The Impact of New Banking Services on the Performance of Selected Banks, A Panel Data Model

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ABSTRACT

In recent years banking services have grown. This expansion of banking services increases the cost of banks and increases their income. The question is whether or not the overall profitability of banks has increased and new services has been positive overall impact. The aim of this paper is to investigate the impact of new banking services on profitability and performance of selected banks. I used regression models with OLS method and pooling (panel) data model. The purpose of this paper is to study the impact of new and innovative banking services on the performance and profitability of selected banks since 2000 to 2010. The selected sample consists of 19 banks, these banks selected in the banking industry from different countries. The dependent variable is an indicator of banks profitability. The results show that offering of new banking services have a positive effect on profitability and performance. Also entry of new banks with new and modern services causes to change in profitability.

Keywords: modern banking services, banks performance, profitability, regression analysis.

JEL: E0, G2, E

1. INTRODUCTION

In recent years, new banking services have been grown. This expansion led to increase the costs and increase the incomes by banks. From the perspective of cost-benefit analysis, it is necessary to examine whether the efficiency and profitability of the banking system is increased or not?

In this paper I want to investigate the performance of banks according to new banking services in selected banks. The aim of this paper is to investigate the impact of new banking services on profitability and performance of selected banks. In first model, I am looking to realize which variables explain return of assets (RoA) of selected banks with new services. In second model, I am looking to realize which variables explain margin profits of selected banks with new services. Finally by using regression model and selecting two kind of models (for return of assets and margin profits) I will test the hypothesis. the hypothesis are: 1) the new banking services has a positive effect on return of assets of selected banks. 2) the new banking services has a positive effects on margin profits of selected banks.

The difference between the proposed approach and the old methods is that Previous studies to evaluate a bank in one country by a single equation estimation, but this article is to examine and compare several banks from several countries by panel method. So the results of this paper are more general and inclusive.

The scientific contributions of this paper are: 1) Using regression and statistics approaches for testing the hypothesis. 2) Using the panel data model and comparing several banks in several countries. 3) Using a complete set of variables that affect the profitability of banks in models.

This research consists three steps. In the first section, by referring to the website of the leading banks and deriving the modern services of selected banks such as; new online purchasing shares through a bank, adjustable credit card, electronic signatures, financial projects to clients and so on, A comprehensive list of these services will be provided.

In the second section, by examining the banks performance indicators, we explain the return of assets and the return of equity.

The third section is to examine the relationship between the banks operations and services provided by banks. For testing the hypotheses we use regression analysis.

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REVIEW OF LITERATURES

John Mylonakis (2009) shows that the Greek bank customers satisfaction level is based on their own banks experiences and perceptions, as well as their buying behavior and attitudes towards banking products and services offered. The research was carried out on a random sample of 182 bank customers with the use of structured questionnaires. Research showed that the majority of bank customers are satisfied with the bank they cooperate with. Banking institutions have managed to differentiate their investment and savings portfolios by converting it from investment banking to commercial and retail banking.

Al-Shobaki, Fouad, and Al-Bashi (2010) show that the use of Total Quality Management (TQM) can be of great benefit to the Jordanian banks, as it will lead to an increase in the organization customer orientation and competitive edge. The paper will also investigate the relation between the application of TQM and the increase in the organization performance and efficiency.

Gregory T. Fraker (2006) shows that Economic Value Added (EVA) can be an important tool that bankers can use to measure and improve the financial performance of their bank. Since EVA takes the interest of the bank’s shareholders into consideration, the use of EVA by bank management may lead to different decisions than if management relied solely on other measures.

Yansheng Zhanand Longyi Li (2009) show that to update the mode of banking services can broaden the field of financial services, and improve the quality and the efficiency of financial services. To achieve innovation model, it is necessary to improve the "Smile" services, personal mechanism and incentive mechanism. We should speed up the reform of financial supervision, improve the level of financial supervision in order to adapt to the development of the new banking services model and respond to changes in financial innovation. The banking industry should also accelerate the transformation of service delivery model to accelerate the pace of mixed services to enhance international competitiveness.

Babalola and Abiodun (2012) investigate the determinants of banks’ profitability in Nigeria. In the process of their investigation, some factors which are significant impacts on return of assets (as an index of performance in the Nigerian banking industry) were considered. Their findings summarily show that, in the short run analysis, capital adequacy ratio is actually the determining factor for banks’ profitability in Nigeria while in the long-run relationships; the size as well as the tangibility of the banks actually play out as the determining factor of performance.

Jiang, Tang, Law and Sze (2003) show that both bank-specific as well as macroeconomic factors are important determinants in the profitability of banks. With regard to macroeconomic factors, real GDP growth, inflation and real interest rates have a positive impact. Among bank-specific variables, operational efficiency and business diversification contribute to higher returns on assets, after controlling for differences in the credit quality of loans.

Bello and Dogarawa (2005) concluded that electronic banking in Nigeria is yet to create any significant impact on service delivery, which will consequently lead to improved customer satisfaction.

Model selection

The purpose of this paper is to study the impact of new and innovative banking services on the performance and profitability of selected banks since 2000 to 2010. The selected sample consists of 19 banks, these banks selected in the banking industry from different countries. Groups are divided into three categories: those that do not use modern banking services, recent recipients of new services and older recipients of new services.

The ratios of return to assets and return to equity, and profit margins selected as indexes. In this study independent variables are included overhead rates, the ratio of assets to deposits and the ratio of loans (debits) to assets. Regression analysis to test the impact of these services on the profitability of banks has been used.

The hypothesis of this study is “the using of modern banking services has a significant effect on bank profitability”. Understanding the relationship between modern banking services and bank performance is an experimental procedure. Profitability ratios are the criteria that are used as benchmarks to evaluate the performance of banks. Bank profitability measures such as return on assets and return it by equity is defined.

In the table below, the variables used as criteria for performance evaluation has been mentioned in some studies.
Table (1) variables for performance evaluation in some studies

<table>
<thead>
<tr>
<th>Author</th>
<th>period</th>
<th>year</th>
<th>The variable for performance evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zazzara and Ciciretti</td>
<td>1993-2001</td>
<td>2005</td>
<td>Average of Return of equity</td>
</tr>
<tr>
<td>Hisar Campus</td>
<td>1996-2005</td>
<td>2008</td>
<td>profit margin</td>
</tr>
<tr>
<td>Yener Altunbas</td>
<td>1990-2002</td>
<td>2004</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>M. Kabir Hassan</td>
<td>1994-2001</td>
<td>2003</td>
<td>profit margin (BTP/TA)</td>
</tr>
<tr>
<td>Alejandro Micco</td>
<td>1995-2002</td>
<td>2004</td>
<td>Ownership, Demand Deposits relative to total deposits Share, Interest margin relative to loans plus deposits, Interest margin relative to total, assets, Non-Interest revenues relative to total assets, Overheads relative to total assets, Employment Relative to Total Assets, and Demand Deposits relative to total deposits</td>
</tr>
<tr>
<td>Abdell-Hameed M. Bashir</td>
<td>1993-98</td>
<td>2001</td>
<td>net non-interest margin (NIM)</td>
</tr>
<tr>
<td>Saovanee Chantapong</td>
<td>1995-2000</td>
<td>2003</td>
<td>net interest margin/total assets, non-interest income/total assets</td>
</tr>
<tr>
<td>Fadzlanusfian</td>
<td>1992-2000</td>
<td>2011</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>MICHAEL L. MARLOW</td>
<td>1969-1979</td>
<td>1981</td>
<td>interest and dividends on savings accounts/savings accounts, average profitability (net income/total assets)</td>
</tr>
<tr>
<td>Medhat Tarawaneh</td>
<td>2006</td>
<td></td>
<td>interest income</td>
</tr>
<tr>
<td>Ahmad Almazari</td>
<td>2011</td>
<td></td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Khizer Ali</td>
<td>2011</td>
<td></td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Muhammad Sidqi</td>
<td>2011</td>
<td></td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Akram Alkatib</td>
<td>2005-2010</td>
<td>2012</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Pooja MALHOTRA</td>
<td>1998-2006</td>
<td>2009</td>
<td>Non-Performing Assets</td>
</tr>
<tr>
<td>SAIDOV ELYOR ILHOMOVICH</td>
<td>2004-2008</td>
<td>2009</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Nor Mazlina</td>
<td>2001-2006</td>
<td>2009</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Tobias Otweny</td>
<td>2002-2008</td>
<td>2011</td>
<td>Average of return on assets</td>
</tr>
<tr>
<td>Mohammad Al-Smadi</td>
<td>2000-2010</td>
<td>2011</td>
<td>Return on equity</td>
</tr>
<tr>
<td>Husni Ali Khrawish</td>
<td>2000-2009</td>
<td>2011</td>
<td>Average of return on assets</td>
</tr>
</tbody>
</table>

I define $Y_{it}$ as The profitability of bank $i$ in year $t$. The general form of the equation is as follows:

$$Y_{it} = \alpha_0 + \alpha_i IR_{mt} + \sum_{i=1}^{n} \beta_i X_{it} + \alpha_R \text{SERVICE}_i + e_{it}$$

As $IR_{mt}$ is macroeconomic variables in $m$th country (where the $m$th bank is there) in year $t$, which is the lending rate, Services are dummy variable for new banking services, and $X_{it}$ are explanatory variables such as: Total savings, Overhead rates, and debts rates.

The list of selected banks which include new banking services are as below:

Table 2: banks with new banking services

<table>
<thead>
<tr>
<th>country</th>
<th>year of using the modern services</th>
<th>Name</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>2000</td>
<td>Clydesdale Bank</td>
<td>1</td>
</tr>
<tr>
<td>UK</td>
<td>2002</td>
<td>Barclays Bank</td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>2000</td>
<td>Nordea Bank</td>
<td>3</td>
</tr>
<tr>
<td>Nederland</td>
<td>1999</td>
<td>Rabobank</td>
<td>4</td>
</tr>
<tr>
<td>Nederland</td>
<td>1999</td>
<td>Fortis Bank</td>
<td>5</td>
</tr>
<tr>
<td>Nederland</td>
<td>1997</td>
<td>SNS Bank</td>
<td>6</td>
</tr>
<tr>
<td>Spain</td>
<td>2000</td>
<td>Banco Popular</td>
<td>7</td>
</tr>
<tr>
<td>Spain</td>
<td>1998</td>
<td>Banco de Sabadell</td>
<td>8</td>
</tr>
<tr>
<td>Spain</td>
<td>2000</td>
<td>Rabobank</td>
<td>9</td>
</tr>
<tr>
<td>Spain</td>
<td>2000</td>
<td>Fortis Bank</td>
<td>10</td>
</tr>
<tr>
<td>Turkey</td>
<td>2000</td>
<td>DemzBank</td>
<td>11</td>
</tr>
<tr>
<td>Italy</td>
<td>2002</td>
<td>Unicredit</td>
<td>12</td>
</tr>
<tr>
<td>Italy</td>
<td>2002</td>
<td>Capitalia</td>
<td>13</td>
</tr>
<tr>
<td>Italy</td>
<td>2001</td>
<td>Intesa</td>
<td>14</td>
</tr>
<tr>
<td>Italy</td>
<td>2003</td>
<td>BanchePopolari Unite</td>
<td>15</td>
</tr>
<tr>
<td>France</td>
<td>1997</td>
<td>BNP Paribas</td>
<td>16</td>
</tr>
<tr>
<td>France</td>
<td>2003</td>
<td>Société Générale</td>
<td>17</td>
</tr>
<tr>
<td>Germany</td>
<td>1994</td>
<td>Deutsche Bank</td>
<td>18</td>
</tr>
<tr>
<td>Germany</td>
<td>1995</td>
<td>Commerzbank</td>
<td>19</td>
</tr>
</tbody>
</table>
The procedure for model selection

In first step, by using Eviews software, I will estimate the random-effects model. This kind of model assumes that the dataset being analyzed consists of a hierarchy of different populations whose differences relate to that hierarchy. In econometrics, random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects (i.e. no individual effects). The fixed effects model is a special case of the random effects model. Contrast this to the biostatistics definitions, as biostatisticians respectively refer to the population-average and subject-specific effects as "fixed" and "random" effects.

In second step, I will use F limer test for choosing between pooling model and fixed effect model. In pooling model, period and cross section deleted in equation. I will find the preferred model by this test.

In third step, I will use hausman test for choosing the preferred model between fixed effect and random effect. The random effect model assumes that the dataset being analyzed consists of a hierarchy of different populations whose differences relate to that hierarchy. In econometrics, random effects models are used in the analysis of hierarchical or panel data when one assumes no fixed effects (i.e. no individual effects).

Finally, by selecting the best model, I will interpret the results and assumptions of best model.

The first model estimation

In this model, I am looking to realize which variables explain return of assets (Roa) of selected banks with new services.

First of all, I use unit root test for variables. Table 3 show the results of stationary test as below:

Table 3: Levin, Lin and Chu test of stationary

<table>
<thead>
<tr>
<th>Variable</th>
<th>LLC Statistics</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>-8.30</td>
<td>0.000</td>
</tr>
<tr>
<td>Lending_rate</td>
<td>-10.92</td>
<td>0.000</td>
</tr>
<tr>
<td>Loan_assets</td>
<td>-3.57</td>
<td>0.000</td>
</tr>
<tr>
<td>Margin</td>
<td>-4.48</td>
<td>0.000</td>
</tr>
<tr>
<td>Overhead</td>
<td>-7.82</td>
<td>0.000</td>
</tr>
<tr>
<td>Total_deposits</td>
<td>-6.02</td>
<td>0.000</td>
</tr>
</tbody>
</table>

As table shows, all variables are stationary and we can estimate the model by OLS method.

As shown in table 4, test results of F limer indicates that the model should run base on pooling data. So I estimate my model according to pooling and show the results in table 5.

Table 4: F limer test

<table>
<thead>
<tr>
<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>0.082603</td>
<td>(18,144)</td>
<td>1.000</td>
</tr>
<tr>
<td>Cross-section Chi-square</td>
<td>1.756579</td>
<td>18</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 5: First model estimation results

Dependent Variable: ROA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.013637</td>
<td>0.003092</td>
<td>-4.410594</td>
<td>0.000</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>0.007036</td>
<td>0.000955</td>
<td>7.366111</td>
<td>0.000</td>
</tr>
<tr>
<td>LENDING_RATE</td>
<td>-0.000163</td>
<td>0.000161</td>
<td>-1.013751</td>
<td>0.312</td>
</tr>
<tr>
<td>LOAN_ASSETS</td>
<td>0.009189</td>
<td>0.001895</td>
<td>4.850246</td>
<td>0.000</td>
</tr>
<tr>
<td>SERVICE1</td>
<td>0.009088</td>
<td>0.002667</td>
<td>3.407796</td>
<td>0.008</td>
</tr>
<tr>
<td>SERVICE2</td>
<td>-0.005430</td>
<td>0.001110</td>
<td>-4.890075</td>
<td>0.000</td>
</tr>
<tr>
<td>SERVICE3</td>
<td>0.003759</td>
<td>0.000704</td>
<td>5.335828</td>
<td>0.000</td>
</tr>
<tr>
<td>TOTAL_DEPOSITS</td>
<td>-0.006525</td>
<td>0.001895</td>
<td>-3.443464</td>
<td>0.007</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.758411</td>
<td>0.030539</td>
<td>24.83419</td>
<td>0.000</td>
</tr>
</tbody>
</table>

As shown in table 4, test results of F limer indicates that the model should run base on pooling data. So I estimate my model according to pooling and show the results in table 5.

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Std. Error</th>
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<th>Prob.</th>
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</thead>
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<td>0.003092</td>
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<td>0.000</td>
</tr>
<tr>
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<td>-1.013751</td>
<td>0.312</td>
</tr>
<tr>
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<tr>
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<td>5.335828</td>
<td>0.000</td>
</tr>
<tr>
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<td>-3.443464</td>
<td>0.007</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.758411</td>
<td>0.030539</td>
<td>24.83419</td>
<td>0.000</td>
</tr>
</tbody>
</table>

R-squared               | 0.926367    | Mean dependent var | 0.008135    |
| Adjusted R-squared     | 0.922731    | S.D. dependent var  | 0.005629    |
| S.E. of regression     | 0.001565    | Akaike info criterion | -10.03107   |
| Sum squared resid      | 0.00097     | Schwarz criterion   | -9.865724   |
| Log likelihood         | 866.6569    | Hannan-Quinn criter. | -9.963982   |
| F-statistic            | 254.7635    | Durbin-Watson stat  | 2.046707    |
| Prob(F-statistic)      | 0.000000    |                     |             |
The dependent variable is the return of assets of selected banks, and the independent variables are; Overhead ratio which is the ratio of operating cost divided by net taxable income and other operating income, LENDING_RATE which is lending rates of selected banks, LOAN_ASSETS which is loan ratio of selected banks, TOTAL_DEPOSITS which is total deposits of selected banks, and services which are dummy variables for time of starting to offer new services by selected banks.

In this model, Roa (return of assets) of selected banks is dependent variable. The results in Table 5 confirms the original hypothesis which new banking services have significant coefficient and significant effect on Roa of selected banks (services as dummy variables). Also the coefficients of total deposits, overhead and loan assets are significant, but the coefficient of lending rate is not significant.

The coefficient of determination, denoted $R^2$, is equal to 0.92 which means the independent variables explain about 92 percent of Roa changes.

The second model estimation

In this model, I am looking to realize which variables explain margin profits of selected banks with new services.

As shown in table 6, F limer and Hausman tests show that the second model is fixed effect model (panel).

<table>
<thead>
<tr>
<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>10.854109</td>
<td>(18,164)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Cross-section Chi-square</td>
<td>149.054448</td>
<td>18</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Table 6: F Limer and Hausman tests of second model

So I estimate my model according to fixed effect model and show the results in table 7.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.005105</td>
<td>0.005834</td>
<td>-0.875046</td>
<td>0.3830</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>0.000651</td>
<td>0.000752</td>
<td>0.865733</td>
<td>0.3881</td>
</tr>
<tr>
<td>LENDING_RATE</td>
<td>-0.000807</td>
<td>0.000241</td>
<td>-3.353137</td>
<td>0.0010</td>
</tr>
<tr>
<td>LOAN_ASSETS</td>
<td>0.016183</td>
<td>0.002055</td>
<td>7.873651</td>
<td>0.0000</td>
</tr>
<tr>
<td>SERVICE1</td>
<td>0.011067</td>
<td>0.005400</td>
<td>2.049465</td>
<td>0.0422</td>
</tr>
<tr>
<td>SERVICE2</td>
<td>-0.009515</td>
<td>0.001909</td>
<td>-4.984182</td>
<td>0.0000</td>
</tr>
<tr>
<td>SERVICE3</td>
<td>0.004814</td>
<td>0.000931</td>
<td>5.169471</td>
<td>0.0000</td>
</tr>
<tr>
<td>TOTAL_DEPOSITS</td>
<td>0.002593</td>
<td>0.001843</td>
<td>1.406998</td>
<td>0.1616</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.618990</td>
<td>0.029576</td>
<td>20.92903</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Table 7: Second model estimation results

Dependent Variable: Margin

<table>
<thead>
<tr>
<th>Weighted Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean dependent var</td>
</tr>
<tr>
<td>S.D. dependent var</td>
</tr>
<tr>
<td>Sum squared resid</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
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The coefficient of all explanatory variables, except overhead, are significant and the hypothesis confirmed.

The coefficient of determination, denoted $R^2$, is equal to 0.978 which means the independent variables explain about 97.8 percent of Margin profits changes. Also graph one shows the goodness of fit, and actual and fitted values of the dependent variable every close together.

**Conclusions**

The aim of this paper is to investigate the impact of new banking services on profitability and performance of selected banks. I used regression models with OLS method and panel data. The dependent variable is an indicator of banks Profitability. In first model, I am looking to realize which variables explain return of assets (Roa) of selected banks with new services. Test results of F limer indicates that the model should run base on pooling data. The results confirms the original hypothesis which new banking services have significant coefficient and significant effect on Roa of 19 selected banks. Also the coefficients of total deposits, overhead and loan assets are significant, but the coefficient of lending rate is not significant. The coefficient of determination, denoted $R^2$, is equal to 0.92 which means the independent variables explain about 92 percent of Roa changes.

In second model, I am looking to realize which variables explain margin profits of selected banks with new services. Tests results of F limer and Hausman show that the second model is fixed effect model (panel). The results confirms the original hypothesis which new banking services have significant coefficient and significant effect on margin profits of 19 selected banks. The coefficient of all explanatory variables, except overhead, are significant and the hypothesis confirmed. The coefficient of determination, denoted $R^2$, is equal to 0.978 which means the independent variables explain about 97.8 percent of Margin profits changes.

**REFERENCES**


