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The Moderating Role of Covid-19 on Determinants of Bank Spread

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ABSTRACT

This study investigates the moderating role of Covid-19 on the bank spreads in developing and developed economies. Based on the largest gross domestic product, the study employs unbalanced quarterly bank data of the largest five economies of Europe and South Asia using the Thomson Reuters DataStream database from 2016 to 2021. Generalized least squared dummy variable estimation is carried out. We find that typical determinants of bank spreads hold for both the developed and developing countries. Covid-19 is found to significantly impact bank spreads. However, we find that the impact in the case of Asia was a decrease in bank spreads while bank spreads were higher in the EU during covid-19. During the covid-19 crisis, the magnitudes of typical determinants increased for the case of South Asian banks. In the case, of EU banks the magnitude of bank spread determinants decreased. Evidence suggests an opportunity of arbitrage available to international banks to enter emerging markets and earn higher spreads. This would improve these countries' financial sectors, shrinking net interest margins and converging with those of developed countries.

Introduction

There is evidence of regional variance in net interest margins based on multiple bank-specific and macroeconomic factors. Bank spreads are generally higher in emerging economies compared to the developed world, where more options and competition within banks for clients and sources of funds for their operations encourage the setting of competitive interest rates(Claeys & Vander Vennet, 2008). During the financial crisis of 2008, banks experienced a series of failures and there is evidence of some banks resorting to higher interest rates (Bourkhis & Nabi, 2013). Banks modified their capital structures to lower debts during the crisis (Hussien, Alam, Murad, & Wahid, 2019; Proença, Laureano, & Laureano, 2014). Smaller, more liquid, and capitalized banks outperformed larger banks during the global financial crisis (Bitar, Pukthuanthong, & Walker, 2020; Košak, Li, Lončarski, & Marinč, 2015). Banks with higher quality capital outperformed the rest during the 2008 crisis (Demirguc-Kunt, Detragiache, & Merrouche, 2013). Research revealed contradictory

evidence on the performance of Islamic versus conventional banks during the crisis (Kassim & Shabri, 2010).

Covid-19 was more severe than the global financial crisis in terms of economic activities, however, the recession probabilities were lower (Li, Farmanesh, Kirikkaleli, & Itani, 2021). Baker et al. (2020) attribute this to restrictions on economic activity which caused an unprecedented US stock market reaction compared to other pandemics. Chen and Yeh (2021) compared industries' encourage responses to quantitative easing of US industries in the global financial crisis and covid-19. They found the expansionary policy to have a higher impact on the performance of stocks during the pandemic. Schularick et. al. (2020) estimate a capital shortfall of 0.6 trillion euros during the pandemic.

Additionally, the exchange market was not hit as hard during the covid-19 crisis compared in 2008 (Gunay, 2020). In South Asia banks preempted the crisis and improved their capital positions. As a result, the typical determinants of capital structure became less important and capital structure decision-making was more responsive to the monetary policy (Mohammad, 2021).

Bank spreads represent the financial health and stability of banking sectors. How were they impacted? The earlier global financial crisis negatively impacted the profitability of both conventional and Islamic banks but the latter was less affected by (Amba & Almukharreq, 2013). During 2008 bank CDS spreads, ROA, and net interest margins were impacted by bank liquidity held(W. Da Chen, Chen, & Huang, 2021; Chiaramonte & Casu, 2013). During 2008 the cost of funds increased for US banks (Gilchrist & Mojon, 2018). Egly et. al (2018) found that net interest margins increased during the financial crisis and the yield curve, GDP growth, and liquidity were factors that impacted the margins. Additionally, bank size also moderated the impact of the yield curve on banks' net interest margins. Meanwhile, in Ghana, the net interest margins decreased during the financial crisis. Risk aversion, operating costs, and inflation were impacting the net interest margins in the banking industry (Amuakwa-Mensah & Marbuah, 2015, . Banks failed to sustain profitability in the euro area due to vulnerable margins(Angori, Aristei, & Gallo, 2019). Weigand (2016) assess the performance of US, European and Japanese banks post-financial crisis of 2008 and find that since banks' capital positions were beyond the Basel 3 requirements their margins were adversely impacted. Mohammad (2021) find similar capital structure dynamics in the case of Pakistani banks during the Covid crisis. Dursun-de Neef and Schandlbauer (2020) find evidence of zombie lending in European banks to avoid write-offs during the covid-19 contractionary period with banks lending more if they had low capital. In the presence of zombie lending, how was the bank spread affected?

Evidence on how the pandemic impacted bank margins is limited. Furthermore, whether the level of financial sector development moderates the impact of the crisis on the determinants of bank spread is also not available.

Does this study seek to answer how net interest margins impacted banks impacted during the covid-19 pandemic? Claeys and Vennet (2008) suggest that banking behavior in more developed and developing countries is significantly different. Was the response to net interest margins to Covid the same across developed and developing economies? A sample of 9 countries from Europe and South Asia is chosen based on their gross domestic products to carry this out. The

impact of the pandemic on their bank net interest margins is investigated by estimating an extension of Zhou and Wong (2008) incorporating dummy variables.

Literature Review

Bank net interest margin (NIM) is defined as the difference between the interest expense on deposits and income from loans. It is of financial institutions' health and stability (Ho & Saunders, 1981). This measure does not incorporate income from fees and commissions nor the noninterest expenses of the bank. This measure depicts the spread of the bank (Demirgüç-Kunt & Huizinga, 1999, Imran et al., 2020, Adnan et al., 2020, Imran et al., 2020).

Ho and Saunders (1981) provide a theoretical foundation for how pure spreads are determined by banks. They model a bank that tries to take advantage of the maturity mismatch between loans and deposits and maximize shareholder welfare. The bank imposes a fee over the risk-free rate on deposits and loans for its services. The difference between the lending and deposit rate constitutes the bank's spread for providing services as an intermediary. They suggest that bank spread is determined by market power, risk aversion, the volume of transactions, and interest rate volatility. It suggested a positive role of market power, managerial risk aversion, volume, and interest rate volatility on bank spread determination.

Ho and Saunders (1981) dealership model and its extensions form the bases of most empirical studies on net interest margins. Demirgüç-Kunt and Huizinga (1999) do an expansive empirical study on NIM determinants and suggest the role of bank-specific factors and macroeconomic variables in determining the bank's pure spread. **Bank-specific** variables identified in the literature to impact bank spread include capital ratios, loans, bank size, ownership, overhead costs, market interest rate, operating costs, management quality, operating expenses, term structures, competition, level of financial liberalization, and inflation positively. Non-interest earnings have an inverse relationship with bank spreads(Barajas, Steiner, & Salazar, 2000; Hanweck & Ryu, 2011; Juttner & Gischer, 2003; Maudos & Fernández de Guevara, 2004; Plakalovic & Alihodzic, 2015; Imran et al., 2019a 2019b; Imran et al.,2018). (Hoang Trung & Vu Thi Dan, 2015a) analyze bank spread determinants in Vietnam and find that bank concentration decreases bank spreads, while inflation, risk aversion, and management quality positively impact net interest margins.

Lestari et. al (2021) find no impact of lending on bank spread, whereas bank diversification, liquidity, size, and efficiency of management impact NIM. Trinugroho et. al (2013) suggest that loan portfolio structures impact bank spreads besides risk aversion, liquidity risk market power (positively), whereas credit risk and cost to income impact spreads negatively. Al-Harbi (2019) suggests that off-balance-sheet activities also have a significantly positive impact on bank spreads. They don't find a significant impact of total assets or noninterest incomes on net interest margins. Investment in government securities and higher capitalization are suggested to positively impact bank spreads. Cruz-García and Guevara (2020) find similar findings for OECD countries and suggest a role of deposit insurance premiums in bank spread determination. Iloska (2014) doesn't find an impact of bank size and risk aversion on bank net interest margins. Sensarma and Ghosh (2004) suggest that more competitive banking sectors have lower net interest margins and developing countries have higher net interest margins. Hamadi and Awdeh (2012) have been decreasing over time. López-Espinosa et. al (2011) find a positive impact

of interest rate volatility on bank spreads. They find inflation risk to be a driver of NIM.

Macroeconomic factors identified in the literature include growth, inflation, regulatory frameworks, and financial development levels. Hussain (2014) finds the role of stock market development in reducing the net interest margins of Pakistani banks. The availability of alternate funding sources is a proxy for indirect competition which is hypothesized to reduce margins. Azeez and Gamage (2013) investigate the NIM of southeastern European banks and suggest that regulatory framework and bank ownership determine bank spreads. They suggest that financial sector evolution also impacts bank margins.

Some studies have focused on identifying the impact of recessions, negative economic shocks, and even Covid on the bank's net interest margins. Lee et. al (2015) find that the negative impact of the financial crisis is greater than economic downturns attributed to business cycles to NIM. Dumicic and Rizdak (2013) found that bank spreads decreased in some countries during the global financial crisis while in some they remain stable. The fall in the margins was attributed to poor-quality loans. They found that improved capitalization reduced the fall in NIM. Caprio et al. (2014) suggest that banks with higher NIMs had a higher probability of suffering during the GFC. Angori et al. (2019) analyze the net interest margins of banks during the global financial crisis of 2008 in the Euro area and find that bank capital position and level of supervision impacted bank spreads. Rahmi (2021) doesn't find an impact of covid-19 on bank profitability. In their study model bank spread was a determinant of bank returns, however, are unable to find any evidence of its impact on bank profitability during the Covid crisis in Indonesia. Rachdi (2013) in a study on Tunisian banks found that net interest margins were not impacted during the GFC due to their low integration with the international markets. Obeidat et al. (2021) estimate the impact of covid-19 on bank spreads and profitability in Jordan. They find that banks' profitability decreased during the crisis, however, bank spreads increased. This finding is similar to the one found in European banks. Alharthi (2017) analyzed the impact of the Arab spring on the net interest margins of banks from GCC countries and found that bank spreads decreased significantly during the period.

Hoang Trung and Vu Thi Dan (2015) don't find any impact of economic growth on bank spreads. The study's findings revealed that assets quality, capital adequacy, bank size, earning ability, liquidity position, management soundness, exchange rate, inflation, and market concentration are significant factors for the net interest margin of banks under the study. Egly et al. (2018) analyzed US banks a found that GDP and yield curves positively impacted net interest margins while liquidity and inflation had a negative impact. Tarus et al. (2012) finds that the higher the inflation, the wider the net interest margin, while growth and market concentration hurt the net interest margin. Moussa and Majouj (2016) find similar results for banks of Tunisia The impact of real GDP growth remains ambiguous (Carbó Valverde & Rodríguez Fernández, 2007).

Claeys and Vennet (2008) suggest that banking behavior in more developed and developing countries is significantly different. Using this as a base this study investigates how banks in developing and developed countries responded differently to the Covid-19 crisis in terms of net interest margins.

Material and Methods

The estimation technique extends the model used by (Zhou & Wong, 2008). The dependent variable is net interest margin, (interest income and expense normalized by total assets). The econometric model is as follows and is estimated using the random effect estimation for both the developing (South Asia) and developed countries (EU) separately.

$$\begin{aligned} NIM_{itc} = \alpha_1 + {} & \beta_1 RiskAversion + \beta_2 CreditRisk_{itc} \\ & + \beta_3 Interest\ Income\ to\ Loans_{itc} + \beta_4 Liquidity\ Ratio_{itc} \\ & + \beta_5 Size_{itc} \\ & + \beta_6 NonInterestIncomeRatio_{itc} + \beta_6 EfficiencyRatio_{itc} \\ & + \beta_7 HHI_{ct} + \gamma_1 Covid_{ct} + \beta_9 GDPGrowth_{ct} \\ & + \mu_{itc} \end{aligned} \quad -(1)$$

The dependent variable is the net interest margin for bank i at time t for country c. It closely resembles the bank spread, which is the difference between the lending and deposit rates (Kasman, Tunc, Vardar, & Okan, 2010). Equation 1 shows the function form of the determinant net interest margin derived from the (Ho & Saunders, 1981). Size is a total log of total bank assets. Bank size is the log of total assets. Larger banks may exert market power and demand higher interest rates. It is therefore hypothesized that bank size should positively impact net interest. The degree of bank management risk aversion is proxied as capital to asset ratio. The capital ratio is used as a proxy degree of risk aversion (Zhou & Wong, 2008).

The credit risk is proxied as nonperforming loans as a ratio of total assets. Other studies also use the total loan ratio as a proxy for credit risk. Credit risk is the bank failing to fulfill its agreed contracts on loans leading to loss of cash flow, principal and interest. A higher level of credit risk leads to a higher cost of borrowing. Nonperforming loans as a ratio of total assets are used to proxy the credit risk (Maudos & Fernández de Guevara, 2004). Credit is positively and significantly linked to bank net interest margins (Bektas, 2014). Interest income to loan ratio proxies returns on earning assets. Therefore, higher interest rates are hypothesized to increase bank spreads. The liquidity ratio is the total loan to total deposit ratio. The noninterest income ratio represents earning diversification and is calculated as the noninterest income to total assets ratio. Herfindahl-Hirschman Index (HHI) represents the industry concentration. There are contrasting views on its impact on bank spreads. For example, banking systems with high bank concentration may result in higher net interest margins due to their ability to influence the interest rates (Naceur, 2003). On the other hand, lower monitoring costs in the higher industry may have an inverse impact on (De Haan & Poghosyan, 2012).

$$\begin{aligned} NIM_{itc} = \alpha_1 + {} & \beta_1 RiskAversion + \beta_2 CreditRisk_{itc} \\ & + \beta_3 Interest\ Income\ to\ Loans_{itc} + \beta_4 Liquidity\ Ratio_{itc} \\ & + \beta_5 Size_{itc} + \beta_6 NonInterestIncomeRatio_{itc} + \beta_7 HHI_{ct} \\ & + \beta_9 GDPGrowth_{ct} + \gamma_1 Covid_{ct} + [Interaction\ Terms] \\ & + \mu_{itc} \end{aligned} \quad -(\mathbf{2})$$

Interaction terms measure the moderation effect of Covid-19 on the independent variables' net interest margins relationship. Covid and interaction terms have been extensively used in the literature (Mohammad, 2021; Mohammad & Khan, 2021; Mohammad, Muhammad, & Muhammad, 2021).

Data

The study uses data from all banks of 5 countries in the EU and 4 countries in South Asia based on the highest GDP. From 2016 to 2021 has been taken from the Thomson Reuters database. The list of countries is listed in Table 1. The average net interest margin of banks of the complete sample is 5%. However, the net interest margin of South Asian banks in our sample is 2.8% for European banks and 5.1% for South Asian banks. Developing economies are earning higher margins consistent with expectations. This is consistent with (Hussain, 2014). He suggests the role of stock market development in reducing the net interest margins of Pakistani banks. The availability of alternate funding sources is a proxy for indirect competition which is hypothesized to reduce margins. (Azeez & Gamage, 2013) offer an alternative explanation referring to better regulatory frameworks in developed nations as a reason.

Table 1
List of countries

	List of countries	Region
1	Bangladesh	South Asia
2	India	South Asia
3	Pakistan	South Asia
5	SriLanka	South Asia
6	Germany	EU
7	France	EU
8	Italy	EU
4	Spain	EU
9	UK	EU

Table 2
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NIM	1591	0.052	0.021	0.012	0.177
EtoA	1591	0.142	0.08	0.039	0.586
NPLratio	965	0.049	0.038	0	0.175
LoantoDeposit	1591	0.865	0.259	0.282	2.71
BankSize	1591	20.347	1.296	15.92	24.602
Covid	1591	0.195	0.396	0	1
GrowthofDeposits	1591	0.029	0.099	-0.986	1.126
EfficiencyRatio	1591	0.602	0.111	0.089	0.903
GDP	1591	0.054	0.025	0	0.127
HHI	1591	0.098	0.031	0.054	0.166

Results and discussion

Table 3 reports the estimation results of the model for south Asian and European banks. The model fit in the case of the EU is 65% compared to 18.7% for the Asian banks. The role of homogeneity of bank system across countries in Europe may be a reason for the high R-squared. Gropp and Heider (2010) investigate the

determinants of capital structure in Europe and Asia find similar differences in model explanatory powers.

The study's most interesting finding is related to the impact of covid-19 on the blank margins. Lee et al. (2015) find that the global financial crisis's negative impact is greater than economic downturns attributed to business cycles to NIM. Obeidat et al. (2021) suggests that for Jordanian banks the spread increased during Covid-19. Angori et al. (2019) analyze the net interest margins of banks during the global financial crisis of 2008 in the Euro area and find that bank capital position and level of supervision impacted bank spreads. The difference in capital positions and supervision may be a reason for the difference in response of NIM across the continents. Interestingly enough both (Rachdi, 2013; Rahmi, 2021) find no impact of the 2008 crisis on Tunisian bank's bank's profitability and Covid-19 on bank profitability in Indonesia. Our findings suggest otherwise.

There is a significant impact of covid-19 on the bank spreads in our study. We find that the impact in the case of Asia was a decrease in bank spreads while in the case of the developed countries of the EU the spread increased during Covid. This is consistent with Dumicic and Rizdak (2013) who found that bank spreads decreased in some countries while in some they remained stable during the global financial crisis. Hoang Trung and Vu Thi Dan (2015) find that higher levels of risk aversion increase the bank spread of Vietnamese banks. Iloska (2014) in analyzing banks of Macedonia does not find any evidence of risk aversion impacting bank spreads.

Table 3
Main Results using Randoms Effects estimation.

Variables	M1 (South Asia)	M2 (EU)
Bank Specific		
EtoA	.0026	.0408*
	(.0126)	(.0229)
NPLratio	.0133	-.0537**
	(.0089)	(.0188)
LoantoDeposit	-.0100**	-.0384**
	(.0036)	(.0145)
BankSize	-.0053**	-.0064***
	.0018	(.0019)
GrowthofDeposits	.0008	.0019
	(.0011)	(.0021)
EfficiencyRatio	-.0259***	-.0918***
	(.0073)	(.0097)
Industry Specific		
HHI	-.0017	-.3195***
	(.0096)	(.0622)
Macroeconomic		
GDP	.0234	-.0003
	(.0239)	(.0090)
Covid	-.0062***	.0097***
	(.0010)	(.0021)
Constant	.1438***	.3325***
	(.0351)	(.0405)
Country effects	Controlled	Controlled

Overall R^2	.187	.650
No. of Observation	823	965
No. of Groups	62	66

The degree of management risk aversions that impacts the net interest margin of south Asian banks is insignificant in South Asia. However, risk aversion is found to positively impact the net interest margins of European banks. These results are consistent with previous studies (Hoang Trung & Vu Thi Dan, 2015a; Trinugroho et al., 2013).

Table 4
Interaction Term Results of South Asia

Variables	SA1	SA2	SA3	SA4	SA5	SA6
Bank Specific						
EtoA	.0111 (.0123)	.0092 (.0136)	.0009 (.0125)	.0036 (.0130)	.0138 (.0149)	.0083 (.0131)
NPLratio	.0122 (.0094)	.0167 (.0102)	.0151* (.0091)	.0129 (.0092)	.0101 (.0109)	.0123 (.0095)
LoantoDeposit	-.0091** (.0036)	-.0086** (.0037)	-.0090** (.0035)	-.0100** (.0038)	-.0076* (.0039)	-.0094** (.0037)
BankSize	-.0058** (.0020)	-.0062** (.0020)	-.0058** (.0020)	-.0053** (.0018)	-.0066** (.0021)	-.0060** (.0020)
GrowthofDeposits	.0016 (.0011)	.0018 (.0012)	.0019 (.0013)	.0010 (.0011)	.0030** (.0012)	.0018 (.0012)
EfficiencyRatio	-.0249*** (.0066)	-.0249*** (.0072)	-.0258*** (.0067)	-.0267*** (.0074)	-.0250*** (.0075)	-.0247*** (.0076)
Industry Specific						
HHI	-.0121 (.0094)	-.0230** (.0097)	-.0056 (.0082)	-.0044 (.0093)	-.0305 (.0107)	-.0077 (.0082)
Macroeconomic						
GDP	-.0117 (.0314)	-.0340 (.0299)	.0223 (.0408)	.0177 (.0239)	-.0509 (.0276)	-.0066 (.0338)
Interaction term						
CovxEtoA	-.0223*** (.0052)					
CovxNPL		-.0580*** (.0167)				
CovxLoantoDeposit			-.0039*** (.0009)			
CovxSize				-.0003*** (.0001)		
CovxGrowthofDeposits					-.0009*** (.0023)	
CovxEfficiencyRatio						-.0118*** (.0028)
Constant	.1539*** (.0383)	.1616*** (.0389)	.1530*** (.0394)	.1455*** (.0359)	.1693*** (.0406)	.1555*** (.0398)
Country effects	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Overall R^2	.188	.183	.179	.189	.190	.184
No. of Observation	823	823	823	823	823	823
No. of Groups	62	62	62	62	62	62

The credit risk proxied by the non-performing loans ratio has a similar effect across the continents. Credit risk negatively impacts the net interest margins of European banks. Literature reveals similar results (Demirgüç-Kunt & Huizinga, 1999; Trinugroho et al., 2013). Higher non-performing loans negatively impact the net interest margin of these banks. The bank is found to negatively impact net interest margins across both developing and developed countries. Other studies also find a significant impact of liquidity on the bank spreads (Hoang Trung & Vu Thi Dan, 2015b; Lestari et al., 2021). The impact of liquidity on the bank spread is higher in the case of the EU compared to South Asia. Smaller banks are found to have higher bank spreads in the case of both EU and South Asia.

The growth of deposits has no impact on banks' net interest margins in both the developed and developing regions. The efficiency ratio is the ratio of interest expense to interest income and negatively impacts net interest margins consistent with theory. Bank concentration has a significant impact on net interest margins in EU banks. The effect is insignificant in Asia. Sensarma and Ghosh (2004) suggest that more competitive banking sectors have lower net interest margins and developing countries have higher net interest margins. The findings of the impact of HHI on net interest margins are conflicting, with some evidence suggesting a negative impact due to higher competition. In contrast, others suggest that bank systems with disproportionate shares of assets across banks may lead to collusion in interest rate settings.

Asia

Models SA 1 to 6 test equation 2 and estimate the impact of covid-19 on the size of the coefficients of the NIM determinants in the developing economies. These models include interaction terms of the Covid dummy multiplied by the bank-specific variables. CovxEtoA for example is calculated by multiplying the Covid dummy with EtoA(risk aversion). We look at the sign and significance of this variable coefficient and the original risk aversion coefficient to see how its impact on bank margins changes during the covid-19 crisis period.

In the case of South Asia, it did not have a significant impact on net interest margins. However, during the Covid, there is a significant impact of risk aversion proxied by capital ratio on the net interest margins. The negative sign suggests a reduction in the size of the overall impact of EtoA on net interest margins during the Covid period. NPL ratio has a similar impact. The interaction term is found to have a significant negative impact during the crisis period. The loan to deposit ratio hurt net interest margins and the size of the impact on net interest margins increased during the Covid period.

Size had a significant impact on the net interest margins of banks. During the Covid period, the size of the impact increased, suggesting that the role of size in determining net interest margins increased.

Table 5
Interaction Term Results of Europe

Variables	EU1	EU2	EU3	EU4	EU5	EU6
Bank Specific						
EtoA	.0464**	.0467*	.0470**	.0408*	.0496**	.0398*
	(.0225)	(.0243)	(.0233)	(.0228)	(.0246)	(.0226)

NPLratio	-.0857*** (.0194)	-.0800*** (.0209)	-.0757*** (.0196)	-.0532** (.0189)	-.0875*** (.0244)	-.0526** (.0192)
LoantoDeposit	-.0414** (.0150)	-.0401** (.0153)	-.0417** (.0151)	-.0382** (.0145)	-.0423** (.0157)	-.0374** (.0145)
BankSize	-.0056** (.0019)	-.0042** (.0018)	-.0055** (.0019)	-.0064** (.0019)	-.0033** (.0019)	-.0061** (.0019)
GrowthofDeposits	.0014 (.0020)	-.0001 (.0024)	.0015 (.0020)	.0017 (.0021)	.0006 (.0032)	.0016 (.0021)
EfficiencyRatio	-.0856*** (.0094)	-.0922*** (.0107)	-.0899*** (.0098)	-.0917*** (.0098)	-.0946*** (.0111)	-.0944*** (.0095)
Industry Specific						
HHI	-.2892*** (.0588)	-.2269*** (.0053)	-.2907*** (.0671)	-.3254*** (.0625)	-.1028*** .0497	-.3194*** (.0639)
Macroeconomic						
GDP	-.0096 (.0094)	-.0185* (.0095)	-.0096 (.0095)	-.0005 (.0089)	-.0296** (.0123)	-.0014 (.0089)
Interaction term						
CovxEtoA	.0554*** (.0110)					
CovxNPL		.1053** (.0360)				
CovxLoantoDeposit			.0099*** (.0027)			
CovxSize				.0005*** (.0001)		
CovxGrowthofDeposits					-.0007 (.0044)	
CovxEfficiencyRatio						.0163*** (.0036)
Constant	.3153*** (.0391)	.2837*** (.0386)	.3152*** (.0390)	.3348*** (.0411)	.2514*** (.0368)	.3285*** (.0406)
Country effects	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Overall R^2	.657	.673	.660	.650	.679	.654
No. of Observation	965	965	965	965	965	965
No. of Groups	66	66	66	66	66	66

It is found that the growth of deposits did not significantly impact banks' net interest margins before or during the Covid crisis. The size of the coefficient of bank efficiency also increased during the covid-19 period.

Europe

EU Models 1 to 6 test equation (2) for the countries from the EU and estimate the impact of covid-19 on the size of the coefficients of the NIM determinants in developed economies. In the case of developed countries, during the Covid, there is a difference in the impact of risk aversion (EtoA) on the net interest margins before and during the covid-19 crisis. The positive sign suggests that the magnitude of risk aversion proxy on the net interest margins of European banks increased. Moreover, during Covid-19 the impact on nonperforming loans became positive on bank spread.

The impact of liquidity on net interest margin was significant during Covid and the magnitude of the impact decreased during the crisis period. The negative impact of bank size on net interest margins also reduced magnitude during the

period. As a result, bank efficiency also becomes less important in determining the bank spread during the covid-19 crisis period.

Conclusion

The study's objectives were to examine the impact of covid-19 on bank spreads of banks and any cross-continental differences in banks' response to the crisis. We find that typical determinants of net interest margins hold for both the developed and developing countries. Banks in developing markets are found to be earning higher spreads compared to developed markets. Credit quality, degree of risk aversion, and bank concentration are not found to impact bank spreads in South Asia compared to Europe. The other variables have similar impacts on bank net interest margins. The model fit is also higher in the case of European banks compared to South Asian banks, which can be attributed to the homogeneity of bank systems in Europe. There is a significant impact of covid-19 on bank spreads. However, we find that the impact in the case of Asia was a decrease in bank spreads while bank spreads were higher in the EU during covid-19. During the covid-19 crisis, the magnitudes of typical determinants increased for the case of South Asian banks. In the case of EU banks, the magnitude of the determinants of bank interest margins decreased. Evidence suggests an opportunity of arbitrage available to international banks to enter emerging higher spreads. This would improve these countries' financial sectors, shrinking net interest margins and converging with those of developed countries. It would be interesting to see how the entrance of foreign banks into less developed banking sectors impacts the net interest margins of banks.

References

Adnan Safi, Imran. M. (2020). Financial instability and Consumption-based Carbon Emission in E-7 Countries: The Role of Trade and Economic Growth. *Sustainable Production and Consumption*. 27(1). https://doi.org/10.1016/j.spc.2020.10.034.

Al-Harbi, A. (2019). The determinants of conventional banks profitability in developing and underdeveloped OIC countries. *Journal of Economics, Finance and Administrative Science*, *24*(47), 4–28. https://doi.org/10.1108/JEFAS-05-2018-0043

Alharthi, M. (2017). Financial performance and stability in Islamic banks: Evidence from GCC countries. *Corporate Ownership and Control*, *14*(4), 103–113. https://doi.org/10.22495/cocv14i4art9

Amba, M. S., & Almukharreq, F. (2013). Impact of the Financial Crisis on Profitability of the Islamic Banks vs Conventional Banks- Evidence from GCC. *International Journal of Financial Research*, *4*(3). https://doi.org/10.5430/ijfr.v4n3p83

Amuakwa-Mensah, F., & Marbuah, G. (2015). The Determinants of Net Interest Margin in the Ghanaian Banking Industry. *Journal of African Business*, *16*(3), 272–288. https://doi.org/10.1080/15228916.2015.1069679

Angori, G., Aristei, D., & Gallo, M. (2019). Determinants of banks' net interest margin: Evidence from the Euro Area during the crisis and post-crisis period. *Sustainability (Switzerland)*, *11*(14). https://doi.org/10.3390/su11143785

Azeez, A. ., & Gamage, S. (2013). the Determinants of Net Interest Margins of. *Journal of Commerce*, *18*(5), 17–36.

Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosin, T. (2020). The unprecedented stock market reaction to COVID-19. *Review of Asset Pricing Studies*. https://doi.org/10.1093/rapstu/raaa008

Barajas, A., Steiner, R., & Salazar, N. (2000). The impact of liberalization and foreign investment in Colombia's financial sector. *Journal of Development Economics* (Vol. 63, pp. 157–196). https://doi.org/10.1016/S0304-3878(00)00104-8

Bektas, E. (2014). Are the determinants of bank net interest margin and spread different? the case of North Cyprus. *Banks and Bank Systems*, *9*(4), 82–91.

Bitar, M., Pukthuanthong, K., & Walker, T. (2020). Efficiency in Islamic vs. conventional banking: The role of capital and liquidity. *Global Finance Journal*, *46*, 100487. https://doi.org/10.1016/j.gfj.2019.100487

Bourkhis, K., & Nabi, M. S. (2013). Islamic and conventional banks' soundness during the 2007-2008 financial crisis. *Review of Financial Economics*, *22*(2), 68–77. https://doi.org/10.1016/j.rfe.2013.01.001

Caprio, G., D'Apice, V., Ferri, G., & Puopolo, G. W. (2014). Macro-financial determinants of the great financial crisis: Implications for financial regulation. *Journal of Banking and Finance*, *44*(1), 114–129. https://doi.org/10.1016/j.jbankfin.2014.03.001

Carbó Valverde, S., & Rodríguez Fernández, F. (2007). The determinants of bank margins in European banking. *Journal of Banking and Finance*, *31*(7), 2043–2063. https://doi.org/10.1016/j.jbankfin.2006.06.017

Chen, W. Da, Chen, Y., & Huang, S. C. (2021). Liquidity risk and bank performance during financial crises. *Journal of Financial Stability*, *56*. https://doi.org/10.1016/j.jfs.2021.100906

Chen, H. C., & Yeh, C. W. (2021). Global financial crisis and COVID-19: Industrial reactions. *Finance Research Letters*, *42*. https://doi.org/10.1016/j.frl.2021.101940

Chiaramonte, L., & Casu, B. (2013). The determinants of bank CDS spreads: Evidence from the financial crisis. *European Journal of Finance*, *19*(9), 861–887. https://doi.org/10.1080/1351847X.2011.636832

Claeys, S., & Vander Vennet, R. (2008). Determinants of bank interest margins in Central and Eastern Europe: A comparison with the West. *Economic Systems*, *32*(2), 197–216. https://doi.org/10.1016/j.ecosys.2007.04.001

Cruz-García, P., & Fernández de Guevara, J. (2020). Determinants of net interest margin: the effect of capital requirements and deposit insurance scheme. *European Journal of Finance*, *26*(11), 1102–1123. https://doi.org/10.1080/1351847X.2019.1700149

De Haan, J., & Poghosyan, T. (2012). Bank size, market concentration, and bank earnings volatility in the US. *Journal of International Financial Markets, Institutions and Money*, *22*(1), 35–54. https://doi.org/10.1016/j.intfin.2011.07.002

Demirguc-Kunt, A., Detragiache, E., & Merrouche, O. (2013). Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking*, *45*(6), 1147–1164. https://doi.org/10.1111/jmcb.12047

Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *World Bank Economic Review*, *13*(2), 379–408. https://doi.org/10.1093/wber/13.2.379

Dumicic, M., & Rizdak, T. (2013). Determinants of banks' net interest margins in Central and Eastern Europe. *Financial Theory and Practice*, *37*(1), 1–30. https://doi.org/10.3326/fintp.37.1.1

Dursun-de Neef, H. Ö., & Schandlbauer, A. (2020). COVID-19 and European Banks. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3681937

Egly, P. V., Johnk, D. W., & Mollick, A. V. (2018). Bank net interest margins, the yield curve, and the 2007-2009 financial crisis. *Review of Financial Economics*, *36*(1), 12–32. https://doi.org/10.1002/rfe.1016

Gilchrist, S., & Mojon, B. (2018). Credit Risk in the Euro Area. *Economic Journal*, *128*(608), 118–158. https://doi.org/10.1111/ecoj.12427

Gropp, R., & Heider, F. (2010). The determinants of bank capital structure. *Review of Finance*, *14*(4), 587–622. https://doi.org/10.1093/rof/rfp030

Gunay, S. (2020). COVID-19 Pandemic Versus Global Financial Crisis: Evidence from Currency Market. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3584249

Hamadi, H., & Awdeh, A. (2012). The Determinants of Bank Net Interest Margin : Evidence from the Lebanese Banking Sector. *Journal of Money, Investment and Banking*, *23*(23), 85–98.

Hanweck, G. A., & Ryu, L. H. (2011). The Sensitivity of Bank Net Interest Margins and Profitability to Credit, Interest-Rate, and Term-Structure Shocks Across Bank Product Specializations. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.886727

Ho, T. S. Y., & Saunders, A. (1981). The Determinants of Bank Interest Margins: Theory and Empirical Evidence. *The Journal of Financial and Quantitative Analysis*, *16*(4), 581. https://doi.org/10.2307/2330377

Hoang Trung, K., & Vu Thi Dan, T. (2015a). Determinants of Net Interest Margin of Commercial Banks in Vietnam. *Journal of Economics and Development*, 69–82. https://doi.org/10.33301/2015.17.02.04

Hoang Trung, K., & Vu Thi Dan, T. (2015b). Determinants of Net Interest Margin of Commercial Banks in Vietnam. *Journal of Economics and Development*, 69–82. https://doi.org/10.33301/2015.17.02.04

Hussain, I. (2014). Banking industry concentration and net interest margins (NIMs) in Pakistan. *Journal of Business Economics and Management*, *15*(2), 384–402. https://doi.org/10.3846/16111699.2012.732105

Hussien, M. E., Alam, M. M., Murad, M. W., & Wahid, A. (2019). The performance of Islamic banks during the 2008 global financial crisis Evidence from the Gulf Cooperation Council countries. *Journal of Islamic Accounting and Business Research*, *10*(3), 407–420. https://doi.org/10.1108/JIABR-01-2017-0011

Iloska, N. (2014). Determinants of net interest margins - the case of Macedonia. *Journal of Applied Economics and Business*, *2*(2), 17–36.

Imran, M. et al (2020). Effect of Regional Factor Productivity on Manufacturing Sector: Under the scenario of Sino-Pak Economic ties. Financial Innovation. 6(5). pp.1-14. https://doi.org/10.1186/s40854-019-0163-z.

Imran, M., Zhang, G. & An, H. (2017). Impact of Market Access and Comparative Advantage on regional distribution of manufacturing sector. China Finance and Economic Review. 5(4). doi:10.1186/s40589-017-0047

Imran, M., Rafique, M., Imranullah, (2019). A Spatiotemporal Approach to Measure Impact of Factors of Production on Innovations. *Journal of Applied Economics and Business Studies*. 03(1), 61-78.

Imran, M., Kaleem, M., Baryal, A. (2018). Impact of Social instability on tourism Industry. Pakistan Journal of Criminology. 10(4), 83-96.

Imran, M., Kaleem, M., Zahoor, H. (2019). Evaluation of Students' Perception Regarding Educational Environment and Future Prospects. Sir Syed Journal of

Education & Social Research. 2(2), 81-99. doi.org/10.36902/sjesr-vol2-iss2-2019(81-99).

Juttner, D., & Gischer, H. (2003). Global Competition, Fee Income and Interest Rate Margins of Banks. *Kredit Und Kapital*, *36*(June), 368–394.

Kasman, A., Tunc, G., Vardar, G., & Okan, B. (2010). Consolidation and commercial bank net interest margins: Evidence from the old and new European Union members and candidate countries. *Economic Modelling*, *27*(3), 648–655. https://doi.org/10.1016/j.econmod.2010.01.004

Kassim, S. H., & Shabri, M. (2010). Impact of financial shocks on Islamic banks: Malaysian evidence during 1997 and 2007 financial crises. *International Journal of Islamic and Middle Eastern Finance and Management*, *3*(4), 291–305. https://doi.org/10.1108/17538391011093243

Košak, M., Li, S., Lončarski, I., & Marinč, M. (2015). Quality of bank capital and bank lending behavior during the global financial crisis. *International Review of Financial Analysis*, *37*, 168–183. https://doi.org/10.1016/j.irfa.2014.11.008

Lee, J. Y., Growe, G., DeBruine, M., & Cha, I. (2015). Measuring the Impact of the 2007-2009 Financial Crisis on the Performance and Profitability of U.S. Regional Banks. *Advances in Management Accounting*, 25, 181–206, https://doi.org/10.1108/S1474-787120150000025005

Lestari, H. S., Chintia, H., & Akbar, I. C. (2021). Determinants of Net Interest Margin on Conventional Banking: Evidence in Indonesia Stock Exchange. *Jurnal Keuangan Dan Perbankan*, *25*(1). https://doi.org/10.26905/jkdp.v25i1.5102

Li, Z., Farmanesh, P., Kirikkaleli, D., & Itani, R. (2021). A comparative analysis of COVID-19 and global financial crises: evidence from US economy. *Economic Research-Ekonomska Istrazivanja* , 1–15. https://doi.org/10.1080/1331677X.2021.1952640

López-Espinosa, G., Moreno, A., & Pérez de Gracia, F. (2011). Banks' net interest margin in the 2000s: A macro-accounting international perspective. *Journal of International Money and Finance*, *30*(6), 1214–1233. https://doi.org/10.1016/j.jimonfin.2011.06.001

Maudos, J., & Fernández de Guevara, J. (2004). Factors explaining the interest margin in the banking sectors of the European Union. *Journal of Banking and Finance*, *28*(9), 2259–2281. https://doi.org/10.1016/j.jbankfin.2003.09.004

Mohammad, K. U. (2021). How bank capital structure decision-making change in recessions: Covid-19 evidence from Pakistan. *Asian Journal of Economics and Banking*, *ahead-of-p*(ahead-of-print). https://doi.org/10.1108/ajeb-04-2021-0049

Mohammad, K. U., & Khan, M. R. (2021). Bank Capital Structure Dynamics and Covid-19: Evidence from South Asia. *IRASD Journal of Economics*, *3*(3), 301. https://doi.org/10.52131/joe.2021.0302.0045

Mohammad, K. U., Muhammad, A., & Muhammad, K. U. (2021). Post-Crisis Behavior of Banks in Asia: A Case of Chronic Over-Capitalization. *Journal of Asian Finance,*

Economics and Business, *8*(3), 517–525. https://doi.org/10.13106/jafeb.2021.vol8.no3.0517

Moussa, M. A. Ben, & Majouj, W. (2016). Determinants of Bank Net Interest Margin: Case of Tunisia. *International Journal of Finance & Banking Studies (2147-4486)*, *5*(3), 103–116. https://doi.org/10.20525/ijfbs.v5i3.252

Naceur, S. (2003). The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence. *Universite Libre de Tunis Working Papers*, 1–17. Retrieved from http://www.mafhoum.com/press6/174E11.pdf

Obeidat, M., Khataibeh, M., Omet, G., & Tarawneh, A. (2021). The performance of banks in a developing country: has Covid-19 made any difference. *Pressacademia*, *8*(2), 102–108. https://doi.org/10.17261/pressacademia.2021.1395

Plakalovic, N., & Alihodzic, A. (2015). Determinants of the net interest margins in BH banks. *Industrija*, *43*(1), 133–153. https://doi.org/10.5937/industrija43-7544

Proença, P., Laureano, R. M. S., & Laureano, L. M. S. (2014). Determinants of Capital Structure and the 2008 Financial Crisis: Evidence from Portuguese SMEs. *Procedia - Social and Behavioral Sciences*, *150*, 182–191. https://doi.org/10.1016/j.sbspro.2014.09.027

Rachdi, H. (2013). What Determines the Profitability of Banks During and before the International Financial Crisis? Evidence from Tunisia. *International Journal of Economics, Finance and Management*, *2*(3), 330–337.

Rahmi, Y. E. S. (2021). A study of the impact of alma to profitability during the covid-19 pandemic. *International Journal of Business Economics and Law*, *24*(3), 54–65.

Schularick, M., Steffen, S., & Tröger, T. H. (2020). A Service of zbw Standard-Nutzungsbedingungen: Bank capital and the European recovery from the COVID-19 crisis. *CEPR Discussion Paper*,www.econstor.eu

Sensarma, R., & Ghosh, S. (2004). Net Interest Margin: Does Ownership Matter? *Vikalpa*, *29*(1), 41–48. https://doi.org/10.1177/0256090920040104

Tarus, D. K., Chekol, Y. B., & Mutwol, M. (2012). Determinants of Net Interest Margins of Commercial Banks in Kenya: A Panel Study. *Procedia Economics and Finance*, *2*, 199–208. https://doi.org/10.1016/s2212-5671(12)00080-9

Trinugroho, I., Agusman, A., & Tarazi, A. (2013). Why Have Bank Interest Margins Been so High in Indonesia Since the 1997/1998 Financial Crisis? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2319057

Weigand, R. A. (2016). The performance and risk of banks in the U.S., Europe and Japan post-financial crisis. *Investment Management and Financial Innovations*, *13*(4), 75–93. https://doi.org/10.21511/imfi.13(4).2016.07

Zhou, K., & Wong, M. C. S. (2008). The determinants of net interest margins of commercial banks in Mainland China. *Emerging Markets Finance and Trade*, *44*(5), 41–53. https://doi.org/10.2753/REE1540-496X440503