Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol 2, No 5, 2011 

# Effects and Consequences of Emphasizing Sectoral Recovery Rate and Sectoral Proportion in Loan Portfolio on Approving New Project Loans of Bangladesh Shilpa Bank

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**Abstract**

This study is designed for the identification of the effects and consequences of emphasizing the sectoral recovery rate and sectoral proportion in loan portfolio on approving new project loans of the Bangladesh Shilpa Bank (BSB). This study primarily focus on the role of sectoral recovery rate and the sectoral proportion of the loan portfolio, then conducts empirical studies considering the sacrifices of the profitability and growth opportunities, and leverage problem of the respective sectors. Empirical studies are conducted under two phases. The results of the empirical tests of Phase-I indicate the lack of reliability of the model under that phase in explaining the characteristics of the population. Empirical results of Phase-II have found significant results indicating the positive relationship of the sectoral recovery rate and sectoral proportion of loan portfolio in approving new projects. The empirical results have also found the evidence of approving project loans to high levered sectors.

**Keywords:** Sectoral Recovery Rate, Sectoral Proportion in Loan Portfolio, Return on Investment, Debt to Asset Ratio.

## Introduction

Bangladesh Shilpa Bank, presently known as Bangladesh Development Bank, use to serve as an industrial development bank in Bangladesh. From January 3, 2009 BSB has been merged with Shilpa Rin Sangstha and formed a new organization named Bangladesh Development Bank Ltd. In addition to commercial banking, BDBL provides financial and technical assistance to broaden the private as well as public sector industrial base of the country. It prioritizes, especially, Export Oriented/Export Linkage industrial units, Efficient Import Substitution, Joint Ventures, Commercialization of local technology and promotion of agro-based industry. Such a development financial institution is always crucial for the improvement of industrial sector in an emergent country like Bangladesh.

Khalily, Ahmed, and Iqbal (1994) state the rationale of such development financial institutions as follows:

> The underlying assumptions behind the creation of separate institutions to finance industrial enterprises were; (a) that profit-oriented commercial banks would not supply long term industrial loans since they consider it as risky; (b) that potential entrepreneurs require cheap credit; and (c) that specialized staffs are necessary to screen and monitor industrial loans.

Khalily et al (1994) also state that as the effective interest rate could not cover the high transaction cost per taka of producing industrial loans, it restricts the private commercial banks to provide loan term industrial loans. As a result an organization like BSB has always been a vibrant role player in the way of industrialization in a country like Bangladesh. However, the continuing operations and sustainability of these banks are contingent upon the cheap funds provided by the Central Bank (Bangladesh Bank) and international agencies and this causes a high social cost for the country. Moreover there are also stems from operating losses of the banks. Therefore, success of the operations of these development financial institutions is also crucial for the socio-economic development of the country. The development of industrial sector is considered as an essential factor for the development by the economists (Meier, 1970; Rostow, 1975, 1978, 1990; Marshall, 1987). Todaro and Smith (2006) provide different aspects of the industrial developments and identified the development financial institutions as an important factor of such development.

Banking industry of Bangladesh plays a vital role in the socio-economic development of this developing country. However, unlike other industries the banking industry suffers several difficulties. Among those difficulties the higher default rates of loans and advances affects the banking industry of the country at most. Although form time to time several protective and preventive measures have been taken, still there is no significant change in this scenario.

Under this unfavorable high loan default scenario, BSB has taken several measures to reduce the adverse effects. BSB often grants project loans to the sectors which already have higher proportion of the project loans in the BSB's loan portfolio. The prime motive behind this decision is to ensure the recovery of the project loans. The rationale of this decision is as those sectors already hold a major proportion of the project loans and BSB has develop a long term partnership with those sectors over the years, the recovery of the project loans is expected to be satisfactory than the other sectors. Islam (2002) also emphasized the importance of recovery rates as one of the key criterion evaluating and determining the credit repayment performance of industrial projects of BSB.

However, emphasizing the loan recovery and the higher proportion of the loan portfolio leads to the sacrifices of other significant matters like sectoral growth and profitability. Besides, the decision of the BSB also leads to the distribution of the loans to relatively highly levered sectors.

Emphasizing the above facts, this study analyzes the motive of approving new project loans of BSB in light of the sectoral recovery rates and sectoral proportion in the loan portfolio. This study also analyzes the impacts of emphasis on recovery and proportion in loan portfolio over the respective sectoral growth and profitability, and sectoral debts to assets scenario.

**Objectives of the Study**

The prime objective of the study is to identify the effects of the sectoral recovery rate and sectoral proportion of BSB's loan portfolio in approving new projects.

The secondary objectives are;

- to test empirically the sacrifices of the opportunities of approving projects in profitable and growing sectors due to concentration on recovery;
- to test empirically the high leverage problem due to approving loans to the exiting sectors.

**Scope and Rationale of the study**

The objectives of the study require emphasis on certain facts of BSB rather than the company as a whole. This study covers sectoral loan sanctions, loan outstanding, loan recovered, recovery rate and its changes, sectoral proportion of loan portfolio and its changes. The study concentrated on finding causal relationships among factors rather than evaluation of the performance of the entity. Therefore, detailed discussion on the analysis of the BSB's financial statements is not included. Besides, the trend analysis of the factors is also excluded as the study tries to find out the causal relationship rather than simple correlation between the factors.

This study emphasizes the role of the sectoral recovery rate and the sectoral proportion in the loan portfolio and tests empirically with the sacrifices of the opportunity of profitable sector and the problem of high leverage. The subject matter of the study is important in the context of the developing country like Bangladesh. This dilemma of development and success is a common phenomenon for a developing economy. Concentration on the industrial development leads to the sacrifices of the

profitable projects which may leads to the high social cost. Therefore, this dilemma adds value to the study. Besides, the models used in this study are rarely use in the studies in the developing economies and hence, contribute to the stack of research findings in the developing economies.

**Critical Factors of Project Appraisals**

As a development financial institution of a developing country, BSB had to consider the socio economic aspect of the country and make a balance between the expectations of the interested parties and its own resource capabilities. Making a perfect balance in case of loan approval is quite difficult as the task is influenced by many complex and interrelated factors. Presence of so many variables has made the situation so intricate that it has become almost impossible to draw a straight cut formula for approval or non-approval of a project. Moreover, the importance/ weight of these factors vary from project to project. In a real world a loan appraisal usually involves five different aspects of a project. The technical, marketing, financial and economic aspects and at the last the management and organization attached to the project. The critical factors considered for project appraisals are summarized below:

Table 1. Critical Factors of the Project Appraisals

| Type of Appraisal | Key Aspects | Critical Factors |
|---|---|---|
| Technical Appraisal | The technical appraisal considers the engineering and technological aspect of a proposal. Usually an engineer of appraisal section used to check to what extent the project is sound in these regard. | - Cost of the project.<br>- Location, infrastructural facilities feature and estimated cost of the land.<br>- Annual production capacity and manufacturing process.<br>- Layout plan for Building and Machinery.<br>- Civil drawing(s) and cost of civil works.<br>- Estimated cost of the Machinery with installation.<br>- Selection of product process involving the choice of alternatives, by product, disposal of waste and effluents etc.<br>- All input output data of the project |
| Market Appraisal | Market appraisal is prepared by the project economist to find out the size of the market, to ascertain the supply gap and to analyze the marketability of products and services. | - Estimation of demand<br>- Marketing strategy<br>- Use and user of the product<br>- Market price of the proposed products(s)<br>- Analysis of existing market competition<br>- Existing capacity and capacity under development, if any. |

| | | |
|---|---|---|
| Financial Appraisal | Financial analyst organize financial appraisal of a project to check out the financial feasibility of the proposal. The main objective of this appraisal is to find out the financial soundness of the offer in future years | - Break-even analysis<br>- Earning Forecast<br>- Pay Back Period method<br>- Ratio Analysis<br>- Fund flow statement<br>- Net Present Value (NPV) |
| Economic Appraisal | Economic appraisal report is prepared by the project economist to determine the economic justification for setting up of the project. The project is verified from the national or social viewpoint. | - The appropriate valuation of all inputs and outputs.<br>- Conversion of foreign currency into local currency at the official exchange rates. |
| Management Appraisal | There are no sets of rules to find out if the borrowers are persons of integrity. Direct or indirect inquiry is the method to find out the Sponsor's educational background, business and operational experience, reputation etc. | - Structure and shares<br>- Verification of Memorandum of Articles and relevant registration certificate.<br>- Introduction to members of proposed management, relevant experience, net worth etc<br>- Comparison of equity proposed and net worth declared and Source of working or working capital. |

**Methodology**

This study designed to find out causal relationship between factors of approving project loans over the years. The major parts of the study are conducted using Ordinary Least Square (OLS) regression equations, estimation and predictions using such regression models. The empirical tests are developed on the basis of standardized prediction errors. The research type used in major parts of the study can be classified as causal comparative research. Besides, the initial parts of this study contain description of some key issues. Therefore, this study is a causal comparative research with some descriptions of key matters.

**Sources of Data**

Working with a causal comparative research with OLS regression models in a developing setting is quite challenging. The strength of the outcome depends on the reliability of the data. The required data for this study are collected from the secondary sources mainly from the Annual Reports of BSB (2000-01, 2002-03, 2004-05) with due care.
For empirical study, relevant data are collected from the Balance Sheet Analysis of Joint Stock Companies Listed on Dhaka and Chittagong Stock Exchange (2005) prepared and published by the Bangladesh Bank.

**Sample Design**

For the purpose of the study and for empirical tests, ten sectors are selected randomly with the help of SPSS command. These sectors are carried over all the models used in the study.

For empirical tests companies listed in both Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) are taken as sample firms. The rationales for using listed companies as sample are to take advantage of the published data and analysis, better time management, and develop and test model in the empirical scenario. The number firms used in this study is given below;

 

Table 2. Sectoral Sample Firms Used in the Study

| Sector | No. of Sample Firms | Sector | No. of Sample Firms |
|---|---|---|---|
| Food & Allied | 34 | Metal Products (Engineering) | 25 |
| Jute & Allied | 4 | Chemical & Pharmaceuticals | 26 |
| Cotton & Woolen | 40 | Petro-chemical | 10 |
| Paper & Printing | 8 | Service | 7 |
| Tannery | 8 | Machinery & Sapre parts (Engineering) | 25 |

Statistical Tools and Techniques

This study is designed for casual comparison or 'ex-post facto' research. Quantitative research tools and techniques like OLS regression, estimation, and prediction are used in this study. The summary of the statistical tests used in this study is given below;

Table 3. Statistical Tests Used in the Study

| Name of the Test | Type of the Test | Purposes |
|---|---|---|
| Run test | Non-parametric | To test the randomness of observed data |
| Kolmogorov-Smirnov test | Non-parametric | Whether a random sample drawn from a population having a given distribution |
| t- test | Parametric | Test for a single population mean/median |
| F- test | Parametric | Test for the equality of Two population variances. |

The statistical tools and techniques are used based on the assumptions that, (a) data set used in the study is random; and (b) data set is normally distributed. Based on these assumptions the OLS regression models are used in this study. Besides, the following software are used for data modeling, processing and empirical tests;

Table 4. Software Used in the Study

| Software | Purposes |
|---|---|
| Microsoft Excel | Data Entry and Manipulation.<br>Data Processing. |
| SPSS | Data Modeling and Manipulation.<br>Statistical Analysis.<br>Empirical Tests and Analysis. |

Model Development

For the analysis of the study and in the light of the research objectives the following factors are expected to affect the approval of new projects;

$$PJ_{it} = f\left(INFR_t, RCOVR_{it}, PLCY_{it}, LNPTF_{it}\right);$$

where $PJ_{it}$ is the number of projects approved in respective sectors at year t, $INFR_t$ is the inflation rate for year t, $RCOVR_{it}$ is the sectoral recovery rate at year t, $PLCY_{it}$ is the policies relevant to different sectors for year t, $LNPTF_{it}$ is the sectoral proportion on loan portfolios of BSB at year t.

This model assumes that;

- raising inflation rate restricts the new project approval,
- the higher recovery rate of the respective sector contributes to the approving new projects in that sector,
- decisions in relevant fiscal, and industrial policies either initiate or restrict project approval in respective sector,
- sectoral proportion of the BSB's loan portfolio either initiate or restrict new sectoral project approval.

Based on those assumptions the expected sign for the factors are:

$$\frac{\partial PJ_{it}}{\partial INFR_t} < 0, \frac{\partial PJ_{it}}{\partial RECOVR_{it}} > 0, \frac{\partial PJ_{it}}{\partial PLCY_{it}} <> 0, and \frac{\partial PJ_{it}}{\partial LNPTF_{it}} <> 0$$

Therefore, based on the function and assumptions the following models can be developed;

For year t:

$$PJ_{it} = \alpha + \beta_1 INFR_t + \beta_2 RCOVR_{it} + \beta_3 PLCY_{it} + \beta_4 LNPTF_{it} + e_{it}, \quad (1)$$

And for year t-1:

$$PJ_{it-1} = \alpha + \beta_1 INFR_{t-1} + \beta_2 RCOVR_{it-1} + \beta_3 PLCY_{it-1} + \beta_4 LNPTF_{it-1} + e_{it-1}, \quad (2)$$

Analysis of the impacts of defined factors during year t requires subtraction of the equation (2) from equation (1). Therefore, the net effects during the year t will be;

$$PJ_{it} - PJ_{it-1} = \alpha + \beta_1 INFR_t + \beta_2 RCOVR_{it} + \beta_3 PLCY_{it} + \beta_4 LNPTF_{it} + e_{it}$$
$$- \alpha - \beta_1 INFR_{t-1} - \beta_2 RCOVR_{it-1} - \beta_3 PLCY_{it-1} - \beta_4 LNPTF_{it-1} - e_{it-1},$$

$$\Rightarrow PJ_{it} - PJ_{it-1} = \beta_1 INFR_t - \beta_1 INFR_{t-1} + \beta_2 RCOVR_{it} - \beta_2 RCOVR_{it-1}$$
$$+ \beta_3 PLCY_{it} - \beta_3 PLCY_{it-1} + \beta_4 LNPTF_{it} - \beta_4 LNPTF_{it-1} + e_{it} - e_{it-1},$$

$$\Rightarrow PJ_{it} - PJ_{it-1} = \beta_1 (INFR_t - INFR_{t-1}) + \beta_2 (RCOVR_{it} - RCOVR_{it-1})$$
$$+ \beta_3 (PLCY_{it} - PLCY_{it-1}) + \beta_4 (LNPTF_{it} - LNPTF_{it-1}) + e_{it} - e_{it-1},$$

$$\therefore \Delta PJ_{it} = \beta_1 \Delta INFR_t + \beta_2 \Delta RCOVR_{it} + \beta_3 \Delta PLCY_{it} + \beta_4 \Delta LNPTF_{it} + \varepsilon_{it}, \quad (3)$$

where $\Delta$ denotes the changes between the year t form the year t-1 and $\varepsilon_{it} = e_{it} - e_{it-1}$

Now, concentration on the inflationary trend $\Delta INFR_t$ raises a problem since it affects the BSB and its loan portfolio as a whole rather than an individual sector. Hence, $\beta_1$ is almost equivalent to the constant term. For this reason, the variable $INFR_t$ is separated from this model. Therefore, the refined model will be;

$$\therefore \Delta PJ_{it} = \beta_2 \Delta RCOVR_{it} + \beta_3 \Delta PLCY_{it} + \beta_4 \Delta LNPTF_{it} + \varepsilon_{it}, \quad (4)$$

Research Hypotheses

The high default culture in the banking sector of Bangladesh has restricted BSB's approval of the project loans. Emphasis is given more on the loan recovery and therefore, BSB approves project loan to the sectors already having higher proportion on the loan portfolio of BSB. This facts leads to the first two research hypotheses;
H1: The sectoral recovery rate is positively related with approval of the new projects.
H2: Emphasis on sectoral recovery rate positively contributes to the approving project loans to the sectors having already having the majority portion of the project loans.
As mentioned in the problem statement, the emphasis on recovery also restricted the opportunities to approve project loans in the relatively lower proportionate but higher profitable and growing sectors. This will lead to the third research hypothesis;
H3: The emphasis of recovery leads to scarifies of the sectoral profitability and growth opportunities while approving new projects.
Finally, as new project loans are given to the existing higher proportionate sectors, the long term debts are increasing over the total assets on those sectors. Therefore, the problem of higher leverage may arise in those sectors. This leads to the final hypothesis;
H4: The emphasis of recovery leads to the approval of new projects in the highly levered sectors.

**Operationalization of the Hypotheses**

As this study concentrated on the role of loan recovery and the proportional share in the loan portfolio of respective sectors, the operationalization of the research hypotheses takes place in two phases.
Phase-I analyze and test the hypotheses concentrating only the role of recovery rates for approving new projects. Therefore, the following OLS regression model can be derived;

$$\Delta PJ_{it} = \beta_i \Delta RCOVR_{it} + \varepsilon_i \quad (5)$$

where $\Delta PJ_{it}$ is the number of new projects in different sectors for year t, and $\Delta RCOVR_{it}$ is the changes in recovery rates in different sectors during the year t.
Phase-II analyze and test the hypotheses concentrating both sectoral recovery rate and the sectoral proportion in the BSB's loan portfolio. Therefore, the following OLS regression model can be derived;

$$\Delta PJ_{it} = \beta_1 \Delta RCOVR_{it} + \beta_2 \Delta LNPTF_{it} + \varepsilon_i, \quad (6)$$

where $\Delta PJ_{it}$ is the number of new projects in different sectors for year t, $\Delta RCOVR_{it}$ is the changes in recovery rates in different sectors during the year t and $\Delta LNPTF_{it}$ is the changes in the sectoral proportion in the loan portfolio during the year t.
Both the equations (5) and (6) are consistent with the model equation (4). However, due to the small sample size (n=10) the factor $\Delta PLCY_{it}$ can't be used in this study.

Empirical Test Models

The empirical test models have been developed under two phases corresponding to the equation (5) and (6) below;

## *Phase-I Test Models*

The tests of role of loan recovery rates presented in this section are based on the prediction errors from the model in equation (5). Prediction errors from this model for each prediction year p ($u_{ip}$) are calculated as follows:

$$u_{ip} = \Delta PJ_{ip} - b_i \Delta RCOVR_{ip} \quad (7)$$

where $b_i$ is the estimate of $\beta_i$. A standardized prediction error ($U_{ip}$) is derived for each firm i for each prediction period p by dividing the prediction error ($u_{ip}$) by the estimated standard deviation ($\sigma_{ip}$), where $\sigma_{ip}$ is based on the estimation period residuals from the regression model.

The empirical tests take the form of a multiple regression, with the standardized prediction errors from equation (7) as the dependent variable, and with sectoral profitability and growth in terms of return on investment and debt level in debt to asset ratio as independent variables. The regression takes the following form:

$$U_{ip} = \gamma_0 + \gamma_1 ROI_{ip} + \gamma_2 DA_{ip} \quad (8)$$

where $\gamma_0$, $\gamma_1$, and $\gamma_2$ represent the hypotheses H1, H3 and H4 respectively. The expected signs for $\gamma_0$ and $\gamma_2$ are positive and for $\gamma_1$ is negative.

However, the equation (8) is not such simple as the ROI (Return on Investment) and DA (Debt to Asset Ratio) are taken only from the companies listed in both DSE and CSE under respective sectors. To make the sample data more reliable these sectoral variables should be averaged to measure the central tendency which is more representative of the population. Therefore, after considering the impact of the sample firms in each sector the following model can be derived;

$$\therefore U_{ip} = \gamma_0 + \gamma_1 \overline{ROI}_{ip} + \gamma_2 \overline{DA}_{ip}, \quad (9)$$

The model in the equation (9) is used in the empirical tests for Phase-I.

Phase-II Test Models

The tests of role of loan recovery rates and the proportion of loan portfolio presented in this section are based on the prediction errors from the model in equation (6). Unlike the equation (7) the prediction errors from this model for each prediction year p ($v_{ip}$) are calculated as follows:

$$v_{ip} = \Delta PJ_{ip} - b_1 \Delta RCOVR_{ip} - b_2 \Delta LNPTF_{ip} \quad (10)$$

where $b_1$ and $b_2$ is the estimate of $\beta_1$ and $\beta_2$ respectively. A standardized prediction error ($V_{ip}$) is derived for each firm i for each prediction period p by dividing the prediction error ($v_{ip}$) by the estimated standard deviation ($\sigma_{ip}$), where $\sigma_{ip}$ is based on the estimation period residuals from the regression model.

$$V_{ip} = \gamma_0 + \gamma_1 ROI_{ip} + \gamma_2 DA_{ip}, \quad (11)$$

where $\gamma_0$, $\gamma_1$, and $\gamma_2$ represent the hypotheses H2, H3 and H4 respectively. The expected signs for $\gamma_0$ and $\gamma_2$ are positive and for $\gamma_1$ is negative.

Unlike the equation (9) the impact of the sample firm in each sector the test variables ROI and DA are averaged, and the empirical tests model for Phase-II will be;

$$\therefore V_{ip} = \gamma_0 + \gamma_1 \overline{ROI}_{ip} + \gamma_2 \overline{DA}_{ip}, \quad (12)$$

**Strength and Applicability of the Models**

The equations used in this study are developed using the OLS regression models and multivariate OLS regression statistics are derived during the empirical study. The OLS regression model is a parametric test model and based on the assumptions of (a) randomness of the data set and (b) data must be normally distributed. To comply with those assumptions at first 10 sectors are selected out of available 13 sectors of BSB's loan portfolio using SPSS sample command, then non-parametric K-test is performed on the sectoral recovery rate over the period 1996-97 to 2004-05 to test normality of the data set. The results of the tests are found significant at the 0.05 level (two-tailed) and hence, indicate the normality of the dataset for all the years covered by the test. The test results are given in the Appendix-B. These significant results have shown the strength of the OLS regression models used in the study.

For the purpose of this study the level of significance is set at $\alpha = 0.05$ or 5 percent indicating for 95 percent of cases this study models are confident to explain the characteristics of the population. The rationales for setting such level of significance are;

- 5 percent level of significance is generally used in the empirical researches.

- significance level more than 5 percent (e.g., 0.1 or 10 percent) indicates the higher strength of the research models which cannot be determined even in the empirical researches in the developed settings.
- significance level less than 5 percent (e.g., 0.01 or 1 percent) requires a large number of valid samples but it is quite difficult to work with lager samples due to resource constraints. Besides, it is quite difficult to find large number of valid sample in unstructured and developing settings.

Therefore, after considering the above assumptions the level of significance is set at 5 percent and it will also add value to the strength of the study.

For testing the applicability of the model non-parametric Run test is made on the number of sectoral new projects approved over the period from 1995-96 to 2004-05 to test the existence on the randomness of the sectoral new project approval. Here, the null hypothesis for each sector is that, the new projects approved each year in the respective sector are independent of each other. The significant results of the Run test are found at the 5 percent level of significance (two tailed) using both mean and median for food and allied sector and metallic product sector indicate the existence of the randomness in the new project approval in those sectors. For all other sectors the null hypotheses of are rejected at the 5 percent level of significance indicating the strength of the new projects approved in those sector in responding to the dynamic forces in the economy. These results of the lack of randomness also evident the applicability of the models. Therefore, the models used in this study especially the empirical study under Phase-II is expected to add value to the empirical studies in the developing settings like Bangladesh.

**Results of Empirical Tests**

Results of Phase-I Empirical Tests

Using the Time Series OLS regression model covering 9 years from 1995-96 to 2004-05 the values of R2 and $\beta_i$ can be derived from equation (5). The values are summarized in the Table 5.

Table 5. Summary Statistics for Time Series Regression of Sectoral New Project Approval on Changes in Recovery Rates on Sample Sectors

Model : $\Delta PJ_{it} = \beta_i \Delta RCOVR_{it} + \varepsilon_i$

No. of Sectors (n = 10)

| Regression Statistics | Mean | 10% | 25% | Median | 75% | 90% |
|---|---|---|---|---|---|---|
| R2 | 0.081 | 0.000 | 0.002 | 0.033 | 0.116 | 0.368 |
| $\beta_i$ | -0.062 | -0.607 | -0.206 | -0.055 | 0.109 | 0.387 |

Table 5 reports the mean value of $\beta_i$ is -0.062 but the sign is quite inverse of the expected sign. The summary results of equation (5) also report that the mean R2 from these regressions is 0.081 which indicates that the model could explain very few of the characteristics of the population. Therefore, reliable results are quite difficult to be found under this model.

The lack of reliability of the model also affects the reliability of the prediction model in equation (7) and the results of the empirical test model in equation (9) and there is higher probability that statistics of the empirical model become produce insignificant results. Therefore, the empirical tests for Phase-I are not further continued.

 

**Results of Phase-II Empirical Tests**

Using the Time Series OLS regression model covering 9 years from 1995-96 to 2004-05 the values of R2, $\beta_i$ and $\beta_2$ can be derived from equation (6). The values are summarized in the Table 6;

Table 6. Summary Statistics for Time Series Regression of Sectoral New Project Approval on Changes in Recovery Rates and Proportion of Loan Portfolio on Sample Sectors

Model : $\Delta PJ_{it} = \beta_1 \Delta RCOVR_{it} + \beta_2 \Delta LNPTF_{it} + \varepsilon_i$

No. of Sectors (n = 10)

| Regression Statistics | Mean | 10% | 25% | Median | 75% | 90% |
|---|---|---|---|---|---|---|
| R2 | 0.589 | 0.120 | 0.487 | 0.540 | 0.819 | 0.908 |
| $\beta_1$ | 0.057 | -0.258 | -0.141 | 0.021 | 0.211 | 0.521 |
| $\beta_2$ | -0.175 | -0.946 | -0.720 | -0.197 | 0.730 | 1.337 |

Table 6 reports the mean values of $\beta_1$ and $\beta_2$ are 0.057 and -0.175 respectively. The positive sign of the mean value of $\beta_1$ is in consistent with the expected sign but the sigh of the mean value of $\beta_2$ is inverses of the expected sign. The summary results of equation (6) also report that the mean R2 from these regressions is 0.589 which indicates that the model could explain a reasonable portion of the characteristics of the population. Therefore, reliable results are expected to be found under this model.
Now, the Phase-II empirical studies are conducted covering the time frame between 2001 and 2004, i.e.; four prediction periods. For Phase-II empirical studies the prediction errors ( $v_{ip}$ ) are calculated though the equation (10). Based on those prediction errors the standardized prediction errors ( $V_{ip}$ ) are derived using SPSS regression residuals command. Putting the standardized prediction error as dependent variable in the equation (12) the following results of the multivariate OLS regression for each prediction period can be derived.

Table 7. Multivariate OLS Regression of Standardized Prediction Error ( $V_{ip}$ ) on Explanatory Variables (n=10)

Model: $V_{ip} = \gamma_0 + \gamma_1 \overline{ROI}_{ip} + \gamma_2 \overline{DA}_{ip}$

Coefficient Estimate, t-statistics, and p-values (Two-tailed)

| Year | $\gamma_0$ | $\gamma_1$ | $\gamma_2$ | R2 |
|---|---|---|---|---|
| 2001 | 8.162 | 35.063 | 32.513 | 0.509 |
| t-stat. (F-stat.) | 2.181 | 0.573 | 2.604 | (3.626) |

| | | | | |
|---|---|---|---|---|
| p-value | 0.066 | 0.585 | 0.035 | 0.083 |
| | | | | |
| 2002 | 8.722 | -62.293 | 22.352 | 0.245 |
| t-stat. (F-stat.) | 2.383 | -1.421 | 0.856 | (1.137) |
| p-value | 0.049 | 0.198 | 0.420 | 0.374 |
| | | | | |
| 2003 | 5.945 | -31.086 | 53.895 | 0.323 |
| t-stat. (F-stat.) | 1.494 | -0.543 | 1.839 | (1.692) |
| p-value | 0.179 | 0.604 | 0.108 | 0.251 |
| | | | | |
| 2004 | 6.791 | -35.564 | 27.638 | 0.154 |
| t-stat. (F-stat.) | 1.364 | -0.858 | 0.932 | (0.637) |
| p-value | 0.215 | 0.419 | 0.382 | 0.557 |

The Null Hypothesis for F-test is $\gamma_0 = \gamma_1 = \gamma_2 = 0$;
The Null Hypotheses for t-tests are $\gamma_0 = 0, \gamma_1 = 0,$ and $\gamma_2 = 0$;
Level of Significance for all tests is $0.05$ or 5 percent.

Table 7 reports the results of regression model of the equation (12). The R2 for 2001 is the largest of the 4 years presented (0.509), and F statistics (3.626) for the regression is only significant at the 0.05 level (one-tailed) in 2001. The intercept of this regression represents the mean standardized prediction error ($\gamma_0$), after controlling for the effect sectoral average ROI, and sectoral average debt levels. The intercept is positive (8.162) and significant at the 0.05 level (one-tailed) for 2001, and is positive (8.772) and significant at the 0.05 level (two-tailed), indicating that the sectoral recovery rate and sectoral proportion on loan portfolio of the sample firms have positively contributing to the approval of new project in the higher proportionate sectors for those years. These empirical evidences, especially the p-value of 2001 is consistent with the prediction of hypothesis H2.

The regression statistic for average sectoral debt level ($\gamma_2$) is positive (32.513) and p-value is significant at the 0.05 level (one-tailed) for 2001, indicating that the new projects are approved to high levered firms which in consistent with the hypothesis H4.
None of other regression statistics is found significant at the 0.05 level and hence, the null hypothesis for t-test can't be rejected. Therefore, no empirical evidence is found to support the hypothesis H3 using this sample data.

**Summary of Findings**

Working with the empirical studies in a developing setting like Bangladesh is quite challenging. Developing and applying empirical test model in such setting and generating interpretation is also challenging due to some inherent limitations of the economy like unstructured system, lack of reliable database, and so on. Nevertheless, after considering the above stringent factors, this study generates the following findings based on the empirical facts;

- Together the sectoral recovery rate and the sectoral proportion of the loan portfolio causes approving project loans to the existing high proportionate sectors. However, no evidence is found to support the effect of only the sectoral recovery rate in approving new projects.
- Significant empirical evidence is found to support the inference, the concentration on the sectoral recovery and the sectoral proportion in loan portfolio leads to approving projects loans to the sectors having high debt to asset ratio.

- No significant evidence is found to support the inference, the concentration on sectoral recovery rate and sectoral proportion in loan portfolio leads to the sacrifices of the opportunity of approving project loan to profitable and growing sectors.
- The existence of the randomness of the approved projects in food and allied products sector, and metallic product sector is found in the Run-test. The rest of the sectors are not significantly evident the randomness of the approving project loans over the 10 years period. These empirical results evident the strength of the project loan approvals in respective sector to responding to the change in the economy.

**Conclusion**

The study is made to identify the effects and consequences of sectoral recovery rate and sectoral proportion of the loan portfolio while approving new project loans of BSB. This study highlighted the importance of this issue in light of the dilemma of industrial development and high social cost due to operating losses which is quite common in the development financial institutions of developing countries. This study also identifies the consequences of the emphasizing on sectoral recovery rate and sectoral proportion of loan portfolio on the sacrifices of the sectoral profitability and growth, and leverage problem of the high proportionate sectors. For the purpose of this study a casual comparative or 'ex-post facto' research has conducted. For analysis purposes research models are being developed using OLS regression models. The research hypotheses are being tested empirically with two phases. Empirical results of Phase-II have found significant results indicating the positive relationship of the sectoral recovery rate and sectoral proportion of loan portfolio in approving new projects. The empirical results have also found the evidence of approving project loans to high levered sectors. The test of randomness of the new project approval has not found the existence of the randomness of such approval except food sector and metal product sector, indicating the flexibility of the loan appraisal procedures of BSB to respond the dynamic forces on the economy. Finally, this study recommends the modification of the loan appraisal procedures, and development of an efficient information system for the BSB.

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**APPENDIX: Data Set Used for the Empirical Tests**

Table 8: No. of New Projects Over the Years

| Sector | 1995-96 | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Food & Allied Products | 126 | 20 | 116 | 112 | 102 | 103 | 99 | 85 | 58 | 31 |
| Jute & Allied Products | 11 | 11 | 11 | 11 | 11 | 11 | 10 | 7 | 5 | 3 |
| Cotton & Wollen | 125 | 130 | 132 | 131 | 130 | 122 | 119 | 112 | 87 | 53 |
| Paper & Printing | 23 | 23 | 23 | 22 | 21 | 20 | 19 | 18 | 15 | 6 |
| Tannery & Leather | 17 | 17 | 17 | 17 | 16 | 16 | 15 | 14 | 9 | 4 |
| Metal Products | 40 | 28 | 37 | 36 | 35 | 34 | 34 | 29 | 14 | 5 |
| Chemical & Pharma | 32 | 33 | 33 | 32 | 31 | 30 | 30 | 30 | 26 | 15 |
| Petro-chemical | 19 | 19 | 19 | 19 | 18 | 18 | 18 | 16 | 10 | 5 |
| Service Industries | 70 | 68 | 65 | 62 | 60 | 52 | 46 | 38 | 28 | 18 |
| Machinery & Spare Parts | 23 | 23 | 21 | 20 | 20 | 19 | 19 | 18 | 13 | 6 |

Table 9: Sectoral Recovery Rate Over the Years

| Sector | 1995-96 | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Food & Allied Products | 0.053 | 0.047 | 0.060 | 0.073 | 0.068 | 0.069 | 0.163 | 0.125 | 0.047 | 0.820 |
| Jute & Allied Products | 0.214 | 0.166 | 0.148 | 0.101 | 0.224 | 0.414 | 0.154 | 0.237 | 0.388 | 0.273 |
| Cotton & Wollen | 0.285 | 0.045 | 0.045 | 0.03 | 0.028 | 0.051 | 0.092 | 0.077 | 0.134 | 0.186 |
| Paper & Printing | 0.188 | 0.221 | 0.178 | 0.176 | 0.146 | 0.149 | 0.160 | 0.146 | 0.492 | 0.421 |
| Tannery & Leather | 0.019 | 0.022 | 0.025 | 0.019 | 0.029 | 0.045 | 0.025 | 0.056 | 0.174 | 0.171 |
| Metal Products | 9.458 | 0.002 | 0.002 | 0.005 | 0.004 | 0.004 | 0.009 | 0.009 | 0.023 | 0.026 |
| Chemical & Pharma | 0.311 | 0.231 | 0.265 | 0.333 | 0.294 | 0.189 | 0.244 | 0.184 | 0.187 | 0.356 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Petro-chemical | 0.066 | 0.006 | 0.008 | 0.007 | 0.019 | 0.006 | 0.007 | 0.009 | 0.049 | 4.171 |
| Service Industries | 0.248 | 0.329 | 0.355 | 0.230 | 0.206 | 0.235 | 0.395 | 0.604 | 1.759 | 1.245 |
| Machinery & Spare Parts | 0.88 | 0.85 | 1.013 | 0.580 | 0.991 | 0.935 | 1.042 | 0.674 | 0.184 | 0.133 |

Table 10: Sectoral Proportion of BSB's Loan Portfolio

| Sector | 1995-96 | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Food & Allied Products | 0.1213 | 0.1199 | 0.1222 | 0.1108 | 0.1040 | 0.1026 | 0.0582 | 0.0565 | 0.2078 | 0.0124 |
| Jute & Allied Products | 0.0466 | 0.0447 | 0.0445 | 0.0433 | 0.0394 | 0.0386 | 0.0287 | 0.0286 | 0.0228 | 0.0227 |
| Cotton & Wollen | 0.3902 | 3.8478 | 4.1093 | 3.9670 | 3.9433 | 3.5933 | 3.2389 | 3.4500 | 2.2455 | 1.8150 |
| Paper & Printing | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0001 | 0.0001 |
| Tannery & Leather | 0.3205 | 0.3174 | 0.3259 | 0.3186 | 0.2782 | 0.2530 | 0.2591 | 0.1409 | 0.0422 | 0.0436 |
| Metal Products | 0.0466 | 0.0459 | 0.0399 | 0.0405 | 0.0455 | 0.0473 | 0.0187 | 0.0129 | 0.0130 | 0.0054 |
| Chemical & Pharma | 0.0011 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0007 | 0.0005 |
| Petro-chemical | 0.0162 | 0.1603 | 0.1669 | 0.1581 | 0.1579 | 0.1785 | 0.2198 | 0.1722 | 0.0565 | 0.0054 |
| Service Industries | 0.0400 | 0.0393 | 0.0419 | 0.0423 | 0.0410 | 0.0386 | 0.0306 | 0.0179 | 0.0086 | 0.0097 |
| Machinery & Spare Parts | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |

 

Table 11: Sectoral Average ROI and Average DA Ratio

| Sector | ROI | | | | DA | | | |
|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2001 | 2002 | 2003 | 2004 |
| Food & Allied Products | 0.064773 | 0.059121 | 0.035301 | 0.024334 | 0.148946 | 0.176427 | 0.17885 | 0.168491 |
| Jute & Allied Products | -0.03553 | -0.02941 | -0.02292 | -0.02392 | 0.673176 | 0.034092 | 0.087473 | 0.14339 |
| Cotton & Wollen | 0.026505 | -0.0015 | -0.01071 | 0.005932 | 0.268186 | 0.250136 | 0.241942 | 0.301092 |
| Paper & Printing | -0.04105 | -0.05884 | -0.04291 | -0.04151 | 0.110877 | 0.117932 | 0.055421 | 0.142754 |
| Tannery & Leather | 0.041236 | 0.037237 | 0.035121 | 0.036982 | 0.165377 | 0.153287 | 0.13654 | 0.129492 |
| Metal Products | 0.034373 | 0.038471 | 0.04286 | 0.033623 | 0.147712 | 0.150193 | 0.151216 | 0.133692 |
| Chemical & Pharma | 0.069524 | 0.064686 | 0.055733 | 0.11456 | 0.112555 | 0.112784 | 0.144393 | 0.231821 |
| Petro-chemical | 0.015203 | 0.01297 | 0.015484 | 0.072907 | 0.017595 | 0.02529 | 0.017559 | 0.172297 |
| Service Industries | 0.010854 | 0.010421 | 0.016674 | 0.011729 | 0.108184 | 0.141096 | 0.132796 | 0.076437 |
| Machinery & Spare Parts | 0.034373 | 0.038471 | 0.04286 | 0.033623 | 0.147712 | 0.150193 | 0.151216 | 0.133692 |