What Determines Risk-Taking Behavior for Organization for Economic Co-operation and Development's Commercial Banks

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Abstract
The research examines the influence of bank-level and macroeconomic factors for risk-taking behavior for Organisation for Economic Co-operation and Development (OECD) commercial banks as an excessive level of bank risk hampers the long-term and sustainable growth of banks. For this purpose, we have taken a large sample of 7616 banks that are actively operating in 36 member countries from 2010 to 2017 by incorporating some macroeconomic variables as instruments and industry control variables to extend previous findings. Our study applies the ordinary least squares (OLS), panel corrected the standard error (PCSE), models.The endogeneity issue, often neglected in previous studies, has also been addressed using the one-step difference general method of moments (GMM). Results obtained by usage of instrumental variables on impaired loans are highly dependable. The variables as management efficiency,, negatively affect risk-taking behavior; however, capitalization significantly increase bank risk. GDP improves economic conditions by causing an instant reduction in the impaired loan portfolio of commercial banks. These findings are relevant to the background of trickledown effects of the global financial crises and have certain policy implications in developed and emerging countries of the economic block.

Keywords: *Bank risk-taking behavior, endogeneity, impaired loans, OECD, panel data*

Introduction
When the economy is at expansion, and growth of GDP is at movement, borrowers want adequate funds from banks based on debt, however, in the time of crisis, there is a decline in the debts. The framework of interface financial system and economy is a critical (Woodford, 2010). A study by (Mizanur et al., 2018) proves the market structure of banks and GDP shows no impact on IMP that can be measured. Although numerous studies explored the same issues, without fully covering the financial situation after the GFC of 2007. The study helps to organize commercial banks' credit. It is a significant challenge for managers and is a vital issues in decision making related to credit loans and guaranteed banks' credibility and profitability.

The present study enhances the discussion with analysis on control of IMP in a group of countries as an (Altunbas et al., 2007). The change in capital requirement improved financialsystem lending. The impact was felt by medium and long term timeframe, therefore, commercial banks regulated interest rates as reimbursement for increased price premium especially explained by (López-espinosa et al., 2011) for the cross country study. A detailed study by (Salas, V., & Saurina, 2002) showed an improved economy led to an instant reduction in the IMP portfolio of commercial banks. (Us, 2017) consider GDP as an important determinant of the IMP. During the time of higher growth and financial crises, borrowers were unable to pay the debt, especially of state banks. Khemraj and Pasha (2013) showed an inverse relationship of GDP, and IMP suggested that an improvement of the economy led to a positive growth in gross domestic product improved debt serving's capacity of the borrower. The findings on OECD research prove that IMP were affected by the GFC in the short-run and have a stable pattern of business in the long run. The overall conclusion of the study is that despite heavy bank regulations after GFC banks are still concerned to earn profits. In the framework of risk-taking behaviors for economic and global financial situations. Commercial banks need improved bank supervision, government performance, and bank risk-taking decision to earn profits.

Someway, the commercial banks need to improve profitability to lower down the credit risk and maintain bank risk-taking behavior. The study objectives is to gain some idea about bank risk-taking and financial performance. Banks have to face or tend to take risks as IMP. Banks need to pay attention to the kind of services and activities in parallel to profit maximization. Following the GFC of 2007, profitability and bank risk-taking behavior becomes the most important problems for both policymakers and academics (Rachdi et al., 2018).Developed and emerging countries in OECD have rapid development and risk-taking have an active part to cultivate lucrative results in the banking market. The wide variety of empirical results have been analyzed by the variations in the level of countries' risk-taking behavior, to emphasize the effect of commercial banks on fiscal growth. The present study is about impaired loans in a group of countries as an example of bank risk-taking behavior by the use of different measures (Altunbas, Carbo, Gardener, & Molyneux, 2007).

The risk-taking behavior adapted in developed countries was stable over the years but the situation has changed lately during the time with the development of growing countries included in the co-operation/ The research adds to the previous study as follows: Firstly, the analysis offers experimental literature on impaired loans with the use of macro-economic variables as the instruments (IV) and specific bank industry variables as additional control variables. Dissimilar to the neoclassical viewpoint on risk-taking behavior previously used in economics, the study uses the alternative approach Prospect Theory (PT). According to PT, banks choose to risk and indecision as an effect that involves subjective judgment, subtle to the methods of choice outlined to target performance. In opposition to neoclassical thoughts about risk-taking behavior application in economics, the study introduced the proposition of Prospect Theory (Kahneman, 1979). The choice of bank, for risk and uncertainty, is an outcome with the inclusion of subjective judgment, sensitive to ways of choice are framed compared to performance target under the status quo. The biased theory of prospect theory (Kahneman & Tversky, 2007) is based on two themes; to edit operations and understand how prospects are received. The theory gives the behavior of a person who misjudges results that are just likely to happen in contrast to situations that are achieved for sure.

The theory is structured for the monetary outcome and linked probabilities. The propensity, known as certainty effect funds risk aversion to making selections that include guaranteed improvements. A risk-taking decision is an option between prospects and gambles. Risk aversion is the preference for risky prospects and is a best-identified generalization of risky choices. The theory mentions a reflection effect where risk aversion is taken as a positive approach and risk-taking is considered a negative domain. The outcome of the situation can be a shift from avoiding risk to risk-seeking. A positive approach is the surety of gain over bigger gain that is probable to happen. Results of OLS as our standard model, the result shows that bank and macro-economic variables significantly affect the portfolio of impaired loans. The existence of endogeneity of impaired loans was the primary issue for analysis. Therefore, the instrumental variables (IV) of gross domestic products and real interest rates were tested with the assumption that the IVs were the critical long term causes of impaired loans of banks. The macro-economic variable used in the model is to determine the causal outcomes. A robustness test was performed to gain an in-depth knowledge of results by the use of an alternate variable collected from Bureau Van Dijk's Bank Focus and World Development Indicator (WDI) database from 2010 to 2017.

The IV in dynamic one-step difference GMM was also performed to measure the consistency of results. For a maximum time, a test was done on existing data for OECD commercial banks on Dijk's BankFocus system with a comprehensive and reliable calculation of the proxy. The proxy was authentically developed for impaired loans by valuations based on formulae that were robust as compared to traditional accounting methods. The data set consists of all 36 OECD countries. Secondly, unlike other studies that used just one estimation model to study endogeneity (López-espinosa, Moreno, Pérez, & Gracia, 2011 and Ahmad & Ariff, 2007) the paper finds, PCSE, and GMM as appropriate models to check for robustness for panel data. Therefore, the study provides practical implications for bank directors and policy-makers in the 36 OECD countries. The research paper was structured as an introduction and background study of banks in OECD. Section 2 consists of a literature review on risk-taking behavior. Section 3 provides details for the dataset. Section 4 presents the methodology framework of regression analysis and a robustness check of models. Section 5 gives findings and empirical results. Section 6 provides some conclusions and implications of policy.

Theoretical Background and Literature Review

Chikoko, Mutambanadzo and Vhimisai (2012) showed that the high impaired loans in the bank balance sheet resulted in a further rise of loans. With time unpaid interest carried compound interest on the principal amount of the portfolio of loans. Big banks faced a lower risk with less volume of risky loans provided with high returns and attracted debtors. On the other hand, small firms were required to maintain high equity which was possible if banks either lowered the credit supply to debtors that were the risk-takers or imposed a high risk on loans.

Bank Specific Variables

Management efficiency studied by Marinković and Radović (2014) is a method to express the balance sheet aspect. Newly operating banks of different sizes had a high amount of investment as fixed assets, liquid assets, and earning assets as a counterbalance which might not be the case for old banks. According to the studies by (Altunbas, Liu, Molyneux, & Seth, 2000; Girardone, Molyneux, & Gardener, 2004; Sufian, 2009; Semih, & Philippatos, 2007 &Havrylchyk, 2006) the coefficient of the impaired loans and management efficiency were negative as problem loans decreased the volume of earning assets, and created additional cost due to monitoring by

management and enforcement of loan payment. Similarly Ahmad and Ariff (2007) and Angbazo, 1997) proposed that commercial banks in developed and emerging economies sustained a level of management efficiency as two-third of their assets collection bear interest to earn interest income. The ratio of earning assets to total assets was the efficiency of administration for revenue generation and to write down the impaired loans. Banks consist of more interest-earning assets than a loan in the form of investment securities and thus the income earned faced no non-performing situations or high rates of default. Capital in commercial banks was proxy by total equity to total assets. Mirzaei, Moore & Liu (2013) indicated that capitalization was a measure of the resilience of banks for any unwanted loss or risk and borrowing cost and banks were capable enough to gain profits during an economic recession. Banks fulfill the capital requirements by an increment of the contribution of shareholders and a decrease in the risky assets (Bougatef & Mgadmi, 2016; Poghosyan, 2013 and Faizulayev, Bektas, & Ismail, 2018) state that the capital adequacy as regulatory capital of banks determines the impaired loans (Makri, Tsagkanos, Bellas, 2014) proved banks with higher capitalization ratio had the high impaired loan and analysis by (Boudriga, Boulila Taktak, & Jellouli, 2009) gave the phenomenon as a result of an absence of strict law enforcement, also a study by (Ahmad & Ariff, 2007) point to need of capital by banks as a safety net against loss bearing the credit risk. (Koehn & Santomero, 1980 and Rime, 2001) evidenced that bank risk-taking behavior had a positive relationship with capital adequacy as a large volume of capital help banks to escalate the assets' riskiness that ultimately results in the portfolio of impaired loans.In a study by Ashraf et al. (2016) and Louzis, Vouldis, & Metaxas (2012), the phenomenon clearly explained as capital regulation affects the risk taken by banks in the assets portfolio. The impaired loans were significantly under impact by lending as suggested by (Salas, V., & Saurina, 2002; Jesus & Gabriel, 2006; Keeton, W. R., & Morris, 1987; Sinkey, & Greenawalt, 1991 and Ropele & Tiziano, 2011). Espinoza & Prasad (2010) showed high lending by banks report the high impaired loans due to a surge in interest rates. Aiyar et al., (2016) stated that change in the amount demand of credit was centered on the kind, the magnitude of bank size and the ratio of capital required was dependent on loan growth or the quality of credit for small or large banks.

Macroeconomic Variables

A detailed study by (Salas, & Saurina, 2002 and Rajan, R., & Dhal 2003) showed that an improved economy led to an instant reduction in the impaired loan portfolio of commercial banks. Us (2017) considers the gross domestic product as an essential determinant of impaired loans. Fofack. (2005) reported an inverse relationship due to improvement in the debt service capacity of the borrower. During the time of higher growth and financial crises, borrowers were unable to pay the debt, especially of state banks. Khemraj & Pasha, (2013) showed an inverse relationship of gross domestic products, and impaired loans suggested that an improvement of the economy led to positive growth in total local products that translate into more income and improved debt serving's capacity of the borrower. Financing by bank loans with lending rates and the bank efficiency was necessary for the distribution of extra monetary strength and sustainability of an economy. Deduction in rates stimulated an increased portfolio of impaired loans to some extent and policy rates in the short term by the principal of banks were not wholly transmitted to lending interest rates (Nkusu, 2011). The relationship of the impaired loans with interest rates studied by (Rajha, 2017) suggested that with the rise in lending interest rates, the loan payment ability of borrower weakened. Beck, Jakubik, & Piloiu, (2013) with increased lending interest rates on impaired loans there was a rise in the debt service cost of the borrower.

Real interest rates were defined by Anjom and Karim (2016) as the measurement of cost and borrowing, at times of high inflation, the interest rates increased and showed a decrease in purchasing power. Borrowers were reluctant to repay the loan as invested money was not compensation for the reduction in purchasing power. Castro, (2013) proved that most of the loans were approved over a long period and the representatives of the economy looked out for existing nominal rates when the decision for investment was made. Saba, (2012) stated that the bad debt was the low loan paying capacity of the borrower and resulted in inefficient use of loans and high real interest rates. The above empirical literature review offered a valid theory and foundation for the identification of impaired loan importance for the research on bank risk-taking behavior.

Methodology

Empirical Specification

Section 3 provided an outline of the econometric structure used for the estimation and identification of problems associated with the impaired loans with specific bank industry and macro-economic variables. The OLS regression was performed to initially measure the association of impaired loans with specific bank industry and macro-economic variables. The baseline regression model specification was as follow:

$$Y_{it} = \beta_o + \beta_1 X_{it} + \beta_2 K_{it} + \beta_3 Z_{it} + \mu_{it} \quad (1)$$

Here, Y indicates a dependent variable, IMP, X are explanatory variables LIR, and, K is the control variables over Y i.e. ZS, MAN, CAP, *i* indicates the index of countries, and *t* denotes the year index. Z is used in the equation to capture macro-economic factors with an effect on impaired loans used as IV in the model that is GDP and RIR and μ_{it} is an error term.

The model enables to analysis the importance of bank-level and macroeconomic determinants for bank risk-taking by credit risk. The result backs the hypothesis,

H_0:bank-level and macroeconomic determinants had significant effect on the credit risk in the OECD countries after global financial crisis.

OLS was used to analyse the direcy effect of independent variables on the dependent variable. The results were reported in model (1) of table 3 and 4. Still, as mentioned by (Schultz et al., 2010; Wintoki et al., 2012) an endogeneity test was run to know if the results under OLS model are robust.

Data Description

The dataset used for an empirical analysis consisted of the impaired loans provided by banks to local firms. The statistics were obtained at Bureau Van Dijk's BankFocus about the financial data for an individual bank. World Development Indicator (WDI), International Monetary Fund (IMF), International Financial Statistics (IFS), The World Bank (WB), and OECD National Accounts data files provided microeconomic information for each country of the block for calculation of proxy formulae. Considering the variables, the research was done on balanced panel data from the sample period 2010 - 2017 for 7616 banks, the sample time is based on the economic situation after the global financial crisis (GFC) that happened from 2007 to 2009 (Dungey, & Gajurel, 2015).

The variables are described as follows: proxy of impaired loans (IMP) for bank risk-taking is the ratio of the impaired loans to gross loans proportion in percentage. Z-Score (ZS) is bank default risk built with a formula of (ROA+CAR)/σROA, where ROA is a return on assets in percentage and CAR is a ratio of Tier 1 capital to total risk-weighted assets in thousand dollars and σROA is the standard deviation of return on assets. Management efficiency (MAN) is calculated as total earning assets to total assets in thousand dollars. Capitalization (CAP) is measured as

shareholders' equity to total assets in thousand dollars. Gross domestic product (GDP) is rates of growth of product written in annual percentage at a market price based on American dollars, a total of value-added in gross by all the local producers in a country with taxes and no subsidies include in the value of the product.

Lending interest rates (LIR) is bank rates for short and medium-term funding according to the creditworthiness of borrower for finance, rates were according to a country and comparability is limited. Real interest rates (RIR) is proposed as a percentage of lending interest rates with inflation-adjusted with GDP deflator. The categorization of OECD as a dynamic group for a study led to global economic growth. Provide pivotal opportunities to potential shareholders of the commercial banks. The concerned study includes 36 countries that were: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guernsey, Hungary, Iceland, Ireland, Isle Of Man, Israel, Italy, Japan, Luxembourg, Mexico, Netherland, New Zealand, Norway, Poland, Portugal, Republic of Korea, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States of America.

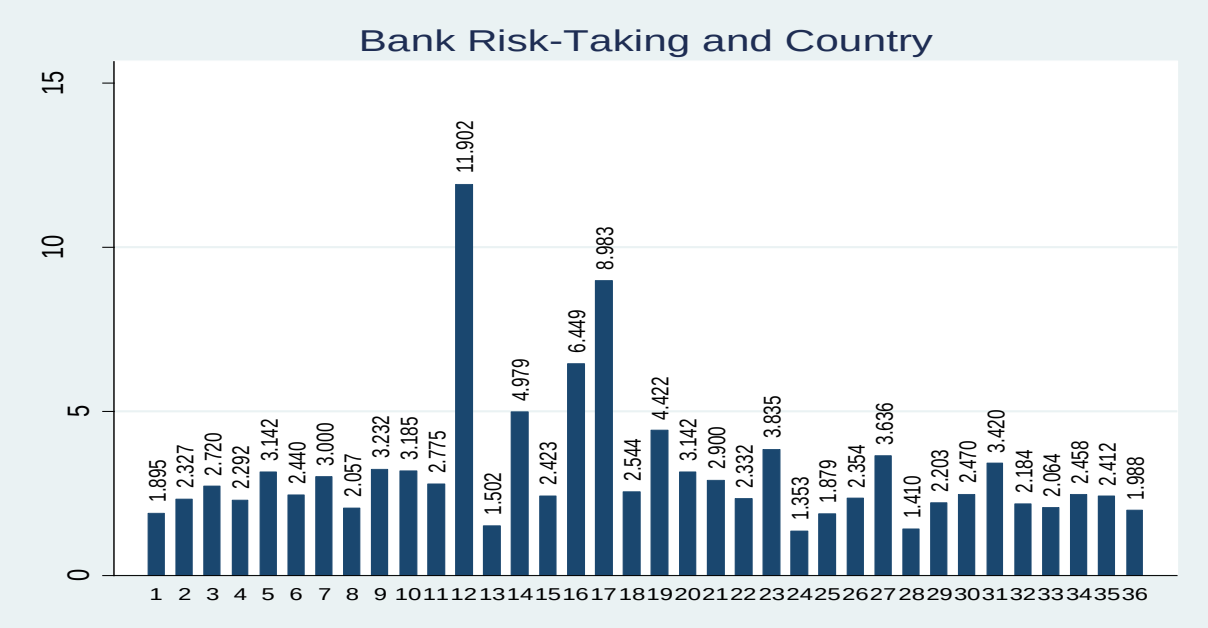

Fig. 1 - Sample distribution of bank risk-taking behavior in of OECD region.
Source: authors' estimation,

Figure 1 graphically represent the dependent variables IMP a proxy for Bank Risk-taking, country 12; Greece has the average highest value at 11.903 whereas country 24; New Zealand has an average lowest cost of IMP at 1.35 with the period of 2010 to 2017.

Table 1: Summary and descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
IMP	49,990	2.140458	3.178901	0.00000	19.60000
ZS	19,918	0.2820354	0.2570617	-0.544234	1.586241
MAN	53,050	0.9001178	0.0751467	0.5097548	0.9916466
CAP	53,043	0.1201752	0.0965151	0.0234043	0.8249586
GDP	60,900	2.141722	0.9727663	-9.13249	25.55727
LIR	47,922	3.268774	0.6404	0.5000000	10.25703
RIR	47,922	1.71229	0.7465519	-3.861397	8.827338

Table 1 showed the pairwise correlation matrix of all the sample banks from 2010 to 2017.
*denotes statistical significance at 0.05.

Table 1 presents descriptive statistics as mean, median, standard deviation, minimum and maximum values, for all the variables. The first column contains the proxy for variables, the second column gave several observations, mean values were present in the third column, standard deviation, maximum and minimum values were present in the fourth, fifth, and sixth columns respectively. Non-performing loans stand at 2.141 but the value does not give a more accurate picture of the real ratio of impaired loans as the sample was based on different kinds of banks as the maximum amount was 19.60 and the minimum amount was 0.00 because some banks did not report any data for impaired loans.

Table 2: Results of correlation between variables.

	IMP	ZS	MAN	CAP	GDP	LIR	RIR
IMP	1						
ZS	-0.1546*	1					
MAN	-0.1768*	-0.0826*	1				
CAP	0.0410*	0.4199*	-0.2150*	1			
GDP	-0.0391*	0.1091*	0.0065	0.0138*	1		
LIR	-0.0136*	0.0250*	0.0303*	0.0012	0.0414*	1	
RIR	-0.0230*	0.0204*	0.0441*	0.0042	0.0014	0.5470*	1

Tab. 2 presents the correlation analysis by Pearson's, multicollinearity was not an issue (Gujarati & Porter, 2009).

Model Estimations, Results, and Discussion

Ordinary least square (OLS) estimated (Perhiar, Zheng, & Bhowmik. 2020) investigates the impact of variables on impaired loans for the model (1) in tables 3 and 4. The equation (1) estimation can be impractical and unreliable as there might the potential issue of endogeneity. IMP, the dependent variable might be under the affect of unobserved aspects concerned to economic, financial or region and the error term (μ_{it}). IV method was uswd to resolve the issue of endogeneity as a classification of independent variables on dependent variables. Gross domestic products and actual interest rates as instrumental variables were some of the critical long-term determinants of impaired loans of banks operating in a country.

GMM is used as a robust estimation in comparison to OLS. In the begning OLS analysis were done to know the endogeneity issue, than GMM model with lagged values of IMP (Ullah et al., 2018). Thus, endogeneity issue was resolved and valid estimated were developed by the use of GMM process. The issue of heteroscedasticity and autocorrelation was resolved with the application of the PCSE method in panel data (Blackwell III, J. L.,2005).For further confirmation of empirical findings the model was re-estimated by the use of GMM, to assess the presence of biasness in simultaneous models (Zheng, Perhiar, Gilal, & Gilal, 2019). Impaired loans from last year's data helped to calculate dependent variables and showed impaired loans following path dependence to the following year.

Sargan and Hansen test to know constraints test for null hypothesis rationality of instrumental variables incorporated in the equation and none rejection of null hypothesis proved the absence of association among IV and error term. Statistically, an insignificant value specifies that the IV used was useful in the GMM estimation. Further on, higher insignificant AR (1) and AR (2) showed order correlations and validated the usage of IV with GMM. Estimation model of dynamic one-step difference version was run in the STATA software version 14 with xtabond2 command (Arellano, M., & Bover, 1995).The panel technique was used for a dependent variable with the IV and control variables with a lag of 1.

If a lag order was for long delay resulted in the loss of a degree of freedom, and some part of the sample data was lost and produced an influence when the sample was small. A lag selection order was selected by GMM in STATA automatically. The results of the study showed significantly different in the observations for OLS, PCSE, and GMM estimation, because of endogeneity bias. Common STATA commands were used by finance researchers to implement models for better control of the three common reasons of enogeneity, that are: simultaneity, unobserved heterogeneity and dynamic endogeneity.

Results of Impaired Loans as Risk-Taking Behavior

Table 3: Results of impaired loans as bank risk-taking behavior.

	(1) OLS IMP	(2) PCSE IMP	(3) GMM IMP	(1) OLS IMP	(2) PCSE IMP	(3) GMM IMP
IMP_{t-1}	0.883***	0.871***	0.571***	0.882***	0.867***	0.691***
	(200.78)	(69.25)	(4.56)	(201.57)	(67.63)	(7.48)
GDP	-0.0945***	-0.0895***	-0.140*			
	(-5.45)	(-4.69)	(-1.80)			
LIR	0.00430	0.000791	-0.106			
	(0.20)	(0.03)	(-1.35)			
RIR				-0.0594***	-0.0645**	-0.0878**
				(-2.87)	(-2.48)	(-2.02)
ZS	-0.550***	-0.568***	-0.813**	-0.589***	-0.616***	-0.855**
	(-8.66)	(-4.90)	(-2.23)	(-9.36)	(-5.34)	(-2.32)
MAN	0.293	0.210	-23.90*			
	(1.32)	(0.54)	(-1.68)			
CAP	1.638***	1.734***	4.453	1.591***	1.734***	6.491*

	(5.84)	(2.98)	(0.92)	(5.73)	(2.96)	(1.77)
_cons	0.00723	0.0978		0.230***	0.256***	
	(0.03)	(0.27)		(4.09)	(2.96)	
No. of observations			5299			5228
Time dummy			yes			yes
No. of groups/instruments			4896/18			4863/20
F statistics			7.26			6.96
GMM instrumental lag			1			1
Wald			4994.51			4923.61
AR (1)			0.090			0.025
AR (2)			0.277			0.305
Sargan test			0.166			0.394
Hansen test			0.669			0.633

t statistics in parentheses *p<0.1 **p<0.05, ***p<0.01 based on heteroskedasticity-robust standard error.

OLS, PCSE, and GMM models are estimated in Tables 3 for the relationship between impaired loans to gross domestic products. Estimation results of table 3 suggest that maintained gross domestic product level in a country or region negatively controlled bank risk-taking behavior. Real interest rate as the IV and specific bank industry data as the primary control variables had a negative but significant relationship with impaired loans. Lending interest rate showed a negative significance level and signed to impaired loans in Tables 3 . Default ratio, Z-Score as the control variable has a significantly negative coefficient in table 3 which suggests that during the high return on equity banks had the incentive to raise the amount of risk-taking.

The inverse relationship between management efficiency and impaired loans in Tables 3 highlighted the issues studied by (Semih, & Philippatos, 2007). The inverse relationship suggested the need to carefully scrutinize the power of management efficiency on the risk-taking behavior of commercial banks. Result gives the implication of OECD banks which could take benefit from improvement in transparency. Interestingly, the coefficient of capitalization in Tables 3 showed an increase in magnitude. The lowest value of the capital adequacy was set as a benchmark by banks to build up capital as support against any loss due to impaired loans (Us, 2017). The hypothesis H_0 is confirmed by macroeconomic variables; GDP, RIR, and all there bank-level variables that are ZS, MAN, and CAP.

Results of impaired loans - long run GMM estimation

The long-run GMM coefficient was analyzed as the main concern for significant variables in the system short-run coefficient model. The main concern of the long-run GMM are the effects for kth parameter as in formula:

$\beta_k / [1-\mathbf{\Phi}]$…… (II)

Here β was a significant variable in the short run, and $\mathbf{\Phi}$ was one lag of the dependent variable defined as IMP_L1. The results of the above estimations were presented and discussed as follow: For table 4 in the long-run coefficient, "z" statistics were in output, the effects of gross domestic products on non-performing loans with a negative coefficient value of 0.326, change in total domestic products was related with 0.326% decrease in impaired loans in the long run at 5% significance level. Gross domestic products have a more substantial inverse outcome on impaired loans in the long run (0.326) than in the short-run (-0.140). The effects of default risk on impaired loans

with a negative coefficient value of 1.897, a percentage change in default ratio were associated with a 1.897% decrease in impaired loans in the long run at a 10% confidence level. The ratio has a more significant adverse effect on impaired loans in the long run (1.897) than in the short-run (-1.897). The effects of management efficiency on non-performing loans with a negative coefficient value of 55.762, a percentage change in management efficiency were associated with a 55.762% decrease in impaired loans in the long run at a 5% confidence level. Management efficiency had a more significant adverse effect on impaired loans in the long run (55.762) than in the short-run (-23.90). For table 4 the impact of real interest rate on a reduced investment with a negative coefficient value of 0.2834, a percentage modification in real interest rate is related to a 0.284% reduction in impaired loans in the long run at a 5% confidence level. Management efficiency has a more significant adverse effect on impaired loans in the long term (0.284) than in the short-run (-0.0878). The effects of capitalization on non-performing loans with a negative coefficient value of 2.767, a percentage change insolvency risk were associated with a 2.767% decrease in impaired loans in the long run at a 5% confidence level. Capitalization has a more significant adverse effect on impaired loans in the long run (2.767) than in the short-run (-0.855). Overall results remain robust with the utilization of alternative estimation methodologies and measure variables.

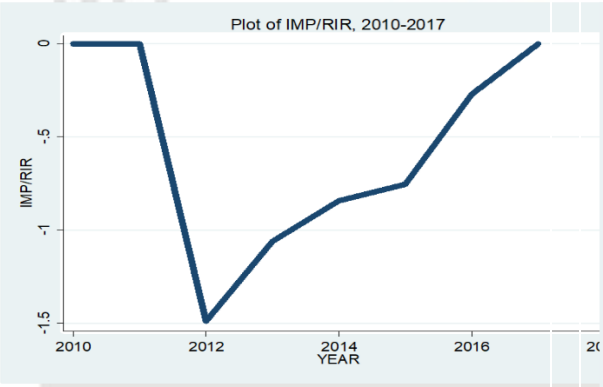

Fig. 2 - The annual average of IMP of all sample banks in the OECD region for year dummy values obtained by GMM result for a time period of 2010 to 2017 in model (4) table 3.

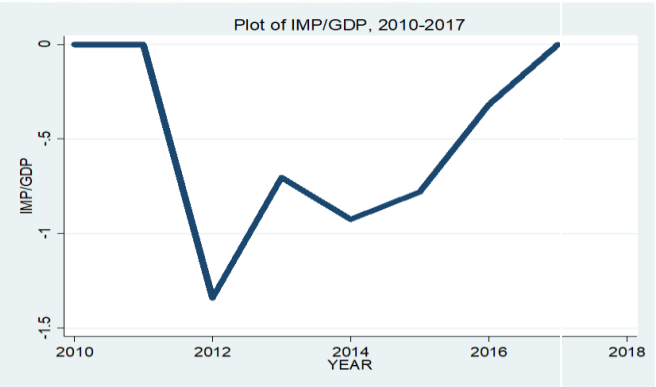

Fig. 3 - The annual average of IMP of all sample banks in the OECD region for year dummy values obtained by GMM result for a time period of 2010 to 2017 in model (4) table 4.

Conclusion and Policy Implication

In the research, an empirical examination was done to know the influence of specific bank industry and macro-economic variables on bank risk-taking behavior with panel data of 36 OECD countries. The impaired loans have received much attention after GFC especially in the promotion of bank sector growth of emerging countries. Bank risk-taking behavior in developed countries remained stable over a long time with no changes in the short term. Built on the idea that impaired loans were a source of financial growth of a country, we must gather knowledge of how different factors affected different regions. Based on four estimation models OLS, PCSE, , and a robustness test is performed with GMM. Empirical evidence provides guidelines to implicate policy especially ones to improving the reliability of banks with clear and entirely

consistent bank frameworks. The bank sector faces challenges as the institute and the environment expands, as all banks were equal with regards to operational and functional capabilities. Results are robust with estimation of GMM, as an alternative estimation technique to analyze the critical role of bank risk-taking behavior of commercial banks. Therefore, the decisive role of impaired loans must be carefully understood by policymakers to ensure the sustainable growth of banks in the future. The country that lags must learn from the countries that were growing at a fast pace. Empirical results added to the literature that provided knowledge with regards to impaired loans. With consideration of the endogeneity issue, which was not paid much attention to in previous studies. The work is vital for the regulatory perspective of commercial banks for the identification of economic shocks to developed and emerging economies from other financial markets. A better mechanism needed framing to manage with any unfavorable incident in the future, and bring up a further area of study. The effect of the financial calamity on interbank markets, to see if bank risk-taking behavior only affected block of countries or also inter-country markets.

Other fascinating areas of future research can be at the supervisory side with the observation of present funding structures of commercial banks in the country or set of countries and devise guidelines pointing limitations of international business. The research was carried out to know the influence of specific bank industry and macro-economic variables the IMP have received much attention after the GFC of 2007-2009 especially in the promotion of bank sector growth of emerging countries. Built on the idea that IMP were sources of financial growth of a country. Based on estimation models OLS, PCSE, and a robustness test is performed with dynamic panel data estimation as a one-step difference GMM. The regulation department in banks must pay attention to MAN and strengthen the bank system by a decrease in IMP. Management efficiency defined the ability framework, especially for new banks. The result of the studies has significant implications for policy for commercial banks. Banks in developing, emerging and developed region must strengthen the CAP with more consideration towards allocation Though the CAP is based on bank trading therefore, the flexible policy is needed by regular supervision. The study researches the effect of many bank methods in consideration of capital, bank risk-taking behavior, and performance. Bank governance is important to help to know the important weaknesses of the banking system.

The prospect theory suggests that biases, in the form of misjudgment and miscalculation of loss and profit, possibly increased the risk-taking behavior in commercial banks for countries understudy with slow progress but with novel methods to risk administration and competence objectives will create an improved and comprehensive commercial banking sector globally. If GDP decreases, the credit taking is less in demand and hurts banks whose basic earning is with interest rates on credits. To conclude, banks make meaningful and strengthen board members, improvement of timing, accuracy, and scope of reporting in the bank and pay attention to the interests of minor shareholders. Balanced judicial schemes and efficient regulations in all make sure the foundation of excellent bank governance and risk management, which leads to better financial performance. A long procedure was required to know the creditworthiness of corporate sector, and the capacity to pay back the original amount including the interest rates on time. Empirical evidence provides guidelines to implicate policy especially ones linked to improving the reliability of banks with a clear and completely consistent bank framework. The bank sector has entered the thought-provoking stage with the growth of the institute and the environment, as all banks were equal with regards to operational and functional capabilities. Therefore, the

decisive role of IMP must be carefully understood by policymakers to ensure the sustainable growth of banks in the future. With consideration of the endogeneity issue, which was not paid much attention to in previous studies. The work is vital for the regulatory perspective of commercial banks for the identification of economic shocks to developed and emerging economies from other financial markets. The better mechanism needed framing to manage with any unfavorable incident of the future. Another very interesting area of future research can be at the supervisory side with an observation of present funding structures of commercial banks in the country or set of countries and devise guidelines pointing limitations of international business. The study is an effort to further develop the literature on bank risk-taking behavior and profitability by the addition of emerging, underdeveloped, and an economic bloc country in empirical research. Especially, I have highlighted facets of the banking sector which are influenced by banking operations and regulations. The findings on OECD research prove that IMP were affected by the financial crisis in the short-run and have a stable pattern of business in the long run. The overall conclusion of the study is that despite heavy bank regulations after GFC banks are still concerned to earn profits in the framework of risk-taking behaviors for economic and global financial situations. Commercial banks need improved bank supervision, government performance, and bank risk-taking decision to earn profits. Someway, the commercial banks need to improve profitability to lower down the credit risk and maintain bank risk-taking behavior. The recommendation for banks is to improve the quality of loan and development in credit risk management to reduce the bank risk and improve profitability. The different kinds of credit risk as bank risk-taking is based on different business models about bank governance. The banks depend on the relationship of higher the risk higher the profit. the study gives important implications to bank governance and gives bases for future analysis. The performance of the bank sector according to governance feature of bank risk-taking and profitability. First, policymakers set some CAP ratio that is used to analyze the Basel regulations. Practically, Basel is based on a one-size-fits-all approach. Second, bank governance plays a part in kinds of risk, based on the factor of profitability.

The banks in developed and developing economies should formulate different risk characteristics based on performance, and capitalization, while the implementation of regulations. Study provides empirical literature on bank risk-taking with the use of macro-economic variables as the instruments (IV) and specific bank industry variables as additional control variables with robustness tests carried out by GMM-dynamic. The analysis proved that crisis has a short term effect on OECD bloc, in long term countries are well provisioned and capitalized to overcome the loss during adverse situations like pandemics, wars, etc. for academic investigation. Particularly for developing regions, a need is felt for a well-defined and broad banking model to enhance and retain the sustainability of a bank.

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