AN ANALYSIS OF THE DETERMINANTS OF PRIORITY SECTOR LENDING IN INDIA

Mahfuja Begum,
Assistant Professor, Jorhat College, P.O: Jorhat, PIN:785001
Assam, India
Email: mafubg13@gmail.com

ABSTRACT
The priority sector lending scheme has been formulated with the objective of ensuring assistance to those sectors of the economy which has not yet obtained adequate support from formal financial institutions. Priority sector lending is a compulsory responsibility given by the RBI to the commercial banks for deploying a fixed portion of their bank lending to few specific sectors which development is very much essential for inclusive financial system like agriculture and allied activities, micro small and medium enterprises, students for education, homeless poor people for housing and other low income groups and weaker sections. However the effectiveness of priority sector lending programme depends upon a few factors such as bank size, bank performance and lending efficiency. This paper tries to identify the factors that determine priority sector lending by scheduled commercial banks in India from 2001-2020. This study used time series data. Data analysis begins with the testing of the unit root of the series to confirm whether the data are stationary or not. Auto regressive distributive lag model is employed to check the relationship of the variables under study. The results indicate deposits, advances, employee strength and return on assets have significant impact on the priority sector lending.
Keywords: *Lending, Determinants, Banks, Data, Impact, Time series*

Introduction:
Priority sector lending is an important part of regulatory framework of the scheduled commercial banks as well as financial institutions of many developing as well as developed countries. The need for and positive impact of the Directed credit program on inclusive growth of a country and growth of different sectors has been analysed by various studies like those conducted by Eastwood and Kohli (1999)[i], Burgess, Wong and Pande (2005)[ii] and Swamy (2011)[iii]. Thus compliance and lending effectiveness of such mandatory directed credit programs are determined by a host of factors. This may be particularly so in developing countries, where availability of finance for the vulnerable sectors like agriculture, small business, weaker sections is scarce. In this chapter we investigate the various factors which influence the priority sector lending and whether these factors and PSL move together in the long run. The study identified eight important variables of priority sector lending under three headings namely bank size, bank performance and lending efficiency. Bank size includes deposits plus advances i.e. volume of business used as an indicator of bank size along with number of employees to denote employee strength. Bank performance includes Capital Adequacy Ratio (CAR), Net Interest Margin (NIM) and Return on Assets (ROA). Lending efficiency includes credit deposit ratio and net NPA (Non performing assets).

Objective: To identify the factors which influences the priority sector lending.

Materials and Methods:

Annual data from 2001 to 2020 for these eight variables along with PSL are used for the study. These data are collected from Report on Trend and Progress of Banking in India and statistical tables relating to banks of India (Various issues). Moreover, the data are transformed into the logarithmic (natural logarithm) values so that changes in the variables represent the relative changes or percentage changes after multiplication by hundred. To analyze these data time series techniques have been used. The first step in multivariate time series is to determine if the series under consideration are stationary or non-stationary. To check the stationarity of the time series, two popular unit root tests viz., Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) tests have been used. Since we have found the time series under consideration are non-stationary at level but some variables are stationary at first difference, some are at second difference, we applied *ARDL* modeling for univariate cointegration test to examine long run relationship.

Results and Discussions:

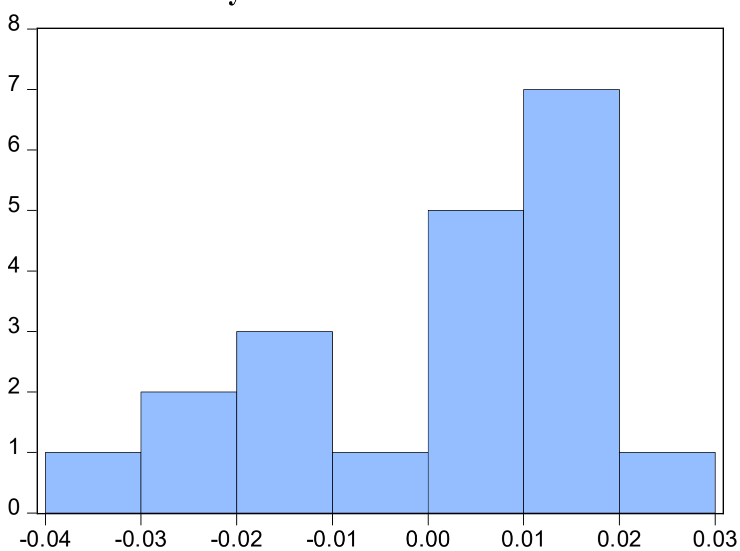
Breusch-Godfrey serial correlation LM test:

Usually, when an analysis involves time-series data, the possibility of serial correlation is high. Therefore, it is necessary to test the residuals for serial correlation using the Breusch - Godfrey LM test. Here the null hypothesis is that there is no serial correlation among the variables The results presented in Table 3.3 reveal that the null hypothesis of no serial correlation can be accepted since the p-value for the test is greater than 0.05, and hence, there is no serial correlation.

Table 1.1: Characteristics of the Breusch-Godfrey Serial Correlation LM Test

Test	F-Statistics/Jarque/bera	Obs*R-squared	P - Value	Prob. Chi-Square(2)
Breusch-Godfrey Serial Correlation LM Test	0.131987	0.569892	0.8780	0.7521

Test for normality of residuals:



Series: Residuals
Sample 1 20
Observations 20

Mean	-3.55e-15
Median	0.004052
Maximum	0.025488
Minimum	-0.033715
Std. Dev.	0.016446
Skewness	-0.604825
Kurtosis	2.214686
Jarque-Bera	1.733311
Probability	0.420355

Here we take the hypothesis as

H_0- There is absence of normality in the dataset.

H_1- There is existence of normality in the dataset.

As the Jarque-Bera value is 1.73 and the probability value is 0.42, we can accept the null hypothesis that there is normality in the residuals in our model.

Breusch-Pagan-Godfrey heteroscedasticity test

To ensure consistency, the study further employed the Breusch-Pagan-Godfrey heteroscedasticity test, and the results are presented in Table 6. The results reveal that the null hypothesis of no heteroscedasticity is accepted, as the test is non-significant (the p-value is greater than 5%). Hence the mean and variance are remains same throughout the study period.

Table 1.2: Characteristics of the Breusch-Pagan-Godfrey heteroscedasticity test

F –statistic	0.966195	Prob. F(8,11)	0.5063
Obs*R-squared	8.253864	Prob. Chi-Square(8)	0.4091
Scaled explained SS	3.061489	Prob. Chi-Square(8)	0.9304

Results of Unit Root Test:

To check the stationarity of the series, unit root test methods have been used. A non-stationary time series is a stochastic process with unit roots or structural breaks. The presence of a unit root implies that a time series under consideration is non-stationary while the absence of it entails that a time series is stationary. The guidelines for rejection of the null hypothesis are that if the estimated value of the variable is greater than the critical value or if the 'p' value is less than 5 percent (i.e. 0.05) we can reject the null hypothesis.

Here the null hypothesis that a unit root exists in a time series sample is tested using the Augmented Dickey–Fuller test (ADF) and Phillips-Perron Test. Depending on which version of the test is employed, the alternative hypothesis is usually stationarity or trend-stationarity. The first step in using any equation is to figure out how much each variable in the model is integrated. The ADF test is a popular practice. To check the robustness and more authenticity of the stationarity the Phillips-Perron test has been conducted. The unit root test results are listed in the table 1.3.

Table 1.3: Result of unit root test

RESULT OF UNIT ROOT TEST					
		AUGMENTED DICKEY-FULLER		PHILLIPS-PERRON TEST	
VARIABLES	UNIT ROOT IN	T-STAT	PROB.	T-STAT	PROB.
CAR	LEVEL	-2.68	0.09	-2.62	0.10
	1ST DIFF	-3.39	0.025*	-3.31	0.02*
CD RATIO	LEVEL	-3.05	0.04*	-2.81	0.07
	1ST DIFF	-2.58	0.11	-2.60	0.10
	2ND DIFF	-4.58	0.002*	-5.61	0.0003

					*
EMPL STRENGTH	LEVEL	1.38	0.99	1.37	0.99
	1ST DIFF	-3.02	0.05	-2.92	0.06
	2ND DIFF	-7.29	0.000*	-7.14	0.000*
NNPA	LEVEL	-2.12	0.23	-1.92	0.31
	1ST DIFF	-3.68	0.01*	-3.68	0.01*
NIM	LEVEL	-1.96	0.29	-2.04	0.26
	1ST DIFF	-3.30	0.03*	-4.03	0.00*
ROA	LEVEL	0.08	0.95	-0.01	0.94
	1ST DIFF	-3.14	0.04*	-3.16	0.03*
TOTAL ADVANCES	LEVEL	-4.11	0.005*	-3.24	0.03*
TOTAL DEPOSITS	LEVEL	-1.48	0.52	-1.09	0.69
	1ST DIFF	-12.37	0.00*	-10.04	0.00*
TOTAL PSL	LEVEL	-1.51	0.50	-1.35	0.57
	1ST DIFF	-1.57	0.47	-3.16	0.03*
	2ND DIFF	-6.33	0.00*	-6.33	0.00*

*represents significance at 95% level.

Source: Compiled by researcher from E-views output

The ADF and Phillips – Perron test shows that the variable total advances is stationary at level, CAR, Net NPA, NIM, ROA and total deposits are stationary at 1st difference and the rest variables i.e. C D ratio, employee strength and total PSL are at 2nd difference. It means the data are of mixed type of I (0), I (1) and I (2). Since the data are of mixed order of integration, we decided to use ARDL (Auto regressive Distributed lag model) for our data analysis.

Bound Test:

To examine the long run relationship among the variables bound test is employed. The existence of co-integration among the variables under study can be confirmed from the bound testing. The decision criteria proposed by Pesaran et al. (2001) is as:

i) If the calculated value of F statistics is greater than the upper bound of the critical values, it can be confirmed that there exists a co-integration.

ii) If the calculated value of F statistics is less than the lower bound of the critical values, then the study concluded that there is no co-integration among the variables.

iii) If the calculated value of the F statistics lies between the upper and lower bound of the critical values than it can be concluded that there is inconclusive co-integration or it is not confirmed whether there is co-integration or not.

Table 1.4: F – Bounds Test

Test Statistic	Value	Significant Level	I (0)	I (I)
			Asymptotic: n=1000	

F-statistic	11.34970	10%	3.03	4.06
k	4	5%	3.47	4.57
		2.5%	3.89	5.07
		1%	4.4	5.72
Actual Sample Size	18		Finite Sample: n=35	
		10%	3.374	4.512
		5%	4.036	5.304
		1%	5.604	7.172
			Finite Sample: n=30	
		10%	3.43	4.624
		5%	4.154	5.54
		1%	5.856	7.578

Null Hypothesis: No levels relationship

In above table F- statistic 11.34970 is greater than upper bound I (1) so we can reject null hypothesis and accept there exist long run relationship.

AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) ESTIMATES

MODEL SPECIFICATION:

We propose an *ARDL* modeling for univariate cointegration test, where the total PSL is considered to be the dependent variable and the independent variables are Total Deposits, Total advances, Return on Assets, Net Interest Margin, Net NPA, Employee Strength, CD Ratio and Capital Adequacy Ratio.

THE MODEL

The general model is

TPSL = f (TDeposits, TAdvances, EStrength, CAR, NIM, ROA, CDRatio, Net NPA)…………………………………..(Model 1)

Model 1 can be rearranged in natural logarithmic form

$Ln\text{TPSL}t = \alpha 0 + \alpha_1\, Ln(\text{TDeposits}_t) + \alpha_2\, Ln(\text{TAdvances}_t) + \alpha 3\, Ln\,(\text{EStrength}_t) + \alpha 4\, Ln\,(\text{CAR}_t) + \alpha 5\, Ln\,(\text{NIM}_t) + \alpha 6\, Ln\,(\text{ROA}t) + \alpha 7\, Ln\,(\text{CDRatio}t) + \alpha 8\, Ln\,(\text{NetNPA}t) + \boldsymbol{\varepsilon_t}$ …………………………..(1.1)

Based on our model, the ARDL Bound Testing will be as:

$\Delta\ \text{LnTotal PSL}_t = \alpha_0 + \sum_{i=1}^{n}\alpha_{1i}\Delta\text{LnTotal PSL}_{t-i} + \sum_{i=0}^{n}\alpha_{2i}\Delta Ln\text{Total Deposits}_{t-i} + \sum_{i=0}^{n}\alpha_{3i}\Delta\ \text{LnTotal Advances}_{t-i} + \sum_{i=0}^{n}\alpha_{4i}\Delta\ \text{LnEmployee Strength}_{t-i} + \sum_{i=1}^{n}\alpha_{5i}\Delta\ \text{LnCAR}_{t-i} + \sum_{i=0}^{n}\alpha_{6i}\Delta\text{LnNIM}_{t-i} + \sum_{i=0}^{n}\alpha_{7i}\Delta\ \text{LnROA}_{-i} + \sum_{i=0}^{n}\alpha_{8i}\Delta\ \text{LnCD Ratio} +_{t-i} + \sum_{i=0}^{n}\alpha_{9i}\Delta\ \text{LnNet NPA}_{t-i} + \beta_1\ \text{Ln Total PSL}_{t-1} + \beta_2\ \text{Ln Total Deposits}_{t-1} + \beta_3\ \text{Ln Total Advances}_{t-1} + \beta_4\ \text{LnEmployee Strength}_{t-1} + \beta_5\ \text{Ln CAR}_{t-1} + \beta_6\ \text{Ln NIM}_{t-1} + \beta_7\ \text{Ln ROA}_{t-1} + \beta_8\text{Ln CD Ratio}_{t-1} + \beta_9\ \text{Ln Net NPA}_{t-1} + \boldsymbol{\varepsilon_t}$..(1.2)

Where,

Δ denotes the first difference operator,

n is the optimum lag length

$\alpha 0$ is the drift component,

ε_t is the usual white noise residuals.

The first until fourth expressions (β1 –β9) on the right-hand side correspond to the long-run relationship. The remaining expressions with the summation sign (α1 – α9) represent the short-run dynamics of the model.

ARDL Estimates:

The study employed ARDL estimation to identify the determinants of PSL. First, the ARDL bound test is conducted and the result obtained from the test is presented in table 1.5:

Table 1.5: ARDL Estimates

Variable	Coefficient	Std. Error	t- Statistic	Prob.
C	-6.473536	2.508854	-2.580276	0.0256
LnTOTAL_DEPOSITS	0.084385	0.028673	2.943030	0.0134
LnTOTAL_ADVANCES	0.589575	0.167693	3.515799	0.0048
LnEMPLOYEE_STRENGTH	-1.046397	0.416598	2.511766	0.0289
LnROA	0.126153	0.043513	-2.899174	0.0145
LnNIM	-0.492772	0.261442	-1.884821	0.0861
LnCAR	0.587531	0.353757	1.660834	0.1250
LnNET_NPA	-0.003973	0.019981	-0.198813	0.8460
LnCD_RATIO	0.708207	0.439418	1.611692	0.1353

R-squared	F-statistic	Prob(F-statistic)	Durbin-Watson stat
0.9987	1024.152	0.000*	2.749

Source: Compiled by researcher from E-views output

This model shows that the coefficient value is -6.47 and it's P value is 0.02 indicating that it is significant. R square value is 0.99 meaning that all the independent variables are combinedly affecting 99 % to the dependent variable. F- Statstic is 1024.152 and it significant at 95 % confidence level confirming the dataset is fit for the model. The DW statistics is 2.74.

PSL and Bank Size:

Bank size consists of deposits, advances and employee strength. From this result, it is observed that all the three variables namely deposits, advances and employee strength positively affect PSL. Moreover all these three variables are statistically significant as their P – values are (0.013), (0.000) and (0.005) respectively. Total deposit's coefficient (0.0844) implies one percent increase in total deposits leads to over 8.44 percent increase in PSL. Deposits play a fundamental role in the financing of the bank, since a predominant part of the commercial bank's assets is usually financed by customer deposits (Bologna, 2011)[iv]. Higher deposits can be transferred into loans. Deposits are important as they are the life blood of banks and the most fertile source of lending (Casu & Molyneux, 2003)[v]. On the other hand total advances's coefficient (0.589) implies one percent increase in total deposits leads to over 58.9 percent increase in PSL. Moreover the employee strength which consists of officers, clerks and sub staff shows negative relationship i.e. one percent increase in employee's number leads to over 104 percent decrease in PSL. Employees size is negatively related with PSL. The bank with smaller employee strength are lending more to PSL. There exists inverse relationship between bank size and the propensity of the banks to lend to small businesses. This is in line with the findings from earlier studies which show that the smaller banks that rely mainly on relationship banking are able to lend more to small size borrowers like in SSI, agriculture etc. (Berger[vi], Miller, Retersen, Rajan and Steiin[vii] 2005 and Uchida, Udell and Watanabe 2008). Banks with small employee strength are more often located closer to their potential relationship clients, offering smoother communications that enable the bank management to collect and transmit more easily soft informations about the local market and the firm characteristics. Small banks with fewer layers of management hierarchy may mitigate contracting problems between the bank managers and the loan officers (Berger and Udell, 2002)[viii].

PSL and Bank Performance:

Bank performance consists of Capital Adequacy Ratio (CAR), Return on Assets (ROA) and Net Interest Margin (NIM), (Naeem, Baloch and Khan, 2017).[ix] From these results it is found that ROA affects positively the PSL. The impact of ROA on PSL is significant because the p – value is 0.0145. Positive value of ROA indicates how profitable a bank's asset in generating revenue. Higher ROA means more asset efficiency. It measures profitability of bank in relation to its total assets. The higher the return the more productive and efficient bank is in utilizing economic resources. However, the impact is insignificant in case of NIM as the p – values is 0.0861. On the other hand there is positive relationship between PSL and CAR. Higher risk absorption capacity and compliance attitude, higher will be the PSL. Since PSL is considered by banks to be riskier form of lending, higher risk absorption capacity of banks helps them to lend more to PSL. But here as the p – value is insignificant, i.e. (0.1250), thus there exists insignificant relationship between them.

PSL and Lending Efficiency:

Lending efficiency consist of C-D Ratio and Net NPA. From this result it is found that C-D Ratio affect positively and Net NPA affect negatively the PSL but their impact is insignificant. It means that when the C-D Ratio increases, lending to priority sector also increases and vice versa. High C- D ratio means banks are making full use of their resources. It helps in assessing a bank's liquidity and health. Credit – deposit ratio coefficient (0.708) implies one percent increase in credit- deposit ratio leads to over 70.8 percent increase in PSL. On the other hand net NPA coefficient (-0.0039) implies one percent increase in net NPA leads to over 0.39 percent decrease in PSL and vice versa.

Casuality Test:

Through Granger Causality test the structure of the causal relationship were analysed. The Granger causality test is a statistical hypothesis test for determining whether one time series is useful for forcasting another. To test the casual relationship among the variables under study, the study employed pairwise Granger – causality test. The testing of the direction of causality among the variables was highly necessitated by the existence of a cointegration association among them. The result of the Granger Causality test reported in the Table indicated that there exists unidirectional as well as bidirectional causality between the variables. There exists bidirectional causality between total deposits and total advance along with employees strength and total deposits. Moreover there are many variables which are statistically significant at 1 percent and 5 percent level of significance leading to the rejection of null hypothesis.

Table 1.6: Summary of Granger Causality Test

Null Hypothesis	Obs.	F - Statistic	Prob.	Direction of causality
LnTotal_Deposits does not granger cause LnTotal_PSL	18	2.40576	0.1291	
LnTotal_PSL does not granger cause LnTotal_Deposits		88.7863	.00000003*	Unidirectional causality
LnROA does not Granger Cause LnTOTAL_PSL	18	5.29164	0.0208**	Unidirectional causality
LnTOTAL_PSL does not Granger Cause LnROA		3.23212	0.0725	
LnEMPLOYEE_STRENGTH does not Granger Cause LnTOTAL_PSL	18	0.31497	0.7352	
Ln TOTAL_PSL does not Granger Cause LnEMPLOYEE_STRENGTH		7.61608	0.0065*	Unidirectional causality
LnTOTAL_ADVANCES does not Granger Cause LnTOTAL_DEPOSITS	18	397.721	0.000000000002*	Bidirectional causality
Ln TOTAL_DEPOSITS does not Granger Cause LnTOTAL_ADVANCES		8.06237	0.0053*	Bidirectional causality
LnEMPLOYEE_STRENGTH does not Granger Cause LnTOTAL_DEPOSITS	18	16.5625	0.0003*	Bidirectional causality
LnTOTAL_DEPOSITS does not Granger Cause		12.4574	0.0010*	Bidirectional causality

LnEMPLOYEE_STRENGTH				
LnROA does not Granger Cause LnTOTAL_ADVANCES	18	1.17719	0.3389	Unidirectional causality
LnTOTAL_ADVANCES does not Granger Cause LnROA		5.43958	0.0192**	Unidirectional causality
LnEMPLOYEE_STRENGTH does not Granger Cause LnTOTAL_ADVANCES	18	3.58632	0.0575	Unidirectional causality
LnTOTAL_ADVANCES does not Granger Cause LnEMPLOYEE_STRENGTH		6.81581	0.0095*	Unidirectional causality
Ln CAR does not Granger Cause LnTOTAL_ADVANCES	18	5.47890	0.0188**	Unidirectional causality
LnTOTAL_ADVANCES does not Granger Cause LnCAR		0.90896	0.4271	
LnNET_NPA does not Granger Cause LnROA	18	16.1629	0.0003*	Unidirectional causality
Ln ROA does not Granger Cause LnNET_NPA		0.64839	0.5390	
LnEMPLOYEE_STRENGTH does not Granger Cause LnROA	18	4.96468	0.0250***	Unidirectional causality
LnROA does not Granger Cause LnEMPLOYEE_STRENGTH		0.55033	0.5896	
LnCAR does not Granger Cause LnEMPLOYEE_STRENGTH	18	8.77971	0.0039**	Unidirectional causality

LnEMPLOYEE_STRENGTH does not Granger Cause LnCAR		0.98745	0.3988	
LnCAR does not Granger Cause LnCD_RATIO	18	3.88038	0.0477**	Unidirectional causality
LnCD_RATIO does not Granger Cause LnCAR		2.08011	0.1645	

Note: * stands for 1 % level of significance respectively
** stands for 5% level of significance respectively

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