (RL), political stability (PS), and corruption control (CC). The main gist of creating several specific empirical models is the concern of correlation between institutional quality variables. According to correlation matrix, Table 3, shows that the correlation value between institutional quality exceeds 0.700, shows multicollinearity exists. Therefore, to avoid this problem, several specific model is introduced as below:

$$STAB_{ijt} = \beta_0 + \beta_1 EFF\text{-}LI_{it} + \beta_2 CE_{it} + \beta_3 GE_{it} + \beta_4 GE*PANDEMIC_{it} + \beta_5 SPINSOFF_{it} + \beta_6 PANDEMIC_{it} + \beta_7 BANKS + \beta_8 MACRO_{it} \quad (2)$$

$$STAB_{ijt} = \beta_0 + \beta_1 EFF\text{-}LI_{it} + \beta_2 CE_{it} + \beta_3 RQ_{it} + \beta_4 RQ*PANDEMIC_{it} + \beta_5 SPINSOFF_{it} + \beta_6 PANDEMIC_{it} + \beta_7 BANKS_{it} + \beta_8 MACRO_{it} + \varepsilon_{it} \quad (3)$$

$$STAB_{ijt} = \beta_0 + \beta_1 EFF\text{-}LI_{it} + \beta_2 CE_{it} + \beta_3 RL_{it} + \beta_4 RL*PANDEMIC_{it} + \beta_5 SPINSOFF_{it} + \beta_6 PANDEMIC_{it} + \beta_7 BANKS_{it} + \beta_8 MACRO_{it} + \varepsilon_{it} \quad (4)$$

$$STAB_{ijt} = \beta_0 + \beta_1 EFF\text{-}LI_{it} + \beta_2 CE_{it} + \beta_3 PS_{it} + \beta_4 PS*PANDEMIC_{it} + \beta_5 SPINSOFF_{it} +$$

$$\beta_6 \text{ PANDEMIC}_{it} + \beta_7 \text{ BANKS}_{it} + \beta_8 \text{ MACRO}_{it} + \varepsilon_{it} \tag{5}$$

$$\text{STAB}_{ijt} = \beta_0 + \beta_1 \text{ EFF-LI}_{it} + \beta_2 \text{ CE}_{it} + \beta_3 \text{ CC}_{it} + \beta_4 \text{ CC*PANDEMIC}_{it} + \beta_5 \text{ SPINSOFF}_{it} +$$
$$\beta_6 \text{ PANDEMIC}_{it} + \beta_7 \text{ BANKS}_{it} + \beta_8 \text{ MACRO}_{it} + \varepsilon_{it} \tag{6}$$

These institutional qualities are employed because it capture the credibility of the governments and authorities in formulating policies, and promoting private sector development. Since Islamic banks are included as part of the dual banking sector, SPINSOFF variable is introduced as a dummy variable. SPINSOFF indicates the separate regulations or laws for Islamic banks in some countries, 1 is for countries implementing separate regulations for Islamic banks whilst 0 is otherwise. PANDEMIC is also a dummy variable which is a proxy of the pandemic era for the year 2020 and 2021. BANKS refers to banks-specific variables consist of capitalisation, diversification, size, and lending. MACRO comprises inflation and GDP per capita. For robustness of our results, dependent variable will be replaced with non-performing loans (NPL). NPL is chosen as a proxy for credit risk, the higher amount of NPL indicates higher credit risks, lead to financial instability. Additionally, this study introduces interaction terms between every institutional quality and pandemic. It is to examine whether pandemic have a positive or negative impact on financial stability through institutional quality. In this study, we expect that pandemic weakens the institutional quality and this leads to banking performance of the dual banking sector.

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**Table 1:** Variables, Descriptions, and References

| Variables | Descriptions | References |
|---|---|---|
| Dependent: | | |
| Z-score (ZROA) | (ROA+EQTA)/standard deviation of ROA | Orbis BankFocus Author's Calculation |
| Non-Performing Loans (NPL) | Total loans/Gross Loans | |
| Independent: | | |
| Government Effectiveness (GE) | GE refers to the government's commitment in implement and formulate the policies | World Bank |
| Regulatory Quality (RQ) | RQ refers to how the government promotes and implements the policies for developing private sectors. | |
| Rule of Law (RL) | RL refers to the quality of contract, property rights, and the confidence of the public on the rules. | |
| Political Stability (PS) | PS refers to the perceptions of instability in political, terrorism. | |
| Corruption Control (CC) | CC captures the perceptions of how public power is used for private gain, corruptions, and captures private interest. | |
| Bank-specific variables: | | |
| Cost Efficiency (CE) | Total Costs = Interest Expenses, Non-interest expenses<br>Price of Labors = Overheads Cost/Total Assets<br>Price of Capital = Other Operating Expenses/Fixed Assets<br>Price of Funds: Interest Expenses/Total Deposit<br>Loans<br>Other Earnings Asset | Orbis BankFocus Author's Calculation |
| Efficiency-Adjusted Lerner Index (EFF-LI) | Total Costs = Interest Expenses, Non-interest expenses<br>Price of Labors = Overheads Cost/Total Assets<br>Price of Capital = Other Operating Expenses/Fixed Assets<br>Price of Funds: Interest Expenses/Total<br>Trend = 0 to 1<br>Outputs = Total Assets | Orbis BankFocus Author's Calculation |

Continued

| | | |
|---|---|---|
| Diversification (DIV) | Non-Interest Income/Total Income | |
| Size (TA) | Total Assets | |
| Capitalization (EQTA) | Equity/Total Asset | |
| Lending (TLTA) | Loans/Total Asset | |
| Macroeconomic Variables: | | |
| | Gross Domestic Products Per capita | World Bank |
| Inflation (INF) | | |
| GDP Per capita (GDPP) | | |

## 4. EMPIRICAL RESULTS

In this section, descriptive statistics, matrix of correlations, and empirical results will be discussed. Table 2 refers to the descriptive statistics of each variable in this study. Mean of Z-score is 8.432 with minimum of -17. Negative value indicates certain banks are instable. It also implies the banks recorded negative z-score cannot sustain their banking performance due to lack of capitalisation, which acts as a buffer to losses. Cost efficiency recorded mean of 0.97, shows banks faced efficiency meanwhile the minimum recorded 0.

The competition level indicated by Efficiency-adjusted LI recorded a mean of 0.19, showing that few banks are experiencing in a competitive behavior due to low market power. The institutional quality such as government effectiveness, and regulatory quality recorded mean values of 0.119 and 0.073 respectively. The higher the value of the institutional score, the better the institutions are in those countries. However, for remaining institutional quality such as rule of law, political stability, and corruption control recorded negative mean value which indicates that some countries have weak institutions. Banks-specific variables such as capitalisation, lending, diversification, and size recorded positive mean value. As for the macroeconomics variables, inflation recorded a maximum with 30 percent and this imply to one of those in middle- income countries whilst GDP per capita, the maximum value indicates from one of high- income countries and minimum implies to one of those middle- income countries.

**Table 2:** Descriptive Statistics

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Z-score | 8.432 | 18.706 | -17 | 408 |
| Cost Efficiency | 0.97 | 0.169 | 0 | 1 |
| Efficiency-Adjusted LI | 0.19 | 0.392 | 0 | 1 |
| Government Effectiveness | 0.119 | 0.736 | -1 | 2 |
| Regulatory Quality | 0.073 | 0.736 | -1 | 1 |
| Rule of Law | -0.051 | 0.673 | -1 | 1 |
| Political Stability | -0.435 | 0.757 | -2 | 1 |
| Corruption Control | -0.215 | 0.662 | -1 | 1 |
| Capitalisation (EQTA) | 13.063 | 13.538 | -181 | 94 |
| Lending (TLTA) | 0.947 | 6.715 | 0 | 327 |
| Diversification | 0.164 | 4.818 | -231 | 27 |
| Size | 15953.57 | 32803.955 | 2 | 326709 |
| Inflation | 3.982 | 3.594 | -3 | 30 |
| GDP Per Capita | 65451.639 | 78035.074 | 2831 | 356871 |

Table 3 shows the matrix of correlation between variables that are employed in the regression. The institutional quality variables show high correlation between each variables. Therefore, in this study, it is appropriate to separate empirical models that contain each institutional quality to avoid multicollinearity. These empirical models are examined to achieve research objectives.

**Table 3:** Matrix of Correlations

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Z-score | 1.000 | | | | | | | | | | | | | | |
| (2) Cost Efficiency | 0.070 | 1.000 | | | | | | | | | | | | | |
| (3) Efficiency Adjusted LI | 0.048 | 0.013 | 1.000 | | | | | | | | | | | | |
| (4) Government Effectiveness | 0.048 | -0.015 | 0.392 | 1.000 | | | | | | | | | | | |
| (5) Regulatory Quality | 0.044 | -0.022 | 0.382 | 0.927 | 1.000 | | | | | | | | | | |
| (6) Rule of Law | -0.004 | 0.004 | 0.414 | 0.834 | 0.790 | 1.000 | | | | | | | | | |
| (7) Political Stability | 0.043 | 0.021 | 0.417 | 0.729 | 0.700 | 0.774 | 1.000 | | | | | | | | |
| (8) Corruption Control | 0.017 | -0.005 | 0.471 | 0.763 | 0.773 | 0.844 | 0.782 | 1.000 | | | | | | | |
| (9) Pandemic | -0.064 | -0.033 | -0.017 | 0.011 | 0.011 | 0.108 | 0.043 | 0.065 | 1.000 | | | | | | |
| (10) Capitalisation (EQTA) | -0.008 | -0.018 | 0.182 | 0.156 | 0.162 | 0.171 | 0.103 | 0.187 | -0.005 | 1.000 | | | | | |
| (11) Lending (TLTA) | -0.004 | 0.008 | -0.011 | 0.031 | 0.034 | 0.004 | -0.005 | 0.011 | -0.013 | 0.010 | 1.000 | | | | |
| (12) Diversification | 0.019 | -0.058 | -0.005 | 0.014 | 0.015 | 0.009 | 0.001 | 0.004 | 0.012 | 0.007 | -0.001 | 1.000 | | | |
| (13) Size (TA) | 0.109 | 0.067 | 0.265 | 0.311 | 0.291 | 0.311 | 0.305 | 0.313 | 0.044 | -0.035 | -0.007 | -0.003 | 1.000 | | |
| (14) Inflation | -0.017 | 0.033 | -0.260 | -0.573 | -0.629 | -0.458 | -0.457 | -0.551 | -0.253 | -0.131 | -0.019 | -0.006 | -0.208 | 1.000 | |
| (15) GDP Per Capita | 0.001 | 0.047 | 0.320 | 0.015 | -0.015 | 0.132 | 0.380 | 0.240 | 0.046 | -0.139 | -0.006 | -0.020 | 0.174 | -0.001 | 1.000 |

Table 4 refers to the regression of the dual banking sector for high- income countries by using (GMM). According to the lagged dependent variable of Z-score, a proxy of financial stability, it shows statistically significant. This implies that the previous financial stability has a positive and significant on current financial stability.

As for the institutional quality, it shows that GE and RQ recorded positive and statistically on financial stability for model (2) and (3). It illustrates that institutional quality has significant role to improve financial stability. Institutional quality in high- income is found crucial in improving financial stability in dual banking sector. The results aligned with Nguyen (2022), Boulanaour et al. (2021), and Zhou (2018), contradict to Mortadza et al. (2024). It indicates institutional quality, especially GE, and RQ increase the financial stability in dual banking sector for high- income countries. In other words, effectiveness in regulations, policies, and laws in high income countries improve the banking performance especially in terms of financial stability. Additionally, banks in high- income countries that comply with the regulations and policies can improve their banking performance. Nevertheless, PS has been found to have a negative impact on financial stability. It implies that a stable political environment contributes to financial instability. This situation reflects that banks under a stable political environment often involve in risky portfolios. Asraf (2017) explains banks may be involved in risky activities due to less interference from the government and confidence in government. In other words, the banks are confident in decision making under a stable political environment regardless of the level of risks.

Table 5 indicates the regression for the dual banking sector in middle- income countries. Similar to high- income countries, lagged dependent Z-score is found to be statistically significant, EFF-LI consistent with the results of high- income countries. It implies that the dual banking sector in middle- income countries has less competition or concentrated markets. In other words, the existence of market power in the dual banking sector improves financial stability. Contrary to the findings of high- income countries, institutional quality such as GE, RQ, RL, and CC recorded negative and statistically significance on financial stability. The findings indicate that effectiveness in regulatory, policies, and strict regulations deteriorate financial stability. In the dual banking sector, pandemics are found to have a negative impact on the banking performance for model (2) and (3).

Interestingly, the pandemic is found to have weakened the institutional quality such as GE, PS, and CC in order to achieve financial stability for the dual banking sector in middle- income countries. This reflects the negative sign of the coefficient of interaction term on financial stability. Specifically, it shows that during the pandemic, institutional quality has been found to be weakened or less regulated effectively by the government and regulators to sustain financial stability of the dual banking sector. Additionally, SPINSOFF recorded insignificance where it indicates that regulations implemented in middle- income countries for Islamic banking sector do not have any significant impact on the banking performance. For banks-specific variables, lending and size are found statistically significant on financial stability in the dual banking sector. In the context of middle- income countries, higher lending activities that circulate in the economy accelerate the development of financial stability. Therefore, the positive sign of coefficient is indicated. As for the size, the results are consistent with the dual banking sector in high- income countries where it indicates that size has a negative impact on financial stability.

In the context of the dual banking sector in middle- income countries, institutional quality such as GE, RQ, RL and CC are recorded to have negative effects on financial stability. The findings are consistent with Bermpei et al. (2018), Boulanaour et al. (2021), and Mortadza et al. (2024), and contrary to high- income finding, this indicates that effectiveness and strict regulations, policies and law deteriorate the financial stability in the dual banking sector. These results are supported by Demirguc-Kunt, Laeven, and Levine (2004) where the authors mention that strict regulations increase the cost of financial intermediaries as the cost of financial intermediaries can increase the financial instability through efficiency. Another explanation is the banks might not engage in broader activities under strict regulations and laws. This also aligns with the findings of CC, where it was found that high CC lowered financial stability. It is consistent with the 'greases the wheels' hypothesis where corruption and bribery have advantages to the banking sector (Leff, 1964; Huntington; 1968). To specify this, inefficient bureaucracy may increase the chances of loan approval of the borrowers through 'greases the wheels' (Meon & Sekkat, 2005). In the midst of pandemic, institutional quality that was introduced may hamper the financial activities due to credit extension, low savings which leads to high cost of financial intermediaries (Barua, 2020).

The interaction between institutional quality variables and pandemic for high- income countries recorded insignificant impact on the financial stability. This evidence implies that pandemic does not weakens the institutional quality in order to sustain positive banking performance. In other words, current institutional quality in high- income countries already beneficial to the financial stability. As for SPINSOFF variable, it shows that specific regulations or law to monitor the Islamic banking sector is found to have a negative effect on financial stability. More specifically, such regulations may not beneficial to dual banking sector in high- income countries.

In the context of middle- income countries, the interaction term of institutional quality and pandemic on financial stability, the dual banking sector in middle- income countries recorded significant results. It shows that pandemics that hit countries with high scores of institutional quality lowered financial stability. In other words, the impact of the pandemic has challenged the regulators and governments in order to maintain financial stability. Based on the regression results, pandemic has strengthened the institutional quality, however, it leads to financial instability according to the negative sign of coefficient of the interaction term. The findings contradict Shabir, Jiang, Wang and Isik (2023) where the authors found that pandemic strengthened the institutional quality and its positive impact on the stability of the banking sector. On the contrary, pandemic has insignificant impact in high- income countries whilst pandemic can improve the financial stability in middle- income countries based on model (2) and (3). The findings aligned with Shabir et al. (2023) where the authors employed Z-score as financial stability.

The main research question in this study is whether pandemic enhance or weakens the institutional quality of the countries in order to achieve financial stability in dual banking sector. The gist of the findings is institutional quality is the vital factors for dual banking sector in high- income countries in order to achieve financial stability. It implies that high- income can provide better institutional framework to sustain the banking performance and aligned with new institutional economics (NIE) where institutional is needed to prevent risks. Contradict to the findings of high- income countries, most of institutional quality variables deteriorate the financial stability. Based on these finding, effective in policies, regulations, and law are costly where high- income countries recorded positive impact on banking performance. In other words, high- income countries can implement better

institutional framework compared to middle- income countries. In the context of middle- income countries, strict regulations and effective policies hamper the development of financial stability. It could imply that strict regulations curb the activities of the banking sector, for instance, diversification. Diversification in high- income countries has found can reduce credit risk or instability and consistent with the findings of Wu, Chen, Chen and Jeon (2020) and Thangavelu and Findlay (2010). Nevertheless, diversification has found no impact on banking performance in middle- income countries but lending activities in those countries has recorded positively impact on financial stability, consistent with Mortadza et al. (2024). Interestingly, SPINSOFF are found to have insignificant role in determining the financial stability in both regressions.

In order to check the robustness (Appendix A and B) of the findings, Z-score as the indicator of financial stability is replaced by non-performing loan (NPL). NPL is the proxy of credit risk, the higher amount of NPL leads to high credit risk faced by the banks. As a consequence, credit risks influence the state of the banks which will become fragile. The robust regressions indicate that 'competition-fragility' indeed represents the dual banking sector in high- and middle- income countries. As for the institutional quality factors, the results of GE and RQ on financial stability are consistent in high- income countries with the baseline regression. Meanwhile, it is contradicts for middle- income countries except spinsoff. This indicates that spinsoff insignificant for financial stability whereas for high- income countries, spinsoff clearly statistically does not have a positive impact on financial stability.

**Table 4:** Impact of Institutional and Pandemic on Financial Stability in Dual Banking Sector for High- Income Countries

| Dependent: | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| | Z-score | Z-score | Z-score | Z-score | Z-score |
| L.1 | 0.400*** | 0.414*** | 0.381*** | 0.406*** | 0.395*** |
| | (12.72) | (11.77) | (12.56) | (11.24) | (11.94) |
| Efficiency-Adjusted | 6.769*** | 7.049*** | 6.779*** | 6.774*** | 6.690*** |
| Lerner Index (LI) | (14.16) | (12.64) | (14.78) | (14.67) | (15.60) |
| Cost | 0.328 | 0.544 | 0.288 | 0.686 | 0.693 |
| Efficiency (CE) | (0.71) | (1.22) | (0.63) | (1.28) | (1.60) |
| Government | 0.414** | | | | |
| Effectiveness (GE) | (2.70) | | | | |
| Regulatory | | 1.374*** | | | |
| Quality (RQ) | | (6.66) | | | |
| Rule of | | | 0.0166 | | |

Continued

| | | | | | |
|---|---|---|---|---|---|
| Law (RL) | | | (0.06) | | |
| Political | | | | -0.625** | |
| Stability (PS) | | | | (-3.21) | |
| Corruption | | | | | 0.281 |
| Control (CC) | | | | | (1.31) |
| Pandemic | -1.322 | -0.790 | -1.868 | -0.970 | -2.214 |
| | (-1.07) | (-0.47) | (-1.29) | (-1.64) | (-1.39) |
| GE*Pandemic | 1.307 | | | | |
| | (1.11) | | | | |
| RQ*Pandemic | | 0.891 | | | |
| | | (0.44) | | | |
| RL*Pandemic | | | 2.177 | | |
| | | | (1.33) | | |
| PS*Pandemic | | | | 1.167 | |
| | | | | (1.59) | |
| CC*Pandemic | | | | | 2.895 |
| | | | | | (1.39) |
| Spinsoff | -1.449*** | -1.609*** | -1.387*** | -0.926* | -1.251*** |

Continued

|  | | | | | |
|---|---|---|---|---|---|
|  | (-4.01) | (-3.78) | (-3.75) | (-2.20) | (-3.93) |
| Capitalisation | -0.0135 | -0.00707 | -0.0174 | -0.0198 | -0.0187 |
|  | (-0.75) | (-0.39) | (-0.95) | (-1.10) | (-0.99) |
| Lending | 1.555 | 1.607$^*$ | 1.665$^*$ | 1.380 | 1.374 |
|  | (1.86) | (2.05) | (1.97) | (1.47) | (1.67) |
| Diversification | 1.205$^*$ | 1.452$^*$ | 1.165$^*$ | 1.247$^{**}$ | 1.180$^*$ |
|  | (2.50) | (2.49) | (2.43) | (2.70) | (2.38) |
| Size | -0.456$^{***}$ | -0.561$^{***}$ | -0.442$^{***}$ | -0.467$^{**}$ | -0.411$^{**}$ |
|  | (-3.43) | (-4.49) | (-3.34) | (-2.77) | (-2.93) |
| Inflation | 0.0251 | -0.112 | 0.0250 | 0.0821 | 0.0587 |
|  | (0.52) | (-1.95) | (0.55) | (1.78) | (1.21) |
| GDP | -0.0635 | 0.0183 | 0.0519 | 0.229 | -0.0377 |
| Per Capita | (-0.52) | (0.13) | (0.53) | (1.88) | (-0.36) |
| Constant | 1.060 | 0.145 | 0.0262 | -1.984 | 0.360 |
|  | (0.62) | (0.08) | (0.02) | (-1.13) | (0.23) |
| Sargan | 39.2618 | 39.0991 | 38.5456 | 39.8932 | 38.5113 |
| p-value | 0.2458 | 0.2515 | 0.2714 | 0.2245 | 0.2727 |
| AR (1) | -2.4534 | -2.7084 | -2.4633 | -2.6353 | -2.4358 |
| p-value | 0.0142 | 0.0068 | 0.0138 | 0.0084 | 0.0149 |
| AR (2) | .4981 | -.1342 | .7117 | .7581 | .8207 |
| p-value | 0.6184 | 0.8932 | 0.4766 | 0.4484 | 0.4118 |
| N | 320 | 320 | 320 | 320 | 320 |

**Notes:** *t* statistics in parentheses, $^*$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

**Table 5:** Impact of Institutional and Pandemic on Financial Stability in Dual Banking Sector for Middle- Income Countries

| Dependent: | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| | Z-score | Z-score | Z-score | Z-score | Z-score |
| L.1 | 0.436*** | 0.453*** | 0.429*** | 0.425*** | 0.415*** |
| | (11.49) | (11.67) | (11.71) | (10.58) | (11.28) |
| Efficiency-Adjusted | 5.091*** | 4.982*** | 4.828*** | 4.971*** | 4.963*** |
| Lerner Index (LI) | (10.49) | (10.04) | (9.58) | (9.96) | (10.40) |
| Cost | -0.672 | -0.553 | -0.532 | -0.629 | -0.744 |
| Efficiency (CE) | (-1.31) | (-1.07) | (-1.04) | (-1.24) | (-1.44) |
| Government | -0.813*** | | | | |
| Effectiveness (GE) | (-4.81) | | | | |
| Regulatory | | -0.631* | | | |
| Quality (RQ) | | (-2.49) | | | |
| Rule of | | | -0.972*** | | |
| Law (RL) | | | (-5.34) | | |
| Political | | | | -0.283 | |
| Stability (PS) | | | | (-1.42) | |
| Corruption | | | | | -1.181*** |
| Control (CC) | | | | | (-5.77) |
| Pandemic | 0.335*** | 0.422*** | 0.0592 | -0.0820 | -0.155 |
| | (3.37) | (3.93) | (0.89) | (-0.84) | (-1.77) |
| GE*Pandemic | -0.391* | | | | |
| | (-2.30) | | | | |
| RQ*Pandemic | | -0.410 | | | |
| | | (-1.82) | | | |
| RL*Pandemic | | | -0.117 | | |
| | | | (-0.93) | | |
| PS*Pandemic | | | | -0.479* | |
| | | | | (-2.46) | |

Continued

| | | | | | |
|---|---|---|---|---|---|
| CC*Pandemic | | | | | -0.440[*] |
| Spinsoff | 0.477 | 0.771 | -0.00510 | -0.587 | -1.276 |
| | (0.59) | (0.95) | (-0.01) | (-0.79) | (-1.66) |
| Capitalisation | -0.0185[*] | -0.0221[**] | -0.0191[**] | -0.0192[**] | -0.0145[*] |
| | (-2.47) | (-2.98) | (-2.63) | (-2.62) | (-1.98) |
| Lending | 1.733[**] | 1.796[**] | 1.708[**] | 1.816[**] | 1.851[**] |
| | (2.96) | (3.12) | (2.94) | (3.10) | (3.25) |
| Diversification | -0.103 | -0.127 | -0.149 | -0.121 | -0.0304 |
| | (-0.43) | (-0.53) | (-0.64) | (-0.52) | (-0.13) |
| Size | -0.378[*] | -0.592[***] | -0.415[**] | -0.543[***] | -0.414[**] |
| | (-2.29) | (-3.91) | (-2.66) | (-3.43) | (-3.12) |
| Inflation | 0.189[***] | 0.285[***] | 0.220[***] | 0.237[***] | 0.155[**] |
| | (3.67) | (5.12) | (4.26) | (4.42) | (3.05) |
| GDP | 0.454 | 0.765[*] | 0.372 | 0.0671 | -0.114 |
| Per Capita | (1.24) | (2.39) | (1.01) | (0.18) | (-0.30) |
| Constant | -2.455 | -4.047 | -1.442 | 2.649 | 3.632 |
| | (-0.71) | (-1.19) | (-0.43) | (0.82) | (1.03) |
| Sargan | 63.2224 | 67.7442 | 67.9987 | 68.7089 | 65.0053 |
| p-value | 0.1369 | 0.0701 | 0.0674 | 0.0601 | 0.1063 |
| AR (1) | -5.506 | -5.5962 | -5.5692 | -5.5667 | -5.4092 |

Continued

| | | | | | |
|---|---|---|---|---|---|
| p-value | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| AR (2) | 1.2521 | .7325 | 1.0359 | .6955 | .8294 |
| p-value | 0.2105 | 0.4638 | 0.3003 | 0.4868 | 0.4068 |
| *N* | 827 | 827 | 827 | 827 | 827 |

**Notes:** *t* statistics in parentheses, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

## 5. CONCLUSION AND RECOMMENDATION

This study examines the impact of institutional, pandemic, and competition on financial stability in the context of the dual banking sector for high- and middle- income countries. According to the regression results, institutional quality is the crucial factor for high- income countries to sustain financial stability. It shows that institutional quality is impacted differently based on the income groups of countries. Another main finding of this study is that pandemics do not have an impact on banking performance whilst pandemic affects banking performance in middle- income countries. As for the interaction term, pandemic strengthened the institutional quality in middle-income countries, but it leads to financial instability. In other words, the countries in middle-income countries responded to the pandemic aggressively and introduced new policies which could deteriorate the financial stability in the dual banking sector. It is important for the regulators and governments to monitor and respond prudently in the midst of a pandemic for the positive result of banking performance. This is because financial stability is one of the main factors to the whole economic system. For future research recommendation, it is interesting to include more countries to examine the impact of pandemic and institutional quality on financial stability. Since the pandemic is different from the financial crisis, its impact and the recovery of the economics sector are crucial to monitor. Other than that, the effect of pandemic and market power should be examined extensively as pandemic also influence the competitive environment of banking sector.

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# APPENDIXES

**APPENDIX A:** Impact of Institutional and Pandemic on Credit Risk (NPL) in Dual Banking Sector for High- Income Countries

| Dependent: | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | **NPL** | **NPL** | **NPL** | **NPL** | **NPL** |
| L.1 | 0.396*** | 0.323*** | 0.377*** | 0.388*** | 0.441*** |
| | (7.29) | (5.69) | (6.80) | (6.99) | (8.06) |
| Efficiency-Adjusted | -0.737* | -0.831** | -0.904** | -0.994*** | -0.928** |
| Lerner Index (LI) | (-2.38) | (-2.81) | (-3.02) | (-3.37) | (-3.00) |
| Cost | 0.468* | 0.552** | 0.623** | 0.660** | 0.572* |
| Efficiency | (2.21) | (2.64) | (2.73) | (2.91) | (2.47) |
| Government | -0.391*** | | | | |
| Effectiveness (GE) | (-3.95) | | | | |
| | | -0.361** | | | |
| Regulatory Quality (RQ) | | (-2.80) | | | |
| Rule of | | | -0.149 | | |
| Law (RL) | | | (-0.89) | | |
| Political | | | | -0.196* | |
| Stability (PS) | | | | (-2.15) | |
| Corruption | | | | | -0.00558 |
| Control (CC) | | | | | (-0.04) |
| Pandemic | 0.358 | 1.093 | 0.862 | 0.316 | 1.238 |
| | (0.40) | (0.97) | (0.86) | (0.71) | (1.14) |
| GE*Pandemic | -0.468 | | | | |
| | (-0.56) | | | | |
| RQ*Pandemic | | -1.542 | | | |
| | | (-1.17) | | | |
| RL*Pandemic | | | -1.144 | | |
| | | | (-1.03) | | |
| PS*Pandemic | | | | -0.577 | |
| | | | | (-1.09) | |
| CC*Pandemic | | | | | -1.785 |
| | | | | | (-1.26) |
| Spinsoff | 1.843*** | 2.174*** | 1.870*** | 1.958*** | 1.833*** |
| | (4.94) | (6.12) | (5.13) | (5.10) | (4.95) |

Continued

| | | | | | |
|---|---|---|---|---|---|
| Capitalisation | 0.0117 | 0.0165 | 0.0140 | 0.00855 | 0.00623 |
| | (1.02) | (1.41) | (1.24) | (0.73) | (0.54) |
| Lending | -1.498*** | -1.586*** | -1.710*** | -1.754*** | -1.623*** |
| | (-5.12) | (-5.28) | (-5.42) | (-5.87) | (-5.70) |
| Diversification | -0.191 | -0.127 | -0.205 | -0.174 | -0.259 |
| | (-0.84) | (-0.56) | (-0.96) | (-0.89) | (-1.14) |
| Size | -0.0460 | -0.130 | -0.0444 | -0.0804 | -0.0385 |
| | (-0.58) | (-1.65) | (-0.59) | (-1.08) | (-0.39) |
| Inflation | 0.0165 | 0.0320 | -0.0158 | 0.0113 | -0.00598 |
| | (0.79) | (1.32) | (-0.71) | (0.58) | (-0.28) |
| GDP | -0.354** | -0.556*** | -0.379** | -0.390** | -0.427** |
| Percapita | (-2.89) | (-4.86) | (-3.07) | (-3.06) | (-3.12) |
| Constant | 5.999*** | 8.875*** | 6.126*** | 6.485*** | 6.520*** |
| | (4.44) | (6.70) | (4.48) | (5.43) | (4.81) |
| Sargan | 36.463 | 38.169 | 38.127 | 37.458 | 35.6709 |
| p-value | 0.4005 | 0.3274 | 0.3291 | 0.3570 | 0.4367 |
| AR (1) | -3.1463 | -2.8141 | -2.9877 | -2.9492 | -3.2681 |
| p-value | 0.0017 | 0.0049 | 0.0028 | 0.0032 | 0.0011 |
| AR (2) | -0.6441 | -0.4724 | -0.4681 | -0.4761 | -0.4573 |
| p-value | 0.5195 | 0.6366 | 0.6397 | 0.6340 | 0.6474 |
| *N* | 338 | 338 | 338 | 338 | 338 |

**Notes:** *t* statistics in parentheses, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

**APPENDIX B:** Impact of Institutional and Pandemic on Credit Risk (NPL) in Dual Banking Sector for Middle- Income Countries

| Dependent: | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | NPL | NPL | NPL | NPL | NPL |
| L.1 | 0.437*** | 0.447*** | 0.448*** | 0.453*** | 0.445*** |
| | (11.17) | (11.56) | (11.56) | (12.14) | (10.71) |
| Efficiency-Adjusted | -1.304** | -1.259** | -1.254** | -1.223** | -1.222** |
| Lerner Index (LI) | (-2.96) | (-3.03) | (-2.91) | (-2.85) | (-2.77) |
| Cost | -0.740* | -0.851** | -0.865** | -0.806* | -0.776* |
| Efficiency | (-2.35) | (-2.67) | (-2.72) | (-2.55) | (-2.44) |

Continued

| | | | | | |
|---|---|---|---|---|---|
| Government | -0.157 | | | | |
| Effectiveness (GE) | (-0.96) | | | | |
| Regulatory Quality (RQ) | | 0.461 | | | |
| | | (1.66) | | | |
| Rule of Law (RL) | | | 0.384 | | |
| | | | (1.46) | | |
| Political Stability (PS) | | | | 0.0416 | |
| | | | | (0.22) | |
| Corruption Control (CC) | | | | | 0.0898 |
| | | | | | (0.49) |
| Pandemic | 0.159 | 0.0519 | 0.0000506 | -0.109 | -0.0658 |
| | (1.53) | (0.46) | (0.00) | (-1.30) | (-0.80) |
| GE*Pandemic | -0.314* | | | | |
| | (-2.04) | | | | |
| RQ*Pandemic | | -0.375 | | | |
| | | (-1.74) | | | |
| RL*Pandemic | | | -0.262* | | |
| | | | (-2.15) | | |
| PS*Pandemic | | | | -0.352* | |
| | | | | (-2.16) | |
| CC*Pandemic | | | | | -0.300 |
| | | | | | (-1.93) |
| Spinsoff | 0.271 | -0.102 | 0.232 | 0.0850 | 0.193 |
| | (0.33) | (-0.14) | (0.30) | (0.11) | (0.22) |
| Capitalisation | 0.00680 | 0.00600 | 0.00513 | 0.00562 | 0.00556 |
| | (1.04) | (0.91) | (0.80) | (0.86) | (0.86) |
| Lending | 1.022* | 1.227* | 1.262** | 1.167* | 1.125* |
| | (2.07) | (2.57) | (2.63) | (2.45) | (2.32) |
| Diversification | 0.0750 | 0.0602 | 0.0779 | 0.0454 | 0.0573 |
| | (0.93) | (0.71) | (0.94) | (0.55) | (0.68) |
| Size | -0.0766 | -0.138 | -0.139 | -0.126 | -0.106 |
| | (-0.88) | (-1.55) | (-1.57) | (-1.42) | (-1.20) |
| Inflation | 0.00966 | -0.00188 | 0.0424 | 0.0329 | 0.0387 |

Continued

|  |  |  |  |  |  |
|---|---|---|---|---|---|
|  | (0.23) | (-0.05) | (1.09) | (0.80) | (0.89) |
| GDP | -0.227 | -0.543 | -0.391 | -0.342 | -0.279 |
| Percapita | (-0.74) | (-1.75) | (-1.38) | (-1.24) | (-0.91) |
| Constant | 3.246 | 6.684 | 5.171 | 4.719 | 3.914 |
|  | (0.96) | (1.94) | (1.63) | (1.53) | (1.16) |
| Sargan | 61.821 | 60.400 | 60.137 | 59.489 | 61.649 |
| p-value | 0.1653 | 0.1983 | 0.2049 | 0.2217 | 0.1691 |
| AR (1) | -4.0476 | -3.9542 | -3.9506 | -3.9956 | -4.0206 |
| p-value | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| AR (2) | -1.01 | -1.0033 | -0.9505 | -0.9886 | -0.9514 |
| p-value | 0.3125 | 0.3157 | 0.3419 | 0.3229 | 0.3414 |
| *N* | 863 | 863 | 863 | 863 | 863 |

**Notes:** *t* statistics in parentheses, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$