

The Relative Importance of Industry- & Country-Specific Factors for Bank Performance in Developed and Emerging Economies

Olga Uzhegova¹

¹ DBA, Department of Finance and Accounting, Bang College of Business, KIMEP University, Almaty, Kazakhstan

Correspondence: Olga Uzhegova, Department of Finance and Accounting, Bang College of Business, KIMEP University, 4 Abai Ave, Dostyk building, office 333, Almaty, Kazakhstan.

Received: March 19, 2015 Accepted: April 21, 2015 Online Published: May 14, 2015

doi:10.5539/res.v7n7p365 URL: <http://dx.doi.org/10.5539/res.v7n7p365>

Abstract

This study examines relative importance of industry- and country-specific factors for profitability of banks operating in emerging and developed economies. A period spanning between two major crises is examined: since 2002, the end of high-tech bubble burst lasting 1999-2001, until mortgage-driven one in 2008. The empirical support is provided for the idea that industry- and country specific factors are much more important for bank performance in emerging rather than in developed economies due to higher level of uncertainty and as results due to higher magnitude of the reaction of banks to external shocks. The issue of higher level of sensitivity of bank performance to external settings in emerging economies is closely associated with a high level of diverging expectations of market participants with respect to the overall economic situation and the higher agency problems in these economies. Further, this effect is more pronounced for performance of leading banks across-the-board, which is due to their higher ability to deal better with challenges coming from the external environment compared to lagging banks. In addition to that, the findings of this research support the study's hypothesis that suggests that the importance of the exchange rate regime for bank profitability increases when approaching a semi-flexible regime.

Keywords: bank performance, profitability, industry-specific factors, country-specific factors, exchange rate regime, emerging markets, developed economies, inflation, discount rates, economic growth, sovereign risk, market concentration, MANCOVA

1. Introduction

This study primarily is inspired by the ideas proposed by Allen and Gale (2001) in their book *Comparing Financial Systems* where it is noted that the form of a financial system varies from country to country, while the current trend with respect to financial systems is towards market-based systems (implying securities market).

“One of the arguments for markets is that they economize on and disseminate information that is needed for efficient decision making. Market-based financial systems are characterized by dispersed information (publicly traded companies are required to reveal more information than privately held companies) and dispersed shareholdings give a large number of people an incentive to gather information on firms and monitor their performance” (Allen & Gale, 2001, p. 11).

The authors noticed that such arguments suggest that market-based financial systems have an informational advantage over intermediary based systems. However, there is a free rider problem, which leads to an underinvestment in information. In turn, intermediaries that are not characterized by the presence of a large number of shareholders “may have a better incentive to gather information and monitor firms.”

They emphasized that markets are good at collecting and aggregating diverse opinions, while intermediaries “can benefit from increasing return to scale in processing standard information, but may have less success dealing with uncertainty, innovation and new ideas” (Allen & Gale 2001, p. 12).

This study argues that as the financial system of any economy becomes more intermediary-based, the level of banks' expertise with respect to the “dealing with uncertainty, innovation, and new ideas” is increasing in comparison with the level of expertise of banks operating in more market-based economies (hereinafter economies where the securities market is more developed). This is due to the absence of any other mechanism

through which uncertainty and innovations could be gauged better in such markets. In other words, the function of markets to gather information and monitor companies in order to deal successfully with uncertainty and innovations transfers more to banks as the financial system of the economy is becoming more intermediary-based.

At the same time, one has to take into account that the level of uncertainty pertaining to each economy is different due to different regulatory and economic environments. Different environments cause divergence of expectations of market participants, an increase in agency problems associated with information asymmetry and moral hazard that is higher in economies with a less developed financial system. For the purpose of this study, this, in turn, means that banks operating in economies with a less developed financial system are more sensitive to changes in the external environment.

Because of a higher level of uncertainty, the magnitude of the reaction of banks to external shocks (for instance, changes in the pricing policy in response to unexpected inflation) is higher in economies with a lower level of financial system development. Given that the role of collecting and aggregating various opinions transfers from markets to banks in such economies, this shift causes banks to naturally develop their expertise in dealing with uncertainty. The development of banks' expertise in terms of collecting and interpretation of information coming from external environment is becoming a cornerstone issue for their performance.

In addition to that, macroeconomic factors in countries with a higher level of regulatory, economic, and financial system development are less volatile. When any factor is approaching a monotonic trend, it tends to be a constant and, therefore, becomes unimportant. This means that the importance of macroeconomic factors is less important, in general, in countries characterized by a higher level of regulatory, economic, and financial system development.

Therefore, the focus of this study is to test a hypothesis that *industry-specific and country-specific factors are more important for the profitability of banks in less developed countries characterized by a lower level of their financial system development than in more developed ones.*

Further, every economy is characterized by the presence of well-performing and under-performing organizations. Banks are no exception. This suggests that there are some factors, which contribute more to well-performing banks while at the same time there are some aspects of the business environment, which add more to underperformance of banks. This study argues that well-performing banks, all other things being equal, are leading banks per se since they are better able to manage challenges, which come from the external environment. Therefore, industry- and country-specific factors are more important for well-performing banks. Therefore, another hypothesis to be tested in the course of this research is that *the importance of industry-specific and country-specific factors is higher for well-performing banks.*

2. Literature Review

The review of the recent research advances suggests that, in essence, there are two major groups of external factors, which contribute to the performance of banks, deserved attention in the literature: industry specific - and country-specific factors.

Concerning the possible effect of country-specific factors on performance of banking organizations, Harrison, Sussman, and Zeira's 1999 study, for instance, suggested that there is a circular relationship between economic growth and banking development (Botrić & Slijepčević, 2008, p. 256).

Albertazzi and Gambacorta (2006, p. 13) found that the effect of GDP as a proxy for business cycle on net income in ten industrialized countries is positive and significant. In economic terms, this suggests that improvement in economic conditions improves the financial conditions in, and lending demand by the private sector, which leads to increases in profitability of "the traditional financial intermediation activities".

Bekker's (2004) business cycle studies also found a significant positive association of banks' profitability with GDP growth, suggesting that bank profitability "moves up and down with the business cycle" (Beckmann 2007, p. 5).

Reporting the results of Demirgüç-Kunt and Huizinga's 1999 study, Beckmann (2007, 6) noted that in contrast to most macro-oriented studies, their results did not provide evidence of significant impact of GDP growth on ROA, but they found significant positive effect of inflation on profitability of banks expressed as ROA.

The effect of inflation on the performance of banks received a great attention, primarily "due to the influence of inflation on the sources and users of banks' financial resources. In particular, inflation affects companies' pricing behaviour" (Gul, Irshad, & Zaman, 2011, p. 73).

Among other macro-factors that could influence banks' performance, Beckmann (2007, p. 9) highlighted the ambiguous effect of real interest rates on performance of banking organizations due to the initial "dampening effect of a rise in real interest rates on credit demand and accompanying deterioration in credit quality" that could contribute to negative association of interest rates with ROA. Beckmann (2007) also found a very strong impact of real interest rate on the return on assets.

Due to very intensive involvement of banking organizations in foreign currency trading activities, the issue of risks associated with it deserves some attention. Grammatikos, Saunders and Swary (1986, p. 671) stated that there are two types of risk related to foreign currency trading activities, namely: the exchange rate risk, which comes from unexpected change in exchange rates in the presence of "a positive (or negative) net asset position [in terms of size] in a particular foreign currency", and the foreign interest risk, which occurs from changes in interest rates in the presence of mismatched maturities of banks' "foreign currency assets and liabilities."

There is also a substantial strand of research devoted to the impact of industry-specific factors on banking activities.

Gilbert (1984, p. 629), for example, indicated that banking studies "do not consistently support or reject the hypothesis that market concentration influences bank performance". For instance, Demirgüç-Kunt and Huizinga (1999), in their analysis of 80 countries covering the period 1988 to 1995, found a positive and significant impact of banking sector concentration ("measured as the ratio of the assets of the largest three banks to total banking assets") on ROA (Beckmann, 2007, p. 6). Gilbert's similar survey of 44 studies shows that 32 found that market structure has some impact on the performance of banks. However, the results of seven of these were not statistically significant.

Pursuant to the collusion hypothesis initially proposed, tested, and confirmed by Bain in 1951 "the average profit rate of firms in oligopolistic industries of a high concentration will tend to be significantly larger than that of firms in less concentrated oligopolies or in industries of atomistic structure" (Bain, 1951, p. 294). The results of his study suggest that on average the profit rate of companies in more concentrated sectors is higher (Bain, 1951, p. 323).

Gilbert (1984, p. 629) indicated that banking studies "do not consistently support or reject the hypothesis that market concentration influences bank performance". For instance, Demirgüç-Kunt and Huizinga (1999), in their analysis of 80 countries covering the period 1988 to 1995, found a positive and significant impact of banking sector concentration ("measured as the ratio of the assets of the largest three banks to total banking assets") on ROA (Beckmann, 2007, p. 6). Gilbert's similar survey of 44 studies shows that 32 found that market structure has some impact on the performance of banks. However, the results of seven of these were not statistically significant. Vemon (1971) and Whitehead (1978) found a significant influence of structure on bank performance, which contradicted the structure-performance relationship hypothesis (Gilbert, 1984, p. 635).

The role of the structure of the financial system—in particular, to what degree the system is bank-based or market-based—in the economy is highly debated. Economies with market-based financial systems are characterized by the presence of a well-developed market for securities. Economies with a bank-based financial system have banks' loans and deposits as the main assets and liabilities (Vitols, 2001, p. 1). Arestis, Demetriades and Luintel (2001), comparing bank-based and market-based economies, empirically showed that bank-based economies contribute mostly to economic growth and investments than do market-based countries. This implies that when the bank sector expands, so will the economy. In turn, this ensures the creation of a strong client base, which results in an increase in the number and volume of bank transactions. This implies that banks in countries where they dominate the economy (relative to securities market) are more likely to make very profitable deals.

However, there is a lack of research devoted to assessment of how strong is and whether there is a difference in the effect of industry—and country-specific factors on performance of bank operating in countries with different regulatory and economic environments.

3. Methodology

A period spanning between two major crises is examined: since 2002, the end of high-tech bubble burst lasting 1999-2001, until mortgage-driven one in 2008. We believe it to be an interim period appropriate for eliciting the effect of industry- and country-specific factors on bank performance at the global level as a term with extensive banking data not skewed by major global events.

To achieve the purpose of this study, banks are clustered based on similar settings. The classification of countries developed by the FTSE Group is used in this research, where economies are classified into developed countries, advanced emerging countries, secondary emerging countries, and frontier countries. Each group of countries is

subject to changes on an annual basis. Given that no variable related to financial markets development, which is the focus of FTSE classification, is included in the model, the choice of FTSE classification and separately running regressions for each market will allow for controlling for the level of market development. This is important as long as this is one of the factors, which determine the level of investments injected into the economy.

This classification implies that the level of uncertainty pertaining to each group of countries is different due to different regulatory and economic environments.

The data set consists of 10,148 banks, with 6,926 banks in developed countries, 556 banks in advanced emerging countries, 2,103 banks in secondary emerging countries, and 563 banks in frontier markets (Note 1). Macroeconomic data was obtained from the International Monetary Fund, World Economic Outlook Database (as of April 2009), Datastream database, Fitch Ratings, S&P, and reviews of the news for the period from 2002 to 2008.

The performance of banks could be measured in a variety of ways, but this study will focus on profitability, in particular, Return on Average Assets and Return on Average Equity, which are typical measures of bank performance (Antwi & Apau, 2015, p. 77), given that these measures are well-recognized due to its simplicity, transparency and comparability. This cannot be said about other measures of performance like economic value added or net interest margin which have been dismissed from this analysis. As Heffernan and Fu (2008) noted, net interest margin as a measure of bank performance is usually dismissed, implying that banks are heavily involved in off-balance sheet activities that are not captured by net interest margin. Given that the current study covers banks in 70 countries in four different markets where different banking practices are in place, it is seen that employing net interest margin as a measure of bank performance is inappropriate due to the lack of comparability. In such circumstances, taking net interest margin as a measure of performance will necessitate controlling for the diversification of banks' revenues, while it is hard if not impossible to do. Economic value added as a measure of bank performance is dropped for two reasons. First, the scope of this study makes it impossible to compute EVA for all of the banks in the sample and for all corresponding years in such a comparable way. Second, even though this measure of performance deserved attention in the literature and is used for determining the performance of individual banks, there is no well-recognized procedure for its computation to make it transparent.

This study will use accounting nominal and risk adjusted rates of return (in order to reflect the risk which banks take on) as measures of bank profitability, in particular, the:

- 1) Return on average assets (ROAA)
- 2) Return on average equity (ROAE)
- 3) Risk-adjusted return on average assets ($SHROAA_{it} = ROAA_{it}/\sigma_i$)
- 4) Risk-adjusted return on average equity ($SHROAE_{it} = ROAE_{it}/\sigma_i$)

Here σ_i is a standard deviation, computed over the period covered by this study.

This study explores how strong is the effect of the following industry-specific and country-specific factors on profitability of banks operating in different economies:

- 1) *Sovereign risk*. Banks operating in countries with a high sovereign risk have correspondingly high banking sector risk because the former is incorporated into the risk assessment of the banks. Further, sovereign risk imposes a ceiling on banks. Banks in economies with high sovereign risk have more difficult access to foreign capital. This raises the cost of capital, which should influence the margins to be earned, and, therefore, is supposed to have a more pronounced effect on bank performance in countries with higher sovereign risk.

Long-term foreign currency ratings provided by Fitch Ratings and S&P over 2002-2008 are used as a proxy for sovereign risk rating. Following the approach developed by Cantor and Packer in 1996 (Gaillard, 2009, p. 43), while slightly modified for the S&P ratings, each country is assigned a score. The higher the score, the better risk profile.

Table 1. Liner transformation of ratings

Fitch				S&P's			
Rating	Numerical transformation						
AAA	23	B+	10	AAA	23	B+	10
AA+	22	B	9	AA+	22	B	9
AA	21	B-	8	AA	21	B-	8
AA-	20	CCC+	7	AA-	20	CCC+	7
A+	19	CCC	6	A+	19	CCC	6
A	18	CCC-	5	A	18	CCC-	5
A-	17	CC	4	A-	17	CC	4
BBB+	16	C	3	BBB+	16	C	3
BBB	15	DDD	2	BBB	15	SD	2
BBB-	14	DD	1	BBB-	14	D	1
BB+	13	D	0	BB+	13		
BB	12			BB	12		
BB-	11			BB-	11		

2) *The Importance of Banks as a Financing Mechanism.* The ratio of the total bank assets in the economy to the nominal gross domestic product of a country expressed in US dollars is used as a proxy for the role, which the banking sector plays in the economy. The higher this ratio the more chances that such economies experience a shift from markets to banks in regard to collecting and aggregating various opinions, that causes banks to naturally develop their expertise in dealing with uncertainty.

3) *Concentration of the Banking Sector.* To gauge banking sector concentration, many scholars use either the C3 or C5 index, which represents the ratio of the assets of three or five major banks to total assets in each country. However, this approach cannot be accepted because the number of banks varies substantially from one country to another. For example, in the Russian Federation, there were around 1000 banks, while in Romania, there were just above 10 during the period covered by this research. Taking only three or five major banks does not take into consideration the scale of the market. Instead, the idea of selecting some percentage of banks rather than just a certain number of banks seems to be expedient, because it provides the foundation for the comparability of results for the banking sector concentration across countries.

To measure concentration, 10% of the banks in each country with the highest level of total assets is selected, summed up, and divided by the total assets of all banks in the economy.

4) *Discount (Key) Rates Set by Central Banks.* Discount (key) rates set by central banks serve as a benchmark for setting lending rates by commercial banks, which affects pricing of banking products and profitability as a result. Announced discount rates embed inflation for the period for which they are set, and therefore are nominal rates.

For the purpose of this study, nominal discount rates matter more than real ones, because the price of banking products is based on nominal discount rates rather than on real ones.

5) *Economic Growth.* Real GDP growth rate will be used in order to separate the impact of inflation from the growth in gross domestic product. Taking nominal GDP growth rate instead of real GDP growth rate would not allow this study to determine the true growth in output as inflation is embedded in it. The real growth in output, in essence, is a determinant factor of the development of businesses that serve as clients of banks, and, therefore, determines the performance of banks.

6) *Inflation.* Inflation is another factor, which is usually taken into consideration in understanding the underlying reasons for bank performance. Given that pricing of banking products is affected by inflation, it is suggested that banks operating in economies, which experience more volatile inflation, are expected to be more affected by this factor compared to ones operating in countries with lower level of volatility of inflation.

7) *Exchange Rate Regime.* There are several avenues through which the exchange rate regime adopted by a

country may affect bank profitability.

On the one hand, negative expectations of investors about the future prospects of economic development of any region leads to a devaluation of the local currency. Contingent upon the exchange rate regime set in a particular country, there could be different consequences. In particular, upon expected negative developments in the economy, the foreign value of a local currency is supposed to decrease. If, under such circumstances, the exchange rate or the corridor is set by a central bank, in order to support the set exchange rate at certain level, governments have to recall a required amount of currency from circulation. If such a recall is made from circulating funds (i.e. not from reserves created to serve like a cushion), it means that money is withdrawn from the economy and is not directed to the further development of the country, which results, at least, in a slowdown of economic development. This implies that fewer transactions are made and/or less budget is devoted to such transactions, which leads to less sales by banks as long as the revenues of banks depend on the economic conditions of their clients who are representatives of other sectors of economy. Using financial resources from isolated funds should have the same effect as with circulating funds, but this effect is expected to be postponed primarily because reserves established for such purposes will be used first and then financial resources are recalled from the economy (which will result in a liquidity shortage). Thus, the worse the economy performs, the worse the performance of banks. From this perspective, it is expected that bank performance decreases when approaching a fixed exchange rate regime (exchange arrangements with no separate legal tender; currency board arrangements; other conventional fixed peg arrangements) adopted by the country where banks operate.

On the other hand, the financial expertise of financial intermediaries, primarily of banks, is substantially higher than that one of any other business in the economy. Insofar as there is no room for banks to generate revenues from foreign currency trading activities in countries where a fixed exchange rate regime is adopted, the expertise of banks in the field of currency exchange games is not expected to affect bank profitability (only the effect described above should take place).

Almost to the same extent as in the countries with a fixed exchange rate regime, financial expertise is expected to have a negligible effect on bank profitability in countries with flexible exchange rate regimes (i.e. managed floating with no pre-determined path for the exchange rate; independent floating). The rationale for such an expectation is different. In particular, the exchange rate in countries with flexible exchange rate arrangements is market-determined (International Monetary Fund 2004). With an increase in the level of market efficiency, there is an increase in the speed of the adjustment of prices to new information and, unfortunately, to new misinformation. Countries, which are characterized by a higher level of financial system and economic development, conventionally have a higher level of market efficiency. A higher level of market efficiency and the absence of a known range, within which fluctuations of exchange rates are possible at a certain moment of time, may lead to a diminishing effect of the financial expertise of banks on exchange rate operations and, as a result, to the inability of banks (operating in countries with a higher level of financial system development and flexible exchange rate regimes) to earn high profits from foreign currency trading activities. In other words, money markets might react to new information too rapidly to permit banks to profit from that information. Here, one has to bear in mind that the risk of losses is always in place.

The risk of big losses is diminished in countries with semi-flexible exchange rate regimes (i.e. pegged exchange rates within horizontal bands; crawling pegs; exchange rates within crawling bands) where the corridor is for exchange rate fluctuation is set within a spread that is known in advance. At the same time, most countries with flexible exchange rate regimes belong to the group of developed countries, which are considered to have higher market efficiency. Therefore, banks operating in countries with semi-flexible exchange rate regimes, due to the lower efficiency of their markets, will have more opportunities to generate profits from with foreign currency trading activities than banks operating in other countries, especially during periods of high depreciation or appreciation of the local currency.

The testable hypothesis is as follows: *The importance of the exchange rate regime adopted by a country for bank profitability increases when approaching a semi-flexible regime (pegged exchange rates within horizontal bands; crawling pegs, exchange rates within crawling pegs).*

This study includes a variable, which incorporates the exchange rate regime. Information in regard to the exchange rate arrangements worldwide has been obtained from the International Monetary Fund. The International Monetary Fund elaborated the classification of exchange rate arrangements based on the de facto arrangements identified by its staff. For the purpose of including it into the model, an index has been created that takes a value from 0 to 7. Scores have been assigned depending on the exchange rate regime (from the least flexible to the most) as follows:

- 1) Exchange arrangements with no separate legal tender—0;
- 2) Currency Board arrangements—1;
- 3) Conventional fixed peg arrangements—2;
- 4) Pegged exchange rates within horizontal bands—3;
- 5) Crawling pegs—4;
- 6) Exchange rates within crawling bands—5;
- 7) Independent floating—7.

The change from one regime to next one is not always of the same magnitude (say, in terms of central bank control of the forex market). Thus, the results must be interpreted with caution.

Because the exchange rate regimes adopted by countries are subject to changes, the classification of de facto exchange rate arrangements elaborated by International Monetary Fund has been tracked for the whole period under consideration. In case of any changes in the de facto exchange rate regime for a particular country, the corresponding changes in index have been made.

The analysis of the performance of banks is based on an estimation of a model in the following linear form:

$$P_{it} = \alpha + \beta_1 SR_{jt} + \beta_2 TA_NGDP_{jt} + \beta_3 CI_{jt} + \beta_4 DR_{jt} + \beta_5 I_{jt} + \beta_6 G_{jt} + \beta_7 ERA_{jt} + u_{jt} \quad (1)$$

Where P_{it} denotes profitability of bank i in a year t based on the chosen measure of bank's profitability (the nominal and risk-adjusted rates of return will be used, namely ROAA, ROAE, SHROAA_{*it*}, and SHROAE_{*it*});

- 1) SR_{jt} —sovereign risk of country j in which bank i is located in a year t ;
- 2) TA_NGDP_{jt} —banking sector expansion of a country j in which bank i is located in a year t ;
- 3) CI_{jt} —Concentration of banking sector of country j in which bank i is located in a year t ;
- 4) DR_{jt} —Discount rate offered by central bank of a country j in which bank i is located in a year t ;
- 5) I_{jt} —Level of inflation in a country j in which bank i is located in a year t ;
- 6) G_{jt} —Real GDP growth rate in a country j in which bank i is located in a year t ;
- 7) ERA_{jt} —Exchange rate regime adopted in a country j in which bank i is located in a year t .

There are four multivariate tests, which could be applied to understand the relative importance of independent variables (covariates) for dependent ones through their interaction: Pillai's trace; Hotelling's trace, Wilks' lambda, U, and Roy's largest root.

Each of the foregoing tests answers the question: "is each effect significant?" More specifically, they answer: "is each effect significant for at least one of the dependent variables?" Olson (1976) found Pillai's trace, also called the Pillai-Bartlett trace, V, to be the most reliable of the four tests (Warne, 2014, p. 6). Pillai's trace is preferred for this reason and will be used in this study.

This study will employ a multivariate analysis of covariance (MANCOVA), which is an extension of an analysis of covariance (ANCOVA), due to the following:

- 1) MANCOVA is used when there is more than one dependent variable (this study has four measures of bank profitability: ROAA, ROAE, SHROAA and SHROAE) and when there are covariates (independent variables);
- 2) MANCOVA is preferable to ANCOVA because multiple testing procedures via a series of ANCOVAs on each dependent variable leads to an inflated Type I error (i.e. thinking there is a relationship when in fact there is no relationship) (Garson, 2009b);
- 3) The outcome of MANCOVA is aimed at determining the interaction between variables by defining the level of importance of one variable over another (Garson, 2009a).

Instead of testing the direction of the association of industry- and country-specific factors with bank profitability, as it was the case in most previous research, this study focuses on how strong is the effect of industry-specific and country-specific factors on banks performance.

There are three testable hypotheses:

1) *Industry-specific and country-specific factors are more important for the profitability of banks in less developed countries characterized by a lower level of their financial system development than in more developed ones;*

2) *The importance of industry-specific and country-specific factors is higher for well-performing banks;*

3) *The importance of the exchange rate regime adopted by a country for bank profitability increases when approaching a semi-flexible regime (pegged exchange rates within horizontal bands; crawling pegs, exchange rates within crawling pegs).*

The research follows two-stage process:

Stage 1. Importance of industry- and country-specific factors for profitability of banks across the markets is assessed.

Stage 2. Importance of industry- and country-specific factors for profitability of well-performing and underperforming banks across the markets is gauged.

For the purpose of consistency, the same dataset is used and the same econometric technique is applied for two stages of analysis.

4. Empirical Findings

4.1 Analysis of Importance of Industry- and Country-Specific Factors for Profitability of Banks across the Markets

A. Stylized Facts: Profitability of banks and industry- and country-specific factors

The results of the descriptive statistics with respect to bank performance, expressed in nominal (return on average assets, ROAA, and return on average equity, ROAE) and risk-adjusted rates of return (risk-adjusted return on average assets, SHROAA, and risk-adjusted return on average equity, SHROAE) are provided in order to identify differences in the characteristics of banks. The results reveal that even though banks in emerging markets (including frontier economies) outperform those in developed countries based on the nominal rates of return (return on average assets and return on average equity), they substantially underperformed in risk-adjusted measures of profitability (Figure 1-4).

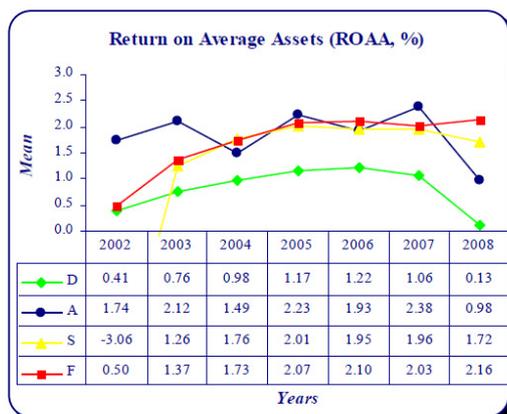


Figure 1. Mean values of the ROAAs of banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

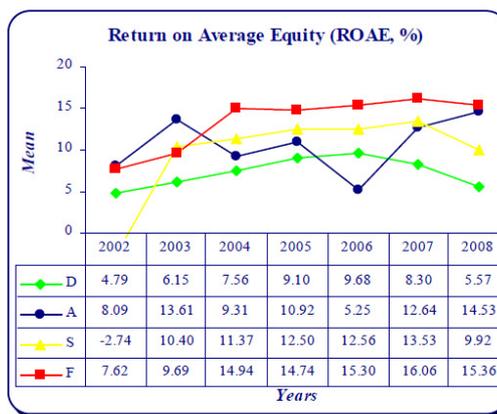


Figure 2. Mean values of the ROAEs of banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

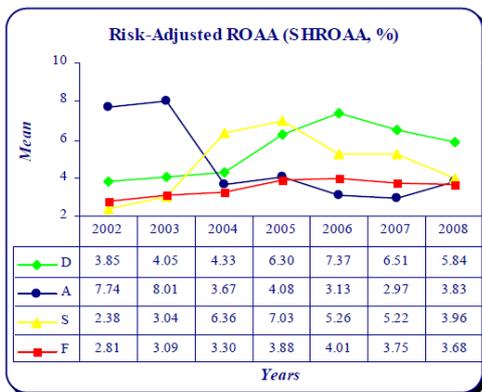


Figure 3. Mean values of the SHROAAs of banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

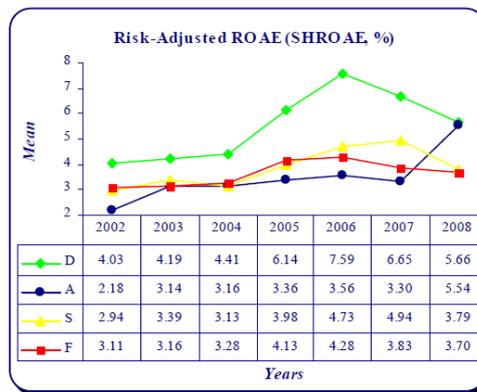


Figure 4. Mean values of the SHROAEs of banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

Summary of the descriptive statistics results for sovereign risk ratings, the banking sector concentration index, the size of the banking sector (the ratio of banks' total assets to nominal GDP), discount rates, inflation rates, real GDP growth rates and the exchange rate regimes adopted by economies in developed, advanced emerging, secondary emerging, and frontier markets is presented in Figure 5-11.

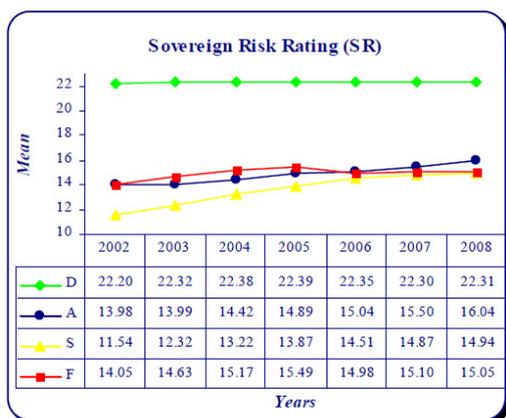


Figure 5. Mean values of the sovereign risk ratings of developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.



Figure 6. Mean values of the banking sector concentration index of developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

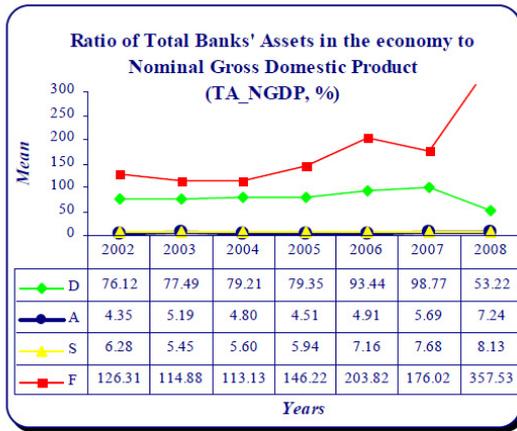


Figure 7. Mean values of the banking sector expansion of developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

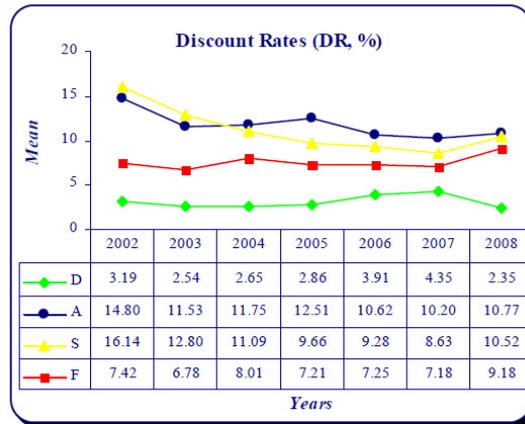


Figure 8. Mean values of the discount rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

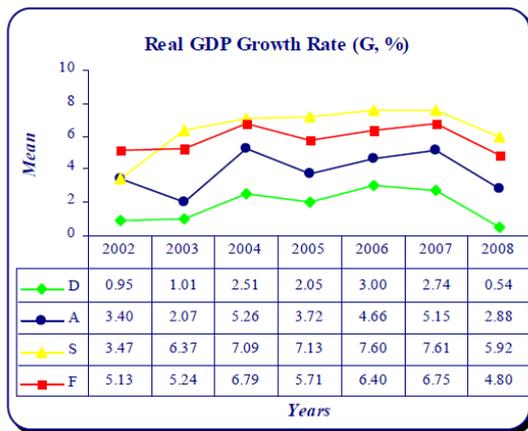


Figure 9. Mean values of the real GDP growth rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

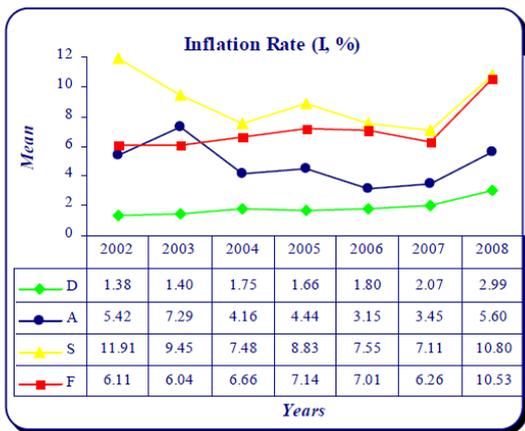


Figure 10. Mean values of the inflation rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

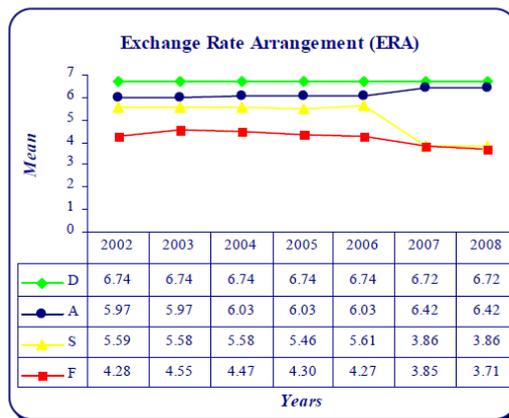


Figure 11. Mean values of the exchange rates arrangements adopted in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

The results of the descriptive analysis demonstrate that changes in all industry- and country specific variables in emerging economies were of higher magnitude than the changes in such variables in more developed economies.

B. Importance of industry- and country- specific factors for profitability of banks across the markets

The analysis of the relative importance of industry- and country-specific factors for bank profitability in developed, advanced emerging, secondary emerging, and frontier markets is based on the average significance level for Pillai's trace values. This multivariate test can take a value from "0" to "1." The larger Pillai's trace, the more this factor is significant and the more the given effect contributes to the model.

A comparative analysis of the results of Pillai's trace with respect to the importance of industry- and country-specific factors for bank performance across the board has been prepared to test a hypothesis that *macro-level factors are more important for the profitability of banks in less developed countries characterized by a lower level of their financial system development than in more developed ones.* The results are summarized further in figures 12-18.

Due to an insufficient number of observations in advanced economies, the results in this section will reflect the results only for developed, secondary and frontier markets.

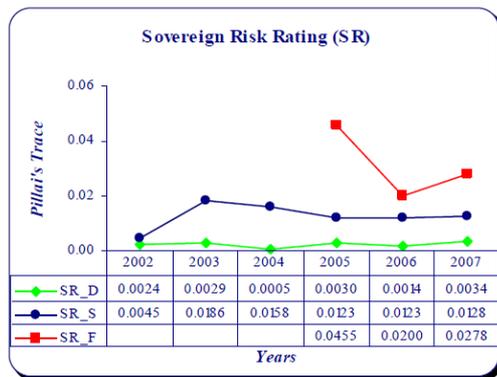


Figure 12. Pillai's trace values for the sovereign risk ratings in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

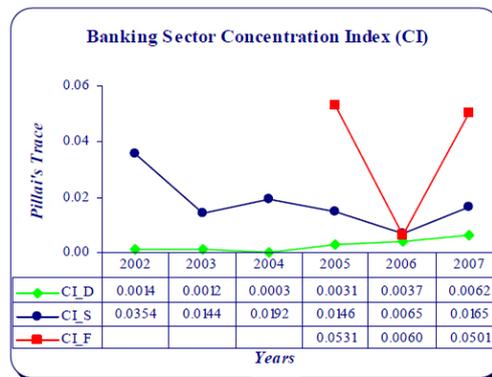


Figure 13. Pillai's trace values for the banking sector concentration index in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

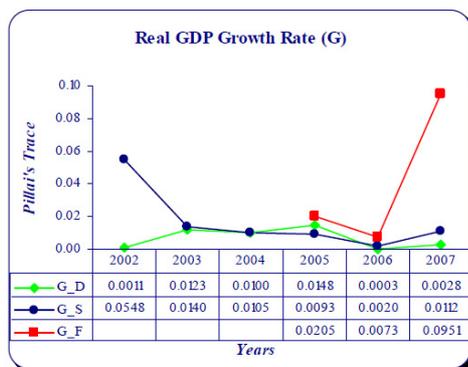


Figure 14. Pillai's trace values for the real GDP growth rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

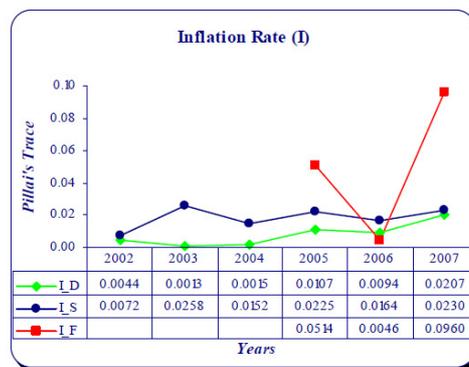


Figure 15. Pillai's trace values for the inflation rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

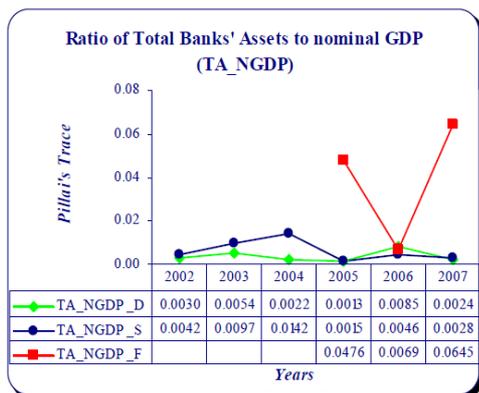


Figure 16. Pillai's trace values for the banking sector development in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

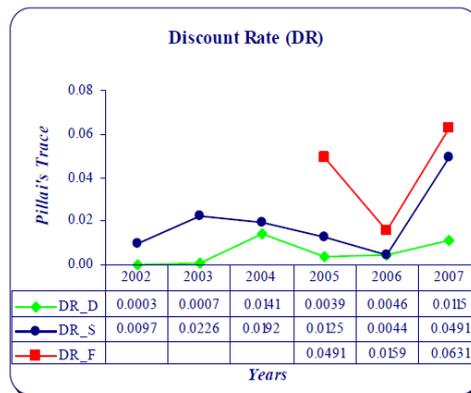


Figure 17. Pillai's trace values for the discount rates in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

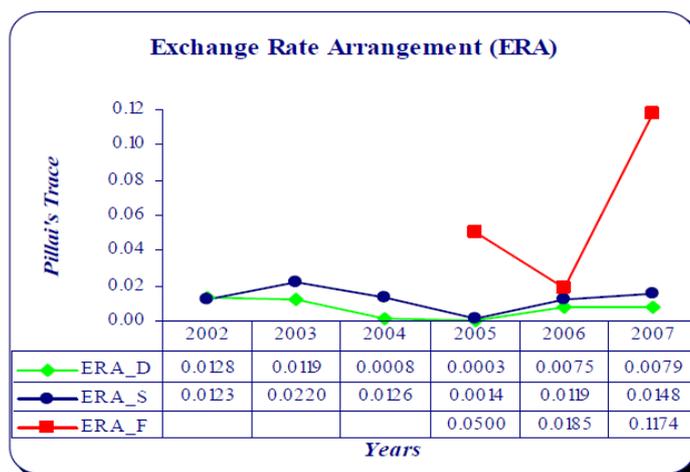


Figure 18. Pillai's trace values for the exchange rate arrangements in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

Figures 12-18 clearly support the testable hypothesis, and industry- and country-specific factors are less important for the profitability of banks operating in developed economies, which have a higher level of financial system, regulatory environment, and economic development.

Further, Pillai's trace values of exchange rate arrangements in frontier markets were by an order of magnitude greater than the values in developed markets. Given that in frontier markets crawling pegs and exchange rates within crawling pegs are common exchange rate arrangements (as it was identified in the course of the descriptive analysis), the results for Pillai's trace values provide empirical support to the second testable hypothesis pursuant to which the importance of the exchange rate regime for bank profitability increases when approaching a semi-flexible regime (pegged exchange rates within horizontal bands; crawling pegs, exchange rates within crawling pegs).

4.2 Analysis of Importance of Industry- and Country-Specific Factors for Profitability of Well-Performing and Underperforming Banks across the Markets

A. Stylized Facts: Well-performing vs. Underperforming Banks

The results of descriptive statistics with respect to nominal rates of return manifested that leading banks outperform lagging ones by, on average, four times based on the nominal rates of return, defined as the return on

average assets and return on average equity (see Figure 19-20).

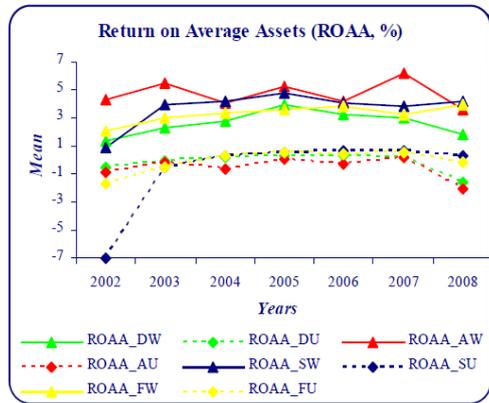


Figure 19. Mean values of the ROAAs of well-performing (W) and underperforming (U) banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002-2008.

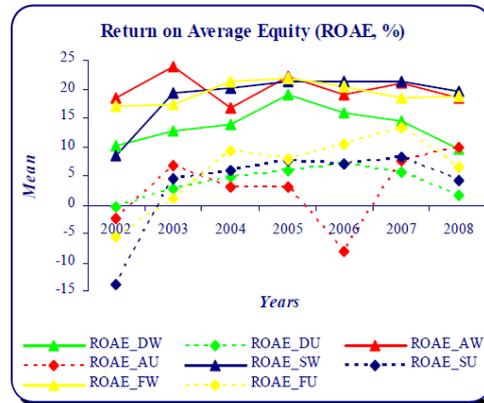


Figure 20. Mean values of the ROAEs of well-performing (W) and underperforming (U) banks which operate in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

Looking at both risk-adjusted rates of return, this effect was less pronounced. There was a noticeable convergence of performance of leading and lagging banks in the period of financial distress (Figures 21-22).

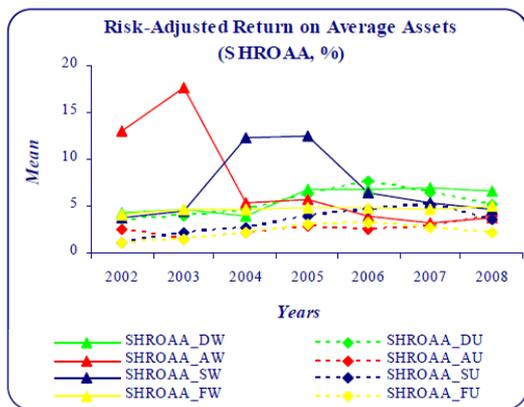


Figure 21. Mean values of the SHROAAs of well-performing and underperforming banks, which operate in developed, advanced emerging, secondary emerging, and frontier markets from 2002 to 2008.

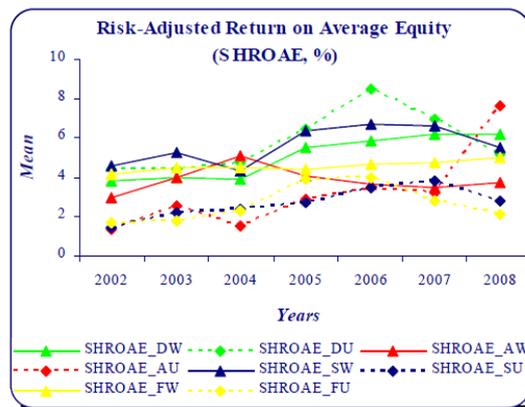


Figure 22. Mean values of the SHROAEs of well-performing and underperforming banks, which operate in developed, advanced emerging, secondary emerging, and frontier markets from 2002 to 2008.

B. Importance of industry- and country-specific factors for profitability of well-performing and underperforming banks across the markets.

This section explores the relative importance of industry- and country-specific factors for bank profitability in all markets with respect to well-performing and underperforming banks.

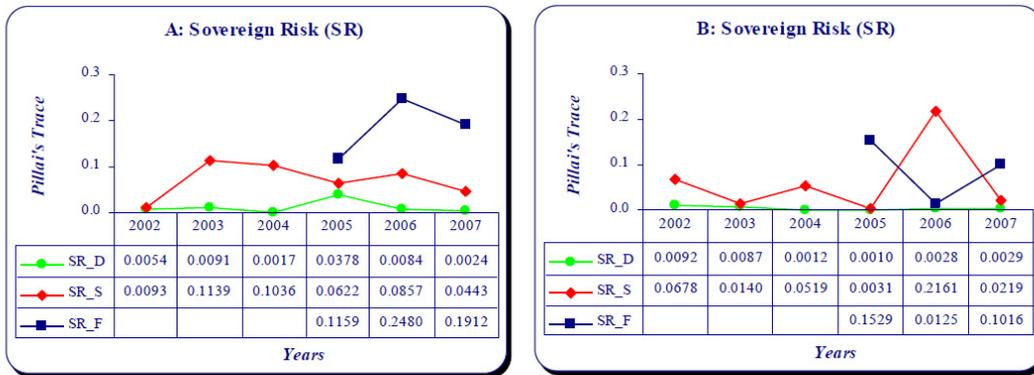


Figure 23. Pillai's trace values for the effect of sovereign risk rating on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

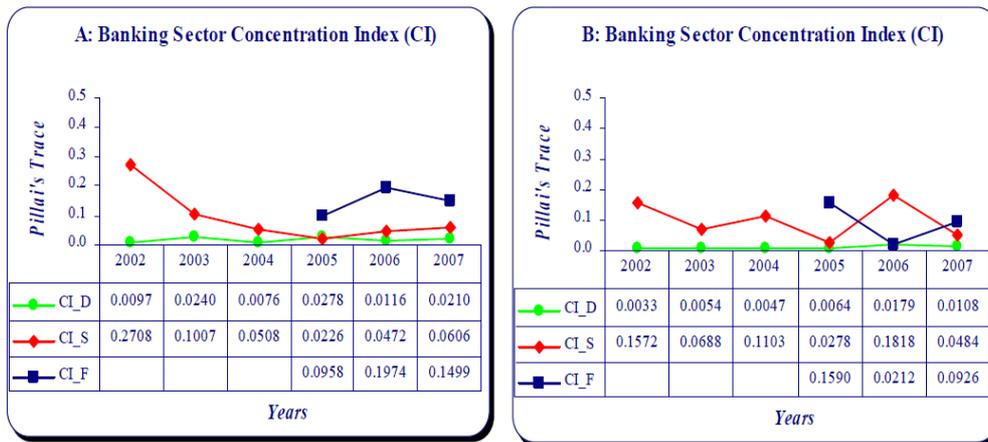


Figure 24. Pillai's trace values for the effect of banking sector concentration index on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

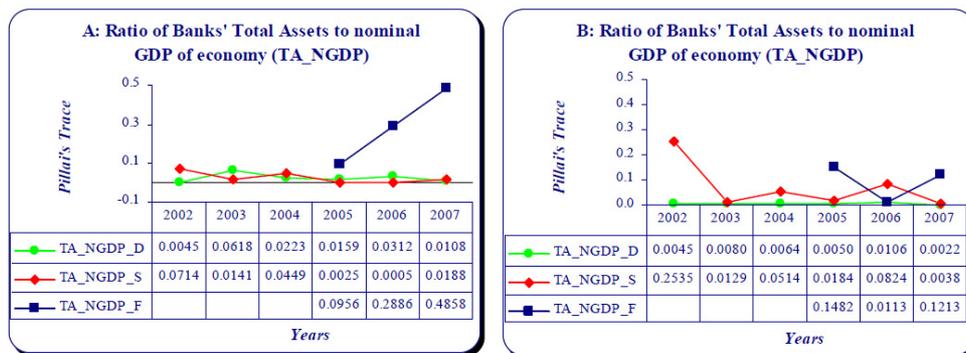


Figure 25. Pillai's trace values for the effect of the ratio of banks' total assets in the economy to nominal GDP on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

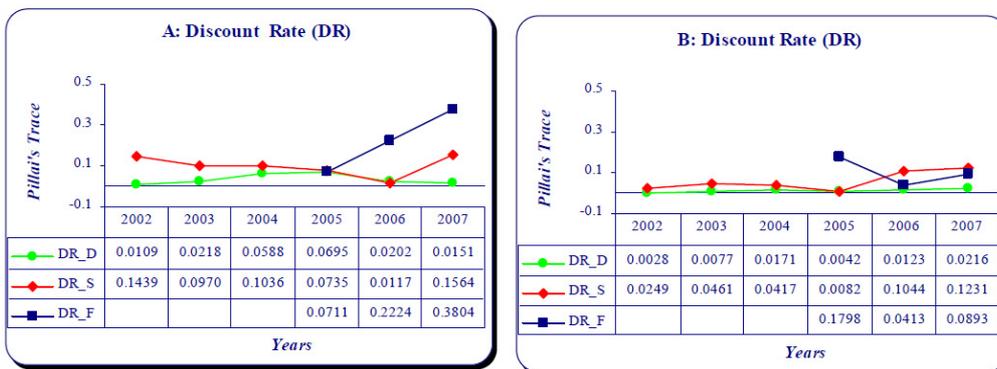


Figure 26. Pillai's trace values for the effect of discount rates on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

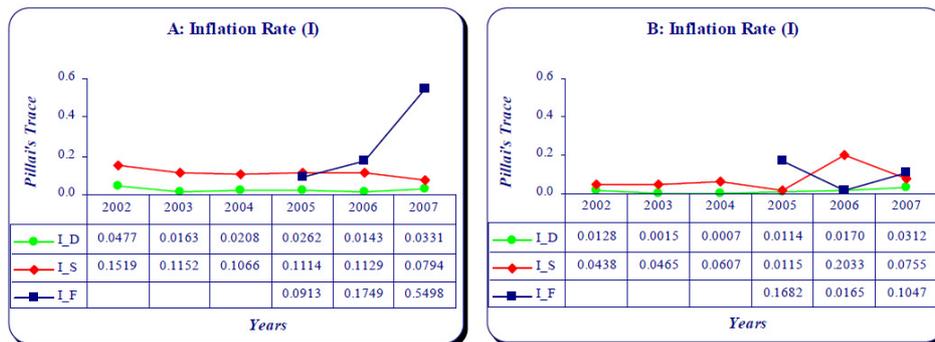


Figure 27. Pillai's trace values for the effect of inflation rates on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

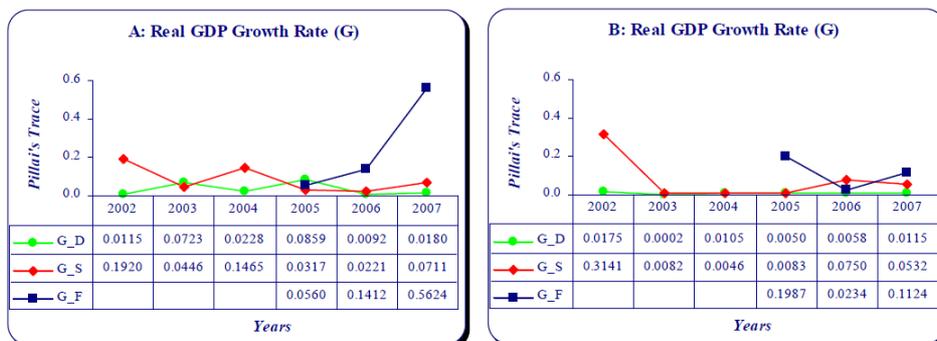


Figure 28. Pillai's trace values for the effect of real GDP growth rates on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

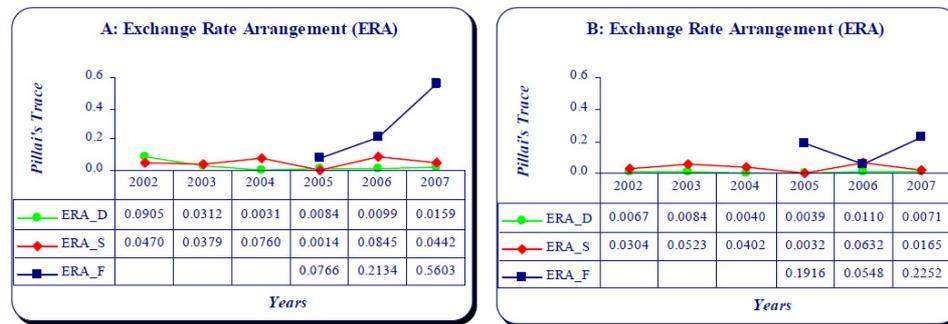


Figure 29. Pillai's trace values for the effect of exchange rate arrangements on profitability of A: well performing and B: underperforming banks in developed (D), advanced emerging (A), secondary emerging (S), and frontier (F) markets from 2002 to 2008.

A comparative analysis of Pillai's trace values for the effect of all industry- and country-specific factors on performance of leading and lagging banks reveal that, overall, the effect of these factors is relatively higher for well-performing banks operating in emerging markets than for underperforming ones.

5. Conclusion

This study provides insight into the performance of banks operating in more than 70 economies characterized by different levels of regulatory, financial system, and economic development, whereas economies were grouped based on the classification of countries developed by the FTSE Group. A period spanning between two major crises is examined: since 2002, the end of high-tech bubble burst lasting 1999-2001, until mortgage-driven one in 2008.

The results of the descriptive statistics with respect to bank performance, expressed in nominal and risk-adjusted rates of return revealed that even though banks in emerging markets (including frontier economies) outperform those in developed countries based on the nominal rates of return (return on average assets and return on average equity), they substantially underperformed in risk-adjusted measures of profitability. This might suggest that statements that banking organizations in emerging markets outperform those in developed countries (especially those which operate in both markets) are just a well-elaborated strategy for attracting new investments into more risky markets.

The relative importance of industry- and country-specific factors for profitability of banks operating in different economies through time was gauged.

Given that there is a lack of research aimed at assessing the impact of exchange rate arrangements on bank performance, there was a special focus on this matter. It was found that the exchange rate regime adopted by country is a significant contributing factor to the profitability of banks. The findings of this research support the study's hypothesis, which suggests that the importance of the exchange rate regime for bank profitability increases when approaching a semi-flexible regime. This is due to existence of more opportunities for banks operating in countries with semi-flexible exchange rate arrangements to generate profits from exchange operations than for banks operating in other countries, especially during periods of high depreciation or appreciation of the local currency due to the lower efficiency of their markets.

The empirical support is provided for the idea that industry- and country specific factors are much more important for bank performance in emerging rather than in developed economies. This result confirms the intuition that banks operating in less developed counties are more sensitive to changes in external environment as due to higher levels of uncertainty the magnitude of the reaction of banks to external shocks is higher. Further, banks, which operate in economies characterized by a lower level of regulatory, economic and financial system development, whereas the financial systems in such economies are viewed as more intermediary-based, reassure the role of the markets concerning collecting, interpreting, and dealing with information coming from the external environment. This boosts their expertise in dealing with uncertainty and innovation that is cornerstone issue for their performance.

Finally, an empirical support is provided for the proposition that effect of industry- and country-specific factors is more pronounced for performance of leading banks across-the-board, which is due to their higher ability to deal better with challenges coming from the external environment compared to lagging banks.

The issue of higher level of sensitivity of bank performance to external settings in emerging economies is closely

associated with a high level of diverging expectations of market participants with respect to the overall economic situation and the higher agency problems in these economies. In this regard, policies should be put in place that will promote better information disclosure by banks, representatives of real sector and governmental agencies, including central banks. Further, the qualification requirements for leadership positions in these banks should be strengthened in order to ensure that qualified personnel are employed. More qualified managers and risk assessors are necessary to assess and face the challenges that come from the external environment.

References

- Albertazzi, U., & Gambacorta, L. (2006). Bank profitability and the business cycle. *Banca d'Italia Temi di discussione del Servizio Studi*, 601, 36. <http://dx.doi.org/10.2139/ssrn.935026>
- Allen, F., & Gale, D. (2000). *Comparing Financial Systems*. Cambridge, Mass: MIT Press.
- Antwi, F., & Apau, E. (2015). Financial Performance of Rural and Community Banks (RCBs) in Ghana. *The International Journal of Business & Management*, 3(2), 76-85.
- Arestis, P., Demetriades, P. O., & Luintel, K. B. (2001). Financial Development and Economic Growth: The Role of Stock Markets. *Journal of Money, Credit and Banking*, 33(1), 16-41. <http://dx.doi.org/10.2307/2673870>
- Bain, J. S. (1951). Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-1940. *The Quarterly Journal of Economics*, LXV(3), 293-324. <http://dx.doi.org/10.2307/1882217>
- BankScope Database, Bureau van Dijk. (2009). Access was provided by the University of Amsterdam, Netherlands.
- Beckmann, R. (2007). Profitability of Western European Banking Systems: Panel Evidence on Structural and Cyclical Determinants. In *The Deutsche Bundesbank Discussion Paper Series 2: Banking and Financial Studies* (No 17/2007).
- Botrić, V., & Slijepčević, S. (2008). Economic growth in South-eastern Europe: The role of the banking sector. *Post-Communist Economie*, 20(2), 253-262. <http://dx.doi.org/10.1080/14631370802019005>
- Classification of Exchange Rate Arrangements and Monetary Policy Frameworks. (2003, June 30). *International Monetary Fund*. Retrieved from www.imf.org/external/np/mfd/er/2003/eng/0603.html
- Classification of Exchange Rate Arrangements and Monetary Policy Frameworks. (2003, December 31). *International Monetary Fund*. Retrieved from www.imf.org/external/np/mfd/er/2003/eng/1203.html
- Classification of Exchange Rate Arrangements and Monetary Policy Frameworks. (2004, June 30). *International Monetary Fund*. Retrieved from www.imf.org/external/np/mfd/er/2004/eng/0604.html
- Credit rating list. (2010). *Sovereigns. Standard & Poor's*. Retrieved from <http://www.standardandpoors.com/ratings/sovereigns/ratings-list/en>
- Country Coverage within the FTSE. (2003, November 12). In *Global Equity Index Series: Consultation Paper*. FTSE The Independent Global Index Company.
- De Facto Classification of Exchange Rate Regimes and Monetary Policy Framework. (2005, December 31). *International Monetary Fund*. Retrieved from www.imf.org/external/np/mfd/er/2005/eng/1205.html
- De Facto Classification of Exchange Rate Regimes and Monetary Policy Framework. (2006, July 31). *International Monetary Fund*. Retrieved from www.imf.org/external/np/mfd/er/2006/eng/0706.html
- De Facto Classification of Exchange Rate Regimes and Monetary Policy Frameworks. (2008, April 31). Retrieved from www.imf.org/external/np/mfd/er/2008/eng/0408.html
- Demirgüç-Kunt, A., & H. Huizinga. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence." *The World Bank Economic Review*, 13. <http://dx.doi.org/10.1093/wber/13.2.379>
- Federal Register. (1997). 62(3), p. 755. Retrieved from <https://www.fdic.gov/regulations/laws/federal/UFIR.pdf>
- Fitch - Complete Sovereign Rating History. (21 January 2013). FitchRatings. Retrieved from www.fitchratings.com/shared/sovereign_ratings_history.pdf
- Fitch Revises Country Ceilings for 40 Countries. (2006). FitchRatings. Retrieved from https://www.fitchratings.com/creditedesk/press_releases/detail.cfm?pr_id=281591.
- The FTSE Country Consultation Results. (2004, March). FTSE The Independent Global Index Company.
- The FTSE Country Classification. (2004, September, Update). FTSE The Independent Global Index Company.

- The FTSE Country Classification. (2005, September, Update). FTSE The Independent Global Index Company.
- The FTSE Country Classification. (2007, September, Update). FTSE The Independent Global Index Company.
- The FTSE Country Classification. (2009, September, Update). FTSE The Independent Global Index Company.
- Gaillard, N. (2009). Fitch, Moody's and S&P's Sovereign Ratings and EMBI Global Spreads: Lessons from 1993-2007. *International Research Journal of Finance and Economics*, 26, 41-59.
- Garson, G. D. (2009a). *Multivariate GLM, MANOVA, and MANCOVA*. Statnotes: Topics in Multivariate Analysis.
- Garson, G. D. (2009b). *Univariate GLM, ANOVA, and ANCOVA*. Statnotes: Topics in Multivariate Analysis.
- Gilbert, R. A. (1984). Bank Market Structure and Competition. *Journal of Money, Credit and Banking*, 16(4), 617-645. <http://dx.doi.org/10.2307/1992096>
- Grammatikos, T., Saunders, A., & Swary, I. (1986). Returns and Risks of U.S. Bank Foreign Currency Activities. *The Journal of Finance*, 41(3), 671-682. <http://dx.doi.org/10.1111/j.1540-6261.1986.tb04530.x>
- Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting Bank profitability in Pakistan. *The Romanian Economic Journal*, XIV (39), 61-87.
- Harrison, P., Sussman, O., & Zeira, J. (1999). *Finance and Growth: Theory and New Evidence*. US Federal Reserve Board's Finance and Economic Discussion Series, Working Paper 1999-35. Retrieved from <http://www.federalreserve.gov/pubs/feds/1999/199935/199935pap.pdf>
- Heffernan, S., & Fu, X. M. (2008). The Determinants of Bank Performance in China. *2nd Emerging Markets Group Conference on Emerging Markets Finance*. London, UK: Cass Business School. <http://dx.doi.org/10.2139/ssrn.1239466>
- Sovereign Ratings in Latin America. (2007). *Standard & Poor's, the Sovereign Ratings Group*. Retrieved from http://www2.standardandpoors.com/spf/pdf/products/Sovereigns_Ratings_Latin_America_Book_2007.pdf
- Vitols, S. (2001). The Origins of Bank-Based and Market-Based Financial Systems: Germany, Japan, and the United States. *Wissenschaftszentrum Berlin für Sozialforschung. Discussion Paper, FS I 01*, 302.
- World Economic Outlook Database. (2009, April). *International Monetary Fund*. Retrieved from <http://www.imf.org/external/pubs/ft/weo/2009/01/weodata/index.aspx>
- Warne, R. T. (2014). A Primer on Multivariate Analysis of Variance (MANOVA) for Behavioral Scientists. *Practical Assessment, Research & Evaluation*, 19(17), 2-10.

Note

Note 1. *Developed countries*: Australia; Austria; Belgium; Canada; Denmark; Finland; France; Germany; Greece; Hong Kong; Ireland; Italy; Japan; Kuwait; Luxembourg; Netherlands; New Zealand; Norway; Portugal; Singapore; Spain; Sweden; Switzerland; United Arab Emirates (UAE); United Kingdom (UK).

Advanced emerging countries: Brazil; Israel; Mexico; South Africa; South Korea; Taiwan.

Secondary emerging Countries: Argentina; Chile; China; Colombia; Czech Republic; Egypt; Hungary; India; Indonesia; Malaysia; Morocco; Pakistan; Peru; Philippines; Poland; Russia; Thailand; Turkey.

Frontier: Bahrain; Bangladesh; Botswana; Bulgaria; Croatia; Cyprus; Estonia; Jordan; Kenya; Lithuania; Mauritius; Nigeria; Oman; Qatar; Romania; Serbia; Slovakia; Slovenia; Sri Lanka; Tunisia; Vietnam

The following assumptions have been made in order to come up with this categorization (based on FTSE classification), which has been used in the whole time period of study:

- 1) Israel was promoted from advanced emerging countries to developed status in June 2008. Since this event occurred in the middle of 2008, Israel is considered as an advanced emerging economy through the whole time period.
- 2) Hungary and Poland were promoted from secondary emerging markets to advanced emerging countries in June 2008. Following the same logic as with Israel, these countries are kept in the group of secondary emerging countries for the year 2008 as well.
- 3) The group of frontier markets first appeared in the FTSE classification in 2009. Assuming that none of the criteria set by FTSE could be met overnight, the countries classified as frontier economies in September 2009

either met the criteria set by FTSE Group to be recognized as frontier countries or were very close to their goal of meeting these criteria during the period of this study. On this ground, for the sake of the research experiment, all countries included in the group of frontier markets in 2009 are considered frontier economies over 2002-2008.

Appendix

Appendix A. Results of the Multivariate Analysis of Covariance (Mancova)

Table A1. Multivariate analysis of covariance (MANCOVA): Pillai's trace values and their level of significance for industry- and country- specific factors in developed countries

MANCOVA: Industry- & Country-Specific Factors												
Developed Countries												
Variable	2002		2003		2004		2005		2006		2007	
	Pillai's trace	Sig										
Intercept	0.0051	0.0014	0.0024	0.0652	0.0004	0.8607	0.0015	0.0684	0.0016	0.0518	0.0347	0.0000
SR	0.0024	0.0776	0.0029	0.0292	0.0005	0.7422	0.0030	0.0018	0.0014	0.0822	0.0034	0.0071
TA_NGDP	0.0030	0.0328	0.0054	0.0004	0.0022	0.0882	0.0013	0.1163	0.0085	0.0000	0.0024	0.0418
CI	0.0014	0.3096	0.0012	0.3637	0.0003	0.9038	0.0031	0.0015	0.0037	0.0003	0.0062	0.0000
DR	0.0003	0.8883	0.0007	0.6089	0.0141	0.0000	0.0039	0.0002	0.0046	0.0000	0.0115	0.0000
I	0.0044	0.0037	0.0013	0.2831	0.0015	0.2233	0.0107	0.0000	0.0094	0.0000	0.0207	0.0000
G	0.0011	0.4479	0.0123	0.0000	0.0100	0.0000	0.0148	0.0000	0.0003	0.8008	0.0028	0.0180
ERA	0.0128	0.0000	0.0119	0.0000	0.0008	0.5637	0.0003	0.7895	0.0075	0.0000	0.0079	0.0000

Table A2. Multivariate analysis of covariance (MANCOVA): Pillai's trace values and their level of significance for industry- and country- specific factors in a group of secondary emerging countries

MANCOVA: Industry- & Country-Specific Factors						
Frontier Countries						
Variable	2005		2006		2007	
	Pillai's trace	Sig	Pillai's trace	Sig	Pillai's trace	Sig
Intercept	0.0506	0.0499	0.0038	0.9249	0.0488	0.1807
SR	0.0455	0.0745	0.0200	0.3127	0.0278	0.4735
TA_NGDP	0.0476	0.0629	0.0069	0.8045	0.0645	0.0800
CI	0.0531	0.0406	0.0060	0.8404	0.0501	0.1695
DR	0.0491	0.0560	0.0159	0.4366	0.0631	0.0864
I	0.0514	0.0468	0.0046	0.8956	0.0960	0.0134
G	0.0205	0.4356	0.0073	0.7865	0.0951	0.0141
ERA	0.0500	0.0523	0.0185	0.3539	0.1174	0.0036

Table A3. Multivariate analysis of covariance (MANCOVA): Pillai's trace values and their level of significance for industry- and country- specific factors in a group of frontier countries

MANCOVA: Industry- & Country-Specific Factors												
Secondary Emerging Countries												
Variable	2002		2003		2004		2005		2006		2007	
	Pillai's trace	Sig										
Intercept	0.0048	0.8876	0.0126	0.6153	0.0148	0.2418	0.0127	0.1421	0.0128	0.1598	0.0264	0.0083
SR	0.0045	0.8995	0.0186	0.4122	0.0158	0.2088	0.0123	0.1541	0.0123	0.1765	0.0128	0.1571
TA_NGDP	0.0042	0.9112	0.0097	0.7249	0.0142	0.2598	0.0015	0.9401	0.0046	0.6659	0.0028	0.8352
CI	0.0354	0.0757	0.0144	0.5490	0.0192	0.1299	0.0146	0.0932	0.0065	0.4994	0.0165	0.0744
DR	0.0097	0.6838	0.0226	0.3056	0.0192	0.1298	0.0125	0.1468	0.0044	0.6922	0.0491	0.0000
I	0.0072	0.7928	0.0258	0.2375	0.0152	0.2268	0.0225	0.0152	0.0164	0.0764	0.0230	0.0179
G	0.0548	0.0102	0.0140	0.5625	0.0105	0.4241	0.0093	0.2848	0.0020	0.9023	0.0112	0.2162
ERA	0.0123	0.5742	0.0220	0.3205	0.0126	0.3224	0.0014	0.9472	0.0119	0.1879	0.0148	0.1064

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).