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How does the market structure in a banking sector affect bank profitability during a financial crisis?

Bachelor thesis in Finance

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Abstract

This thesis studies how profitability in both emerging and advanced economies is affected by market structure in a financial crisis. The country sample from Mirzaei, Moore, & Liu (2013) is used with a similar methodology, with the distinct difference of using all banks rather than simply active banks, to enable a comparison to the time period 1999-2008. A sample of 1328 banks in 40 countries, 17 advanced countries and 23 emerging countries, from 2005-2014 is used with 934 banks from advanced countries and 394 banks from emerging countries.

None of the market power hypotheses, the relative-market-power hypothesis nor the structure-conduct-performance hypothesis, are found to be significant for the crisis period 2008-2010. Instead in advanced economies market concentration is a negative determinant of profits in the financial crisis period 2008-2010, indicating that a high market concentration reduces stability and profitability for the banking sector in advanced economies. In contrast, emerging economies find market concentration as a positive determinant of profitability and market share of the bank as negative. The banks in a concentrated market seem to be able to perform better, but the largest banks are more negatively affected by the financial crisis, resulting in lower profitability. The result of both economies for the entire sample period 2005-2014 is equivalent to the market structure-profit relationship found in emerging economies during the financial crisis period. No signs are found of a market structure and profitability relationship after the crisis, which indicate that something other than market structure mainly affects profitability today. A survivorship bias is present when only including active banks, which speaks for the importance of not excluding data in market structure-profit research.

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1. Introduction

1.1. Background

The performance of the banking sector is crucial for a country's stability and growth, and yet the configuration of the banking sector is different in each market. A country like Sweden has over 85 percent in four-firm concentration[1], whereas Germany has a significantly lower concentration at 47 percent (Table 19). In 2008, the subprime crisis[2] hit and bank profitability was reduced significantly, with over 250 banks declaring bankruptcy during the financial crisis period 2008-2010 in the U.S. alone (Antoniades, 2015). In a way the financial crisis showed which banks were safe and which were not. The outcome of the crisis motivated this thesis to further look into which banks performed better under the financial crisis and the type of market those banks were active in.

The relationship between the market structure in a country's banking sector, measured in market share and market concentration, and bank performance have been previously studied. The two variables have found to have a positive relationship when performed on banks according to other studies (Berger, 1995). The terminology market power is often used to explain how firms with high market share are able to be "price makers", and have large influence on the sector in which it participates. The two most recognized market power theories are the structure-conduct-performance (SCP) paradigm and the relative-market-power (RMP) paradigm. The first determine how much of the profitability that can be attributed to monopolistic behavior of the bank, and the second the extent that it can be credited to the bank's ability to use their market power to earn profits.

Mirzaei, Moore, & Liu (2013) analyze the effect of market structure on profitability and stability between the years 1999-2008 on emerging and advanced economies. More specifically by studying the regions Western Europe, Eastern Europe, and the Middle East. This thesis uses the same country sample and replicates their

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[1] A market concentration measurement which measures the fraction of bank assets held by the four largest banks in a country

[2] The financial crisis that started in 2008 is refered to as the subprime crisis due to the subprime mortgage loans that are seen as the trigger that started the financial crisis

methodology to a large degree. Their study is subject to a survivorship bias, which could be problematic because they only capture the good performing banks rather than the whole banking sector. The existing literature is very heavy on highly profitable banking periods, but the market structure and profitability relationship is not extensively researched in a financial crisis period. To this thesis' knowledge the paper is the first to examine the differences between the relationship in a highly profitable banking period to a period of low profitability with the same country sample and methodology.

1.2. Research question

The research question posed in this thesis is whether the market structure in the banking industry positively or negatively affects individual bank profitability during a financial crisis in advanced and emerging economies. Furthermore, conclude if any of the two market-power hypotheses, structure-conduct-performance (SCP) or relative-market-power (RMP), hold in a crisis. The question also entails if there are potential deviations to the findings of Mirzaei, Moore, & Liu (2013. Lastly, investigate how profitability and market structure are related after the financial crisis.

1.3. Purpose

The aim of this paper is to examine the relationship between the market structure and profitability by using data on individual banks in both advanced economies and emerging economies. The thesis contributes to the market structure and profitability relationship research by using a different approach; more precisely study the relationship during a crisis period, and include all banks rather than just the active banks. Furthermore, the paper investigates if profitability is explained by any of the current market-power hypotheses. Thus study how significant market concentration or market share affects bank profitability, and how it differs between advanced economies and emerging economies. More specifically, assess if the larger or smaller banks, in terms of market share, are able to benefit from a concentrated banking sector. Also determine if bank size affects profitability in a financial crisis.

The findings of the thesis are of interest for both regulators and institutional investors. The regulators could benefit from the findings of the study, by receiving information on whether antitrust regulation should be more or less regulated in the banking sector. In addition, the market structure and profitability relationship could give institutional investors insight in which market is able to generate highest profit in a crisis.

1.4. Delimitations

The time period for the assessment is from 2005 to 2014, in pursuance of capturing the effect of the years before and after the subprime crisis. The time period is in accordance of the availability of data since the chosen span is the only fully captured crisis in the database. When going further back in time less bank data is accessible, which could make the findings less reliable.

Banks are only included from 40 countries in the regions of Western Europe, Eastern Europe, and Middle East. The main reason is to enable a comparsion to the results of Mirzaei, Moore, & Liu (2013). Data on the banks is processed mainly from Bankscope; this can make it hard to get exactly all the available data since some information could be missing from the database. In addition, these inaccurate or missing values can impact the specific variables, but also the market share and market concentration calculations.

A recent trend among research is to test Berger's efficiency hypothesis in different countries or regions. The relationship is not tested in this thesis, but the model controls for efficiency indirectly through overheads to assets, cost to income, and bank size. The efficiency-structure relationship requires using stochastic frontier analysis (SFA) and the data envelopment analysis (DEA), which would shift the focus of this thesis. In addition, calculating the efficiency variables for 40 countries would require more resources to finish in the limited time period available for this thesis.

2. Theoretical Framework

2.1. Market power and efficiency theory

In market structure research there are two main views, market power and effcency, which provide different explanations for the market structure-bank profitabilty relationship.

2.1.1. Market power theory

The first out of the two market-power hypothesis, structure-conduct-performance (SCP) hypothesis, explains that in a more concentrated market, prices are set less favorable to consumers, due to imperfectly competitive markets, resulting in low rates of deposits and higher loan rates (Bourke, 1989). The second theory, relative-market-power (RMP) hypothesis, claims that firms with large market share[3] and well-differentiated products are able to exercise their market power and earn supernormal profit (Shepherd, 1982). This implying that only large banks can affect prices and thereby achieve higher profits (Tregenna, 2009). The two hypotheses require market concentration, measured by Herfindahl-Hirschman index (HHI) or four-firm concentration, and market share in order to be tested. The market-power hypotheses are mutually exclusive, the relative-market-power (RMP) hypothesis holds if market share is positive and significant and market concentration is not, and the structure-conduct-performance (SCP) hypothesis is accepted if market concentration is positive and significant while market share is not.

2.1.2. Efficiency theory

Berger believes that profitability is not only driven by market power but also efficiency. The efficient structure stresses the importance of size on profits because they are scale dependent. More precise, X-efficiency argues that firms with superior management or production technologies have lower costs and therefore higher profits (Berger, 1995). While scale-efficiency justifies that firms with equally good management and technology, some firms can still produce at more efficient scales than others, and consequently, have lower unit costs and higher unit profits (Berger,

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[3] Market share is the percetage of the individual firm's assets out of the total assets within the country's banking sector.

1995). In Berger's (1995) research he gathers support for the relative-market-power (RMP) hypothesis and some support for the X-efficiency hypothesis. Studying the market structure-profit relationship without including the efficiency variable can lead to incorrectly supporting the structure-conduct-performance (SCP) hypothesis and relative-market-power (RMP) hypothesis since efficiency can be a correlation with both price and structure. This is because large firms with high market share often have lower marginal cost, giving support for X-efficiency hypothesis (Yu et al., 2007). Consequently, efficiency variables are more frequently used in empirical studies studying the market structure- profitability relationship align with Berger's (1995) research.

2.2. Empirical studies

The determinants of bank profitability have historically been extensively researched. Early research focus on the market structure-profit relationship on multinational markets, Bourke (1989) studies Europe, North America, and Australia, and Molyneux & Thornton (1992) focus entirely on Europe. They both find the structure-conduct-performance to be positive and significant. Demirguc-Kunt, Laeven and Levine (2004) look at how bank regulations, market structure, and national institutions affect banks net interest margins and overhead costs, and find that a country with high inflation often have wider margin and greater returns. Athanasoglou, Brissimis, & Delis (2008) look at single country level, more specifically study Greece macroeconomic determinants of bank profitability, and find GDP growth to have a positive relationship with profitability.

Recently there is a trend of more focus towards emerging economies. Ben- Khadiris (2009) look into Islamic bank profitability in the MENA region[4], and find a positive relationship between structure and profits of the banking industry. The following two studies, Guillén, Rengifo, & Ozsoz (2014) in Latin America, and Garza-Garcia (2012) on country level in Mexico, attempt to answer if profitability is a result of lower efficiency or non- competitive market conditions. The first conclude that the efficient structure hypothesis holds, and the later find support for the relative-market-power hypothesis, but not the efficient structure hypothesis.

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[4] The MENA region is referring to the Middle East & North Africa region

Mirzaei, Moore, & Liu (2013) examine market structure's affect on banks' profitability and stability in advanced- and emerging economies. Their study investigates this phenomenon during the pre-crisis period, 1999 to 2008, which they refer to as the "fat banking years" because of the large profits in the banking sector. The study concludes market share to be positive and significant, and five-firm concentration to be non-significant in advanced economies, providing support for the relative-market-power hypothesis. In emerging economies, they find four-firm concentration to be negative and significant in the working paper and five-firm concentration to be negative, but non-significant in their published paper. Thereby, showing no support of neither the relative-market-power hypothesis nor the structure-conduct-performance hypothesis in emerging economies. They also find higher interest rate spreads to increase profitability and stability for both types of economies. The deviation of the result, a non-significant negative market concentration coefficient rather than a significant, can likely be attributed to using five-firm concentration instead of four-firm concentration. Mirzaei, Moore, and Liu do not justify changing it to five-firm concentration in their published paper. Another questionable decision is their choice to only include active banks. When excluding banks that failed during the time period, a survivorship bias might be present, which can make the results unreliable.

Tregenna (2009) writes about a highly profitable US banking industry in 1994-2005. The report investigates the structure of the banking sector, and how it affects the profitability. He finds a positive relationship between profitability and market concentration in the U.S. banking industry. He claims that a higher concentration in the market affects the profitability positively in a structural way and not in an individual way. Profits extracted from increased market share or market concentration in the banking industry will not prevent the banks from going bankrupt in a financial crisis, which it could if profits come from efficiency.

A highly concentrated market can have several different applications. First, the most recognized, a redistribution of profits within the banking industry at the expense of smaller banks. Second, a more powerful banking market can achieve high profits at the expense of non-banking firms, which can in fact be beneficial to smaller banks. If the large banks together are able to raise interest rate spreads, then the smaller banks

could increase their interest rate spreads as well. This shows that the largest banks can be price-leaders for the banking sector (Tregenna, 2009). Tregenna (2009) also argues that the economies of scale are not as beneficial in the banking sector in relation to the industrial sector, and the banks that can benefit from economies of scale is much smaller than the "large" banks in his sample, since the effect of economies of scale is diminishes with size.

Uhde & Heimeshoff (2009) explain the implications of an increased market concentration on financial stability using two opposing theories, concentration fragility and concentration stability. The concentration stability view emphasizes that banks are able to reduce fragility in five ways. First, by having a high "capital buffer" to protect for macroeconomic and liquidity shocks. Second, higher franchise value comes with higher opportunity costs when facing bankruptcy, resulting in less risk-taking behavior by management according the charter value hypothesis. Thirdly, having larger banks enables them to provide more credit monitoring services. Fourthly, having large banks facilitates monitoring and more efficient supervision. Lastly, these banks have large economies of scale and scope, which enables them to diversify their loan-portfolio risks more efficiently.

The concentration fragility view, presents three main reasons why high market concentration reduces bank stability (Uhde & Heimeshoff, 2009). Large banks are able to receive guarantees or subsidies, making them ''too big to fail'', consequently making moral hazard more severe. Secondly, if large banks give out high interest rate loans then the borrowers are more likely to take on risky investment to compensate for the expensive loan payments, resulting in borrowers being more likely to default on their loans. Lastly, having large market share and diversified assets may lead to less efficient management and increased operational risk.

With most focus on profitable banking periods there seems to be a gap in research on the determinants of profitability during a financial crisis. Therefore, this thesis adds the aspect of a financial crisis to study how profitability can be explained by the market structure in their country's banking sector. If the relationship looks different in a financial crisis than that needs to be kept in mind when studying the relationship in a profitable banking period as well.

2.3. Financial crisis

A financial crisis can depend on a lot of things and is often very hard to anticipate. Mishkin, (1992) defines a financial crisis as: *"A financial crisis is a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities."* Mishkin also mentions several factors that causes a financial crisis, which are: Increases in interest rates, stock market declines, increases in uncertainty, bank panics, and unanticipated declines in the aggregate price level. In the subprime crisis, which started in 2008, prices on houses fell rapidly due to a lot of loans given to people that could not pay. Banks were exposed to these loans and the liquidity in the banking market fell (Cornett et al., 2011). When the liquidity disappears from the market, all banks are at risk of having problem with short-term obligations because they rely on the short-term borrowing from the market. When the U.S. banks started to have problems, these problems spread to Europe and the rest of the financial world. Because of the financial crisis a lot of banks profitability decreased and some of them even declared bankruptcy, with as much as 150 banks declaring bankruptcy in 2010 in the U.S. alone (Antoniades, A. 2015). Market specific information on how the financial crisis affects bank profitability and market structure are difficult to find for the regions in the study.

2.4. Hypotheses

To test the market structure and profitability relationship four hypotheses have been developed with different explanation of how market structure can affect profitability during a financial crisis. The first two hypotheses are the well-known market-power hypotheses that are tested by almost all research in a highly profitable banking period. The other two hypotheses have been created to give an explanation for the relationship in a financial crisis period with low profitability.

Hypothesis 1

Market share is positive and significant, and market concentration is non-significant. Being unable to reject this hypothesis would indicate that firms with large market shares and well-differentiated products are able to exercise market power and earn

supernormal profit, supporting the relative-market-power hypothesis (Shepherd, 1982). This is perhaps the most common result, and accepted on the advanced economies in this thesis' country sample, but before the financial crisis, by Mirzaei, Moore, & Liu (2013).

Hypothesis 2

Market concentration is positive and significant, and market share is non-significant. This implies that the structure-conduct-performance hypothesis cannot be rejected, meaning the banks are using their monopolistic power to set prices less favorable to consumers, with lower deposits rates and higher loan rates (Bourke, 1989). Tregenna (2009) provide support for the hypothesis when performed on the U.S. banking industry in the pre-crisis period.

Hypothesis 3

Market concentration is negative and significant, and market share is non-significant. The hypothesis indicates that the concentration of the country bank market has hurt the profitability of the individual banks in the market. The concentration fragility view presents a few potential explanations for how high concentration leads to lower stability. The large banks are "too big to fail", borrowers default on their expensive loans, and increased operational risk and less efficient management (Uhde & Heimeshoff, 2009). These stability-reducing factors can lead to lower profitability during a financial crisis.

Hypothesis 4

Market share is negative and significant, and market concentration is positive and significant. This hypothesis would provide some support for the concentration stability view mentioned by Uhde & Heimeshoff (2009). Implying that the high "capital buffer" in the market is able to protect the banks from macroeconomic and liquidity shocks. The negative market share indicates that the largest banks' profitability gets hit the hardest in a financial crisis.

3. Methodology

3.1. Sample

In order to capture the financial crisis, the period 2005 to 2014 was used. Years before and after the crisis were used to pick up the changes in profitability and other measurements during the period. Since this thesis' time period caught part of the highly profitable banking sector before the crisis, three different regressions were tested to examine the differences between the periods. The time periods were the pre-crisis period 2005 to 2007, crisis period 2008 to 2010, and post-crisis period 2011 to 2014. The reason why this thesis defined the crisis period as the years 2008 to 2010 was because the financial crisis started in 2008 and the two top years of bank bankruptcies were in 2009 and 2010 in the U.S. (Antoniades, 2015). To test for potential survivorship bias, a different result when only using active banks, the same time periods were also regressed with only active banks to enable a comparison between the two sample types.

The advanced countries in the study consisted of the following Western European countries Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Sweden, and United Kingdom. Mirzaei, Moore, & Liu justified using Western European countries because it was a highly competitive market. To represent emerging economies 10 countries in Eastern Europe and 13 countries in the Middle East were selected. In the Eastern Europe Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. Their banking market had mainly been state-owned, but had adapted to European Union banking regulation during the last decade (Mirzaei, Moore, & Liu, 2013). The following countries were used to portray the Middle East Bahrain, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, and United Arab Emirates. The Middle Eastern banking market was a concentrated market, which had been very regulated and protected from foreign competition (Mirzaei, Moore, & Liu, 2013).

3.2. Data

The data on profitability was collected over time and over the individual banks, and then regressed over the two dimensions. The data was mainly extracted from Bankscope because it was easy to access and had been used in most of earlier research regarding banks. Data on 1328 banks in 40 countries, 17 advanced countries and 23 emerging countries, were collected. Which amounted to 934 banks in advanced countries and 394 banks in emerging countries. The same countries were used in the analysis as Mirzaei, Moore, & Liu (2013); however, unlike their studies the thesis included all commercial banks in the countries instead of only active banks, and used data from 2005 to 2014. The country level data used for macroeconomic variables was not accessible on Bankscope and therefore taken from the World Bank database. All values were in US dollars because it made the comparison between different countries possible.

After finding the market structure ratios, the banks were filtered using consolidation codes in Bankscope to determine which banks were to be included in the sample. In Bankscope banks were divided into different consolidation codes depending on if it was a mother bank (C1 or C2) or a branch to the mother bank (U1). The information of the subsidiaries was already included in the mother banks' financial statement. To avoid using the same information twice, the commercial banks with the consolidation code C1 and C2 were included, whereas banks denoted U1 were not included in the sample. Since the central banks do not have any commercial goals, they were not included in the sample. To assure none of the central banks were in the sample, since some central banks were code C1 or C2, all central banks were manually removed.

To get a more reliable sample, the outliers in the sample were replaced using a winsorizing method. The method took values in the 1st percentile and replaced them with the lowest remaining value after the adjustment, and values in the 99th percentile were replaced with the highest remaining value (Gregory & Reeves, 2010). An exception was made in the case of interest rate spread in advanced economies, because it still had extreme values above after replacing the above 99th percentile values. To adjust this problem, the 90th percentile value was used to replace the highest 10 percentile values, which gave a much more reasonable value. As a result,

the average interest rate spread in advanced economies went from 47 percent to around 3.8 percent. This error must be attributed to inaccurate input of data in Bankscope.

The banks in the sample were only domestic banks. This means that banks that had a mother bank in another country were excluded from the sample. In some cases, this led to misleading data, for example Morgan Stanley, an American bank with branches in the UK, was not included in the sample nor the market share calculations. Since the U.S. was not included in the study their assets were not be accounted for; however, a bank like Danske Bank, which was the fifth largest bank in the Swedish market was only included in Denmark. This led to an overestimated level of assets in the home country, resulted in a too high market share at home, and made the market share of the domestic banks in the country in which the bank was not included higher than in reality.

The choice of variables to explain profitability could have been exposed to an endogeneity problem. It could be argued that bank assets were correlated to the error term if the bank's assets picked up an effect of how well the bank had performance in the past. If this was the case, then past performance was an omitted variable correlated with the error term.

3.3. Model

An empirical model was developed, which used panel data to measure the performance of individual banks over time. Two independent models were used, one for emerging and another for advanced economies. The dependent variables were return on average assets (ROAA) and return on average equity (ROAE). The independent variables were market share, four-firm concentration, Herfindahl-Hirschman index (HHI), logged bank assets, cost to income, overheads to assets, interest rate spread, equity to assets, inflation, and GDP growth. The variables are defined later in the section. The notation i indicated which bank, t represented time, and bank profitability was a performance measure for the individual bank.

$$Bank\ Profitabilty_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 CR4_{it} + \beta_3 IS_{it} + \beta_4 EA_{it} + \beta_5 Size_{it}$$
$$+ \beta_6 \pi_{it} + \beta_7 \Delta GDP_{it} + \beta_8 OA_{it} + \beta_9 CI_{it} + \varepsilon_{it}$$

$$Bank\ Profitabilty_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 HHI_{it} + \beta_3 IS_{it} + \beta_4 EA_{it} + \beta_5 Size_{it}$$
$$+ \beta_6 \pi_{it} + \beta_7 \Delta GDP_{it} + \beta_8 OA_{it} + \beta_9 CI_{it} + \varepsilon_{it}$$

Abbreviation	Variable
MS	Market Share
MC	Market Concentration
IS	Interest Rate Spread
EA	Equity to Assets
Size	Logged Bank Assets
π	Inflation
ΔGDP	GDP growth
OA	Overheads to Assets
CI	Cost to income

The variables that were used in the thesis were chosen to mimic Mirzaei, Moore, & Liu's (2013) as close as possible. Thereby, the results were comparable and conclusions could be drawn from differences between the two studies. Combining the same variables with the same countries over another time period gave the same test but applied to a financial crisis. To simplify the model, off-balance-sheet activities to total assets, bank age, foreign ownership, domestic credit, stock turnover ratio, and loan growth were not included. Cost to income was the only added variable, but Mirzaei, Moore, & Liu mentioned that they ran the regression with cost to income for robustness test and found an equivalent result. This thesis used four-firm concentration simply because four-firm concentration was closer to Bourke's (1989) original three-firm concentration and at the same time comparable to Mirzaei, Moore, & Liu working paper (2011).

The dependent variable in the model was profitability, with the ambition to demonstrate how it was affected by the independent variable in the model. To measure profitability, the model used return on equity and return on assets. Return on assets, or more commonly used return on average assets (ROAA), measured the net

income compared to the amount of assets of the firm. In contrast to return on average equity (ROAE) which used net income to equity. The two measurements showed how good the bank used its assets and equity to create revenues. The usage of average return on assets and average return on equity were because it took in differences in equity and differences in assets over time. Averages were used to reassure that none of the measurements had fluctuated a lot under the specific year.

To measure market structure both market concentration and market share were used. This way, the model was able to distinguish between the relative-market-power hypothesis and the structure-conduct-performance hypothesis. Market share could be conducted by taking the individual firm's assets out of the total assets within the country's banking sector. To measure market concentration, the model used four-firm concentration, which was the fraction of bank assets held by the four largest banks in a country. As mentioned earlier, four-firm concentration was used because Mirzaei, Moore, & Liu had it in their working paper (2011), and was closer to Bourke's (1989) original three-firm. For the robust purposes the model also used the Herfindahl-Hirschman index, which was the sum of the squared market shares of all the banks in the country market.

To pick up the country effect two macroeconomic factors were included, real GDP growth and inflation. This took into account the findings of Demirguc-Kunt, Laeven, & Levine (2004) and Athanasoglou, Brissimis and Delis (2008), which were mentioned earlier. Where the first, found wider margin and greater returns as a result of high inflation, and the later a positive GDP growth profitability relationship.

The model also included controls for other bank specific variables. The effect of efficiency was controlled for indirectly using three variables. First, bank size was used to capture the economics of scale. To proxy bank size the model used a bank's logged total assets, which was equivalent to Mirzaei, Moore, & Liu (2013). Cost to income showed the profitability of the operating activities, operating costs divided by the operating income. An increase in this ratio showed that the costs increase more than the incomes over the same period. This variable was included as an expense management measure to control for efficiency. Overheads to total assets captured

differences in cost structure when comparing banks because it displayed cost to income divided with total assets (Demirguc-Kunt, Laeven, & Levine, 2004).

Interest rate spread added the profitability on loans; it showed the difference between the interest that the bank paid on borrowing from its customers and the interest the bank received to lend out money. This spreads gave an approximation of how much power the bank had in its price setting (Golin, 2001).

Equity to total assets was included to capture the capital risk of leverage. When leverage was high, low equity, the bank could enjoy good profits when doing well, but had a higher risk of bankruptcy when performing badly. When this ratio was high, the leverage was low, and the cost of funding was low, as well as the risk (Golin, 2001).

Separate regressions were used, with bank fixed effects and clustered standard errors at the bank level, for robustness of the original model. The Hausman test determined that the model should control for fixed effect rather than random effects. Fixed effect controlled for the characteristic of the individual bank which may or may not affect their profitability. The country effect of the bank was accounted for indirectly by inflation and GDP growth.

4. Results and Analysis

4.1. Results

In this part of the thesis the result of the regressions are presented with market structure as a function of profitability for the four different time periods in advanced and emerging economies. In addition, the effect of a survivorship bias and using fixed effect are displayed.

4.1.1. Advanced and emerging economies

Table 1. Descriptive statistics of dataset in emerging and advanced economies.

Descriptive statistics	Advanced economies					Emerging economies				
	n	Mean	St. Dev.	Min	Max	n	Mean	St. Dev.	Min	Max
ROAA	6807	0.78	2.18	-9.97	16.25	2938	1.39	3.31	-15.98	18.44
ROAE	6803	6.05	13.79	-94.28	49.24	2937	8.98	16.16	-83.97	47.63
Four Firm	9239	0.59	0.16	0.38	0.95	3882	0.69	0.15	0.44	1
HHI	9027	0.13	0.06	0.06	0.30	3844	0.17	0.1	0.08	0.7
Market share	6817	0.02	0.05	0.00	0.33	2943	0.07	0.09	0	0.49
Overheads to total assets	6798	0.04	0.08	0.00	0.66	2934	0.03	0.03	0.01	0.28
Interest rate spread	5416	0.04	0.03	-0.03	0.21	2273	0.04	0.03	-0.15	0.1
Inflation	9176	0.02	0.01	-0.02	0.04	3786	0.05	0.06	-0.15	0.2
Log bank assets	6818	16.17	2.20	10.52	21.39	2945	15.01	1.67	10.94	18.35
GDP growth	9152	0.01	0.02	-0.06	0.06	3819	0.04	0.04	-0.08	0.13
Equity to total assets	6817	12.59	15.48	0.61	94.56	2944	18.6	17.8	2.86	96.88

Four-firm concentration and HHI are measures of market concentration

More detailed data is available in Table 17 and Table 18 in the appendix

Table 2. Correlation matrix

Correlation Matrix	ROAA	ROAE	Four Firm	HHI	Market share	Overheads/ assets	Interest spread	Inflation	Log bank assets	GDP growth	Equity/ assets
ROAE	0,6331***										
Four Firm	-0,0138	0,0422***									
HHI	-0,0028	0,0426***	0,94***								
Market share	-0,0162	0,0967***	0,3527***	0,3246***							
Overheads/assets	0,1951***	0,0262	-0,075***	-0,06***	-0,149***						
Interest spread	0,0442***	0,0287***	-0,018*	-0,028***	-0,067***	0,0522***					
Inflation	0,1513***	0,1347***	0,0421***	0,0324***	0,0813***	-0,0053	-0,0172				
Log bank assets	-0,136***	0,0127	-0,053***	-0,061***	0,3773***	-0,3466***	-0,0347***	-0,157***			
GDP growth	0,191***	0,2154***	0,1246***	0,1183***	0,1177***	-0,0182*	0,02*	0,4217***	-0,119***		
Equity/assets	0,3385***	0,0052	-0,031***	-0,027***	-0,156***	0,3612***	0,1257***	0,1556***	-0,4486***	0,1031***	
Cost to income	-0,378***	-0,435***	-0,095***	-0,08***	-0,173***	0,2635***	-0,0478***	-0,158***	-0,1616***	-0,138***	-0,0047

Four-firm concentration and HHI are measures of market concentration

* significant at 10% ** significant at 5% *** significant at 1%

The descriptive statistics above showed differences between the variables in the two economies for the entire sample period 2005-2014. It displayed that emerging economies had higher mean returns using both profitability measures. The mean market concentration and market share were also higher in emerging economies than advanced economies.

Yearly averages of the profitability of the banks in the sample were presented in figure 1 below in form of ROAA and ROAE. The figure displayed high profitability before the financial crisis, a steep decline under the crisis, and low values after the financial crisis. The figure showed that emerging economies had higher returns than advanced economies in pre-crisis period; however, this was not the case during the crisis period in which emerging economies had lower returns. The emerging economies were much more volatile when looking at both ROAE and ROAA.

Figure 1.

(a)	(b)

light blue = Emerging economies, dark blue = Advanced economies
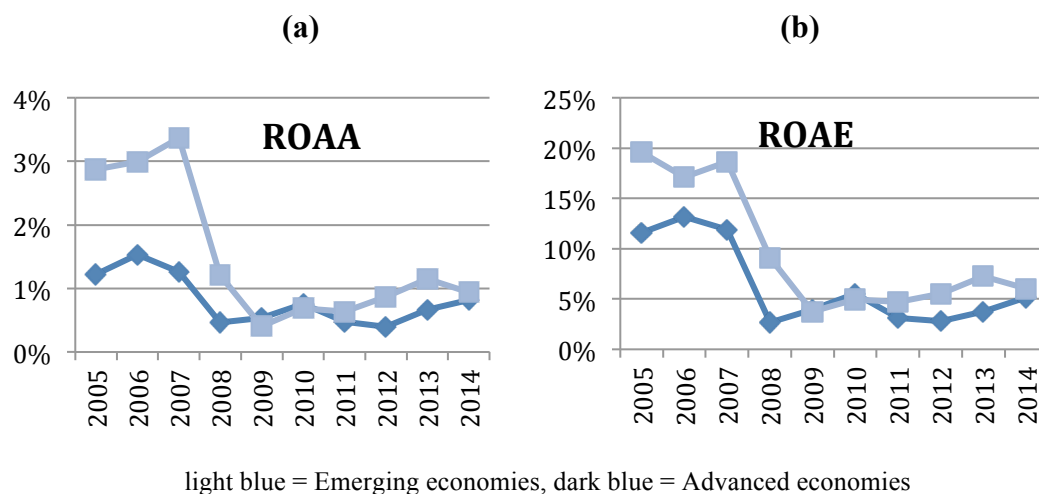
Entire sample period 2005-2014

In advanced economies four-firm concentration and Herfindahl-Hirschman index were both positive, but only four-firm concentration regressed on ROAE was significant. Market share was negative and significant with ROAA but not with ROAE for the period 2005-2014. The expense management measure, cost to income was negative significant related to returns. The capital structure ratio was close to zero but slightly positive using ROAA, and somewhat negative using ROAE but always significant. Overheads to total assets was positively and significant correlated to profits. Interest rate spread had a negative and significant relationship to profitability in advanced economies (Table 7, appendix).

In emerging economies both market structure variables, four-firm concentration and Herfindahl-Hirschman index, were positive and significant. Market share was only negative and significant when run with ROAA regressed on four-firm concentration. Interest rate spread was negative but non-significant for emerging economies. Cost to

income, overheads to total assets, and capital structure all showed same signs and significance as in advanced economies (Table 7, appendix).

Table 3. Determinants of bank profitability 2005-2014.

2005-2014	Advanced Economies				Emerging Economies			
	ROAA		ROAE		ROAA		ROAE	
Four-firm concentration	0.273**		3.755***		1.111***		8.806***	
HHI		0.147		4.298		1.914***		10.779***
Market share	-1.269**	-1.097**	2.436	3.766	-0.854**	-0.685*	-1.587	1.802

Four-firm concentration and HHI are measures of market concentration

The control variables are available in the complete regression in Table 7 in the appendix

* significant at 10% ** significant at 5% *** significant at 1%

 Pre-crisis period 2005-2007

When simply looking at the pre-crises period 2005-2007 in advanced economies market share was positive and significant with ROAE but not with ROAA. Market concentration, using four-firm concentration and Herfindahl-Hirschman index, was found to be positive and significant when correlated to profitability, in all but Herfindahl-Hirschman index regressed on ROAA. Interest rate spread showed a negative significant relation to return in the high profitable period 2005-2007. Cost to income, overheads to total assets, and equity to total assets showed the same sign and significance to the results of the entire sample period (Table 8, appendix).

The pre-crisis period in emerging economies showed a positive market concentration coefficient with exception of ROAE regressed on four-firm concentration. The results found market share to be negative significant with ROAA but not with ROAE. Cost to income, overheads to total assets, and capital structure were all equivalent to the results of the entire sample period. Interest rate spread was positive non-significant with ROAA and negative non-significant with ROAE.

Table 4. Determinants of bank profitability during the pre-crisis 2005-2007.

2005-2007	Advanced Economies		Emerging Economies	
	ROAA	ROAE	ROAA	ROAE
Four-firm concentration	0.400**	6.412***	1.342**	3.055
HHI	0.659	13.009***	1.780***	10.519**
Market share	0.602 0.721	11.451*** 14.076***	-2.102*** -1.986***	3.184 0.145

Four-firm concentration and HHI are measures of market concentration

The control variables are available in the complete regression in Table 8 in the appendix

* significant at 10% ** significant at 5% *** significant at 1%

Crisis period 2008-2010

The crisis period 2008-2010 in advanced economies showed a noticeable difference to the entire sample period. In the period the market concentration coefficients were negative with both ROAA and ROAE and significant with ROAA. In contrast to the previously measured time period, this period showed no relationship between market share and profitability. Some of the other control variables such as cost to income, overheads to total assets, and equity to total assets had the same sign and significance as the 2005-2014 period. Interest rate spread was significant and negative correlated with profitability in the crisis period.

Examining the crisis-period in emerging economies displayed the same positive and significant market concentration coefficients as when running the entire sample period. Market share was only negative significant when running ROAE regressed on four-firm concentration. Some of the other control variables such as cost to income, overheads to total assets, and equity to total assets had the same sign and significance as the 2005-2014 period. Interest rate spread was negative non-significant in the crisis period 2008-2010.

Table 5. Determinants of bank profitability during the financial crisis 2008-2010.

2008-2010	Advanced Economies				Emerging Economies			
	ROAA		ROAE		ROAA		ROAE	
Four-firm concentration	-0.878***		-3.368		1.195**		15.862***	
HHI		-2.347***		-6.726		2.474***		22.030***
Market share	-0.147	0.170	0.509	2.730	-1.165	-1.194	-17.912*	-13.571*

Four-firm concentration and HHI are measures of market concentration

The control variables are available in the complete regression in Table 9 in the appendix

* significant at 10% ** significant at 5% *** significant at 1%

Post-crisis period 2011-2014

In advanced economies the post-crisis period showed no signs of a market structure and profitability relationship. Market share and the market concentration coefficients could not significantly explain bank profitability during the 2011-2014 period. Cost to income and overheads to total assets were equivalent to the results of the entire sample period. For this time period equity to total assets was positive and significant using both ROAA and ROAE. The post-crisis period had the same negative significant interest rate spread as the all time period in advanced economies.

Emerging economies had the same absence of relationship between profitability and market structure in the post-crises period as advanced economies. In contrast to the results of the whole crisis period, overheads to total assets were positive but not significant for the 2011-2014 period. In line with the results of advanced economies in the post-crisis period, equity to total assets was positive and significant using both ROAA and ROAE. Equivalent to the results of the 2005-2014 period cost to income was negative significant. For the first time interest rate spread was significant but also negative using both ROAA and ROAE.

Table 6. Determinants of bank profitability during the post-crisis 2010-2014.

2011-2014	Advanced Economies				Emerging Economies			
	ROAA		ROAE		ROAA		ROAE	
Four-firm concentration	-0.210		0.548		0.311		0.664	
HHI		-0.868		-2.387		0.963		-1.741
Market share	-0.696	-1.639	-6.977	-5.829	-0.913	-1.137*	1.150	2.075

Four-firm concentration and HHI are measures of market concentration

The control variables are available in the complete regression in Table 10 in the appendix

* significant at 10% ** significant at 5% *** significant at 1%

4.1.2. Survivorship bias

Comparing the regressions with only active banks to the other that contained all banks, the coefficient for market concentration was less positive in the regression with only active banks in emerging economies in all of the four different time periods with an exception of ROAE 2008-2010 (Table 16, appendix). Market concentration was more positive in advanced economies when using only active banks for all time periods but the 2011-2014 period. The market share coefficient was more positive in the regression with only active banks than with all banks in both economies to large degree. This did not hold for the 2008-2010 period, but also not for emerging economies 2005-2007 using ROAE and Herfindahl-Hirschman index, and advanced economies 2011-2014 using ROAA and four-firm concentration.

4.1.3. Fixed effects

The regression with fixed effect can be found in Table 15 in the appendix. Market concentration was positive significance for both economies for the 2005-2014. Market share was positive significant for emerging economies and non-significant for advanced economies. In advanced economies, the interest rate spread was positive significant for the entire period, but negative and significant in the crisis period. Interest rate spread was non-significant in emerging economies.

4.2. Analysis

In this section the results of the paper are analyzed with each time period seperatly. More precisely, the market structure-profit relationship, surviorship bias, fixed effect, profitability robustness, omitted variable bias, and the sample data are evaluated.

4.2.1. Advanced and emerging economies

Entire sample period 2005-2014

In both advanced and emerging economies support was found of a positive market concentration and negative market share but with different significance level and robustness when tests were applied to the entire period 2005-2014. This results implied that the largest banks' profitability gets hit the hardest and banks in a concentrated market performed better during this period. This outcome also showed support of the concentration stability view because the high concentration in the

banking sector enabled protection against macroeconomic and liquidity shocks, at least in terms of profitability. The results for the 2005-2014 period showed that a negative market share was more robust in advanced economies, and positive market concentration had stronger support in emerging economies, in terms of significance with both ROAA and ROAE. Strangely, the negative market share relationship was not significant for any of the three separate time periods in neither economy.

Consequently, the findings did not find support of neither the relative-market-power (RMP) hypothesis nor the structure-conduct-performance (SCP) hypothesis, and as a result, *first hypothesis* and *second hypothesis* could be rejected. This meant that banks were not able to use their monopolistic power, nor their large market shares regressed on well-differentiated products to achieve higher profits during a crisis. Instead, the results showed that a more concentrated banking sector in a country enabled the banks to achieve the highest returns in a crisis. This could be attributed to largest banks being price-leaders for the banking sector, align with Tregenna (2009). The findings seemed to show the reverse relationship between high concentration and redistribution of profits compared to Tregenna (2009), since a negative market share coefficient regressed on a positive market concentration indicated that small firms were able to make the higher profits at the expense of large firm during the crisis.

Pre-crisis period 2005-2007

The results of the pre-crisis period 2005-2007 confirmed Mirzaei, Moore, & Liu's (2013) positive relationship between bank performance and market share in advanced economies, at least in terms of ROAE. In addition, this thesis found advanced economies to have a positive market concentration and profitability relationship. This indicated that the relative-market-power hypothesis, *first hypothesis,* did not hold. Instead both market structure coefficients were positive, this could be explained by an increase in profits at the expense of other industries. Being a large bank was beneficial because they are able to be price-leaders and raise interest rate spreads the most. The interest rate spread increase by large banks enabled small banks to increase theirs too (Tregenna, 2009). The negative interest rate spread-return relationship in the period 2005-2007 was contradictory to Mirzaei, Moore, & Liu (2013) findings. This seemed to be a limitation of the model, but a positive interest rate spread was found when controlled for fixed effects.

In emerging economies, the results of Mirzaei, Moore, & Liu (2013) in the period 2005-2007 were not confirmed, where this thesis found a significant negative market share instead of a close to zero non-significant result. This could be partly attributed to Mirzaei, Moore, & Liu only using active banks because of the positive market share bias. In addition, it could be a more positive coefficient for the years 1999-2004, which weighed up the level of their market share coefficient for the entire period. The positive significant market concentration coefficient was non-existent when looking at the period with active banks; however, using all banks the *fourth hypothesis* could be rejected.

Crisis period 2008-2010

The crisis-period 2008-2010 showed distinct differences in the market structure and bank performance relationship between the two economies. In advanced economies the *third hypothesis* could not be rejected. Result suggested that the performance of the banking sector was reduced by the high concentration in the market. According to Uhde & Heimeshoff (2009) the large banks were "too big to fail", which had caused them to increase risk because of the belief that the bank would bailed out by the government. The higher interest rate spreads, due to lower competition in the market, could have led to borrowers defaulting on their loans, as result of the attempt to compensate for the expensive loan payments.

In emerging economies, the results showed that a country with high concentration in the banking sector were able to generate the highest profits in a financial crisis. There was also some support of the largest banks' profitability taking the biggest hit. As a result, the *fourth hypothesis* cannot be rejected. This suggested that the market was able to protect for the banks from macroeconomic and liquidity shocks, in support of the concentration stability view (Uhde & Heimeshoff, 2009).

Post-crisis period 2011-2014

The non-significant relationship between market structure and bank profitability in the post crisis suggested that all hypotheses could be rejected. Market structure in terms of market share and market concentration did not seem to be a determinant of bank profitability after the financial crisis. The true determinant factors have not been further tested in this thesis.

4.2.2. Survivorship bias

In advanced economies market concentration was negative and significant 2008-2010 when using all banks but not when only using active banks. This implied that if the thesis only used active banks it would be able to reject the *third hypothesis*. Including all banks also gave a significant negative market share for the 2005-2014 period as opposed to using only active banks. The pre-crisis period in emerging economies had a positive significant market concentration with all banks but not with active banks. The 2005-2014 period had a negative and significant market share with all banks, in contrast to the non-significant market share with active banks. The previous two situations of using active banks could have resulted in incorrectly rejecting the *fourth hypothesis*.

4.2.3. Profitability robustness and omitted variable bias

This thesis achieved results with higher significance level when using return on average assets (ROAA) than return on average equity (ROAE), this could potentially be explained by the calculation of market share and market concentration using total assets, which could have biased the results. The regressions in this thesis had less robustness between the market structure variables in comparison to Mirzaei, Moore, & Liu (2013). This could partly be explained by the correlation differences between return on average assets (ROAA) and return on average equity (ROAE), where this thesis had 0.633 (Table 3) and Mirzaei, Moore, & Liu (2013) had 0.816. Since the two variables were not as similar in this sample, they will not give as robust results. As a result of this model not using all variables in Mirzaei, Moore, & Liu study this thesis could also be exposed to omitted variable bias.

4.2.4. Fixed effects

The market concentration was equivalent in terms of the sign and significance for the 2005-2014 to the regressions without fixed effect (Table 15). The result of market share showed lack of robustness with a negative significant coefficient without fixed effects and positive when including fixed effects in emerging economies and non-significant in advanced economies. The fixed effect regression gave a more realistic positive interest rate spread in advanced economies during the entire, and a slightly negative significant coefficient in the crisis period.

4.2.5. Data

Four-firm concentration (figure 2a), Herfindahl-Hirschman index (figure 3, appendix), and market share (figure 2b) showed the same pattern. The banks in emerging economies were on average fewer and larger, in terms of market share, than in advanced economies. The four-firm concentration had been declining in both emerging and advanced economies since the start of the measured data in this thesis. Herfindahl-Hirschman index had very similar movement to which four-firm concentration had over time. The market share in emerging economies was on average much larger than in advanced economies; this came from a much higher competition in the advanced banking market.

Figure 2.

(a)   (b)

light blue = Emerging economies, dark blue = Advanced economies
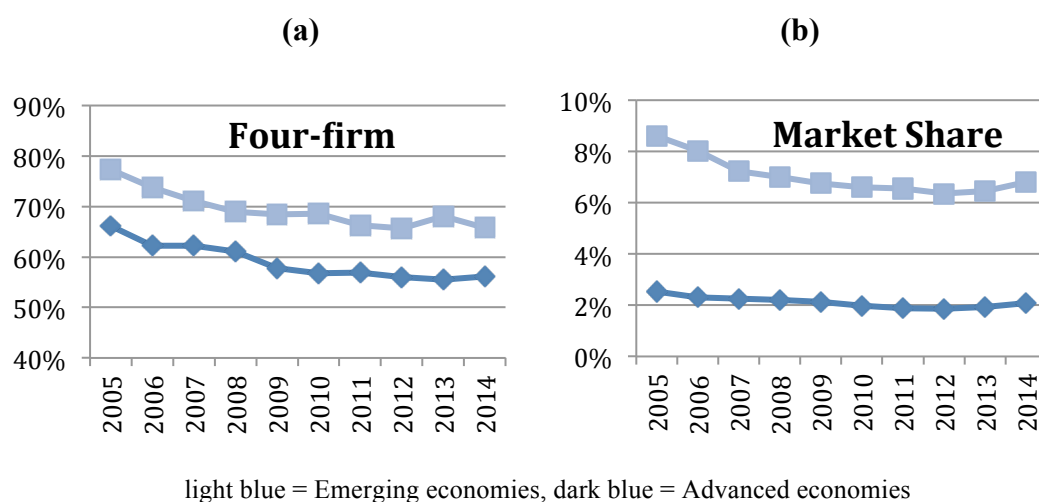
The two macroeconomic measurement variables used in the thesis were Inflation and GDP growth, and the averages are displayed in figure 4 and 5 in the appendix. GDP growth fluctuated about the same amount in both emerging and advanced economies, and under the crisis a large decline in growth appeared. The inflation in advanced economies had almost no volatility, and in emerging economies the volatility was very high. The extreme inflation average in 2009 in emerging economies came from high deflation in some Arabic countries.

The interest rate spread can be seen in figure 6 in appendix and showed that the spreads were much larger in emerging economies than in advanced economies. The

required return was higher in riskier bank countries and therefore the spreads should be larger. On the contrary, equity to total assets (figure 7, appendix) showed that the leverage of the bank in the advanced economies on average was higher, which implied that they had more risk.

5. Conclusions and Future Research

5.1. Conclusions

This thesis examines the extent profitability in both emerging and advanced economies can be explained by market structure, more specifically market share and market concentration, during the period 2005-2014. The period is separated into three parts to capture the financial crisis as well as the periods before and after. The sample includes 1328 banks in 40 countries, 17 advanced countries and 23 emerging countries. The results support neither of the most well-known market power hypotheses, the relative-market-power hypothesis nor the structure-conduct-performance hypothesis, in the crisis period 2008-2010. In advanced economies the paper finds market concentration to negatively affect profitability during the crisis period, suggesting that stability and profitability are reduced with high market concentration in the banking sector. On the contrary, in emerging economies market concentration positively affect profitability and market share of the bank negatively influence profits. This result implies the largest banks' profitability gets hit the hardest and banks in a concentrated market perform better. Some consistencies are found between the two economies in the sample period 2005-2014, with the same negative market share and positive market concentration as emerging economies in the financial crisis. The post-crisis period 2011-2014 did not find any significance of the market structure and profitability relationship, which indicates that something else is the main determinant of bank profitability after the financial crisis. The study finds evidence of a survivorship bias in this sample period, and it is therefore important to include the non-active banks when performing market structure-profit research.

5.2. Future Research

This thesis only investigated the profitability aspect of banks and the concentration of the market. It could also be of interest to assess how financial aid from the government affects the concentration in the market and the profitability during a financial crisis. Further tests on the robustness of the model by performing the same analyzes on different markets, and different time period or even earlier crises. Future research could follow up on the non-existing relationship between market structure and profitability after the crisis, and study what the actual determinants of profitability were in that period. Also, how regulation changes after the financial crisis may have affected the market structure and profitability relationship.

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7. Appendix
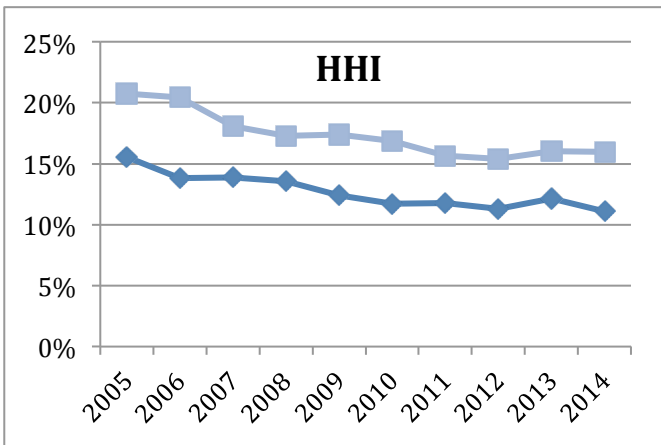
Figure 3
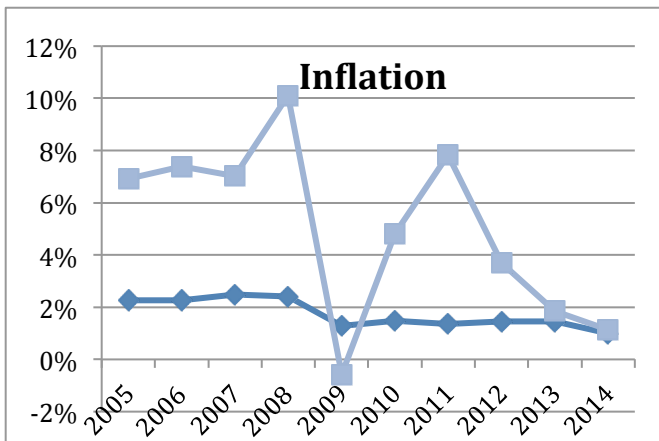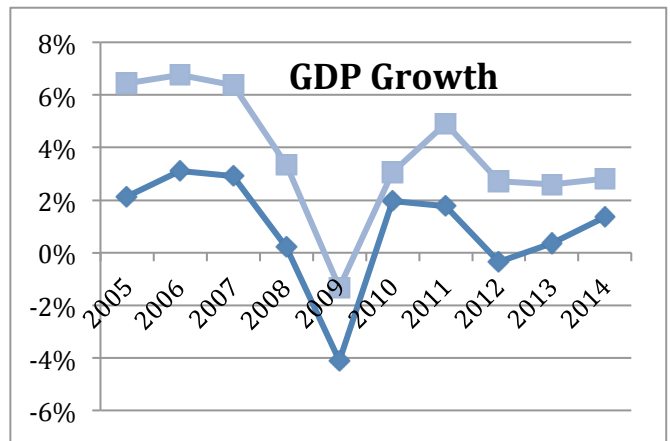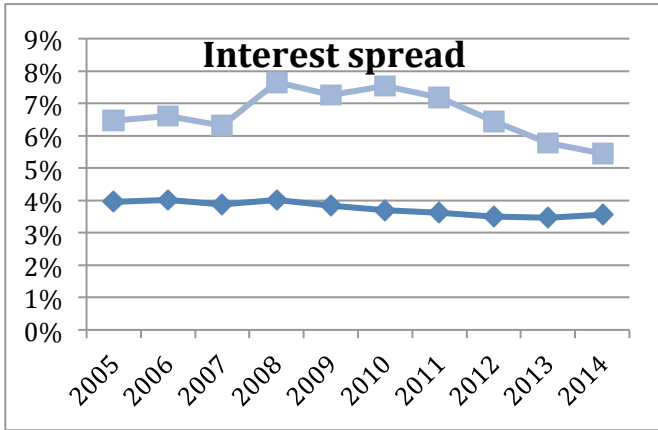
Figure 4

Figure 5

Figure 6
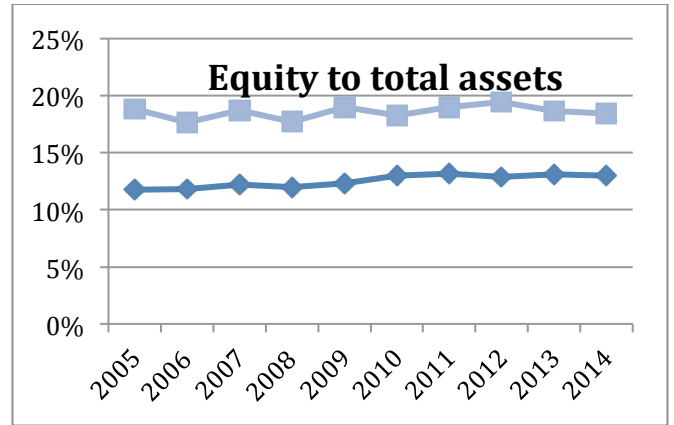
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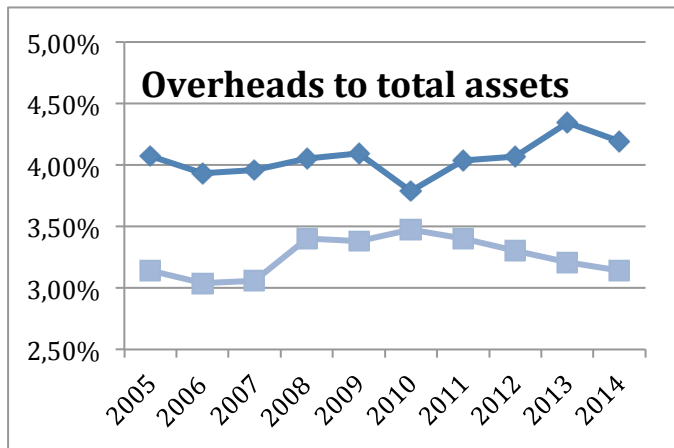
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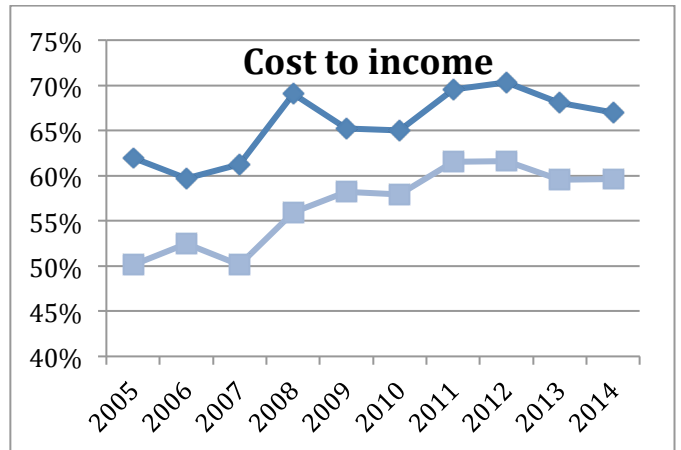
Figure 9

Table 7. Determinants of bank profitability 2005-2014.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	0.273**		1.111***		3.755***		8.806***	
	(2.05)		(4.21)		(3.06)		(4.55)	
Herfindahl-Hirschman index		0.147		1.914***		4.298		10.779***
		(0.43)		(4.52)		(1.35)		(3.56)
Market share	-1.269**	-1.097**	-0.854**	-0.685*	2.436	3.766	-1.587	1.802
	(2.29)	(2.04)	(2.02)	(1.84)	(0.66)	(1.02)	(0.43)	(0.52)
Overheads to total assets	7.785***	7.748***	28.530***	28.501***	55.784***	54.713***	157.286***	157.147***
	(6.94)	(6.80)	(6.19)	(6.20)	(10.32)	(10.09)	(5.66)	(5.63)
Interest rate spread	-3.656***	-3.649***	-0.556	-0.567	-31.202***	-32.681***	-3.620*	-3.752*
	(5.75)	(5.62)	(0.74)	(0.76)	(5.78)	(5.94)	(1.79)	(1.85)
Inflation	6.373***	7.011***	1.263*	1.102	78.668***	85.060***	8.118**	6.436*
	(3.57)	(3.88)	(1.75)	(1.54)	(4.89)	(5.10)	(2.12)	(1.69)
Log bank assets	-0.003	-0.005	0.095**	0.093**	-0.397***	-0.412***	1.023***	0.892***
	(0.26)	(0.39)	(2.46)	(2.43)	(3.93)	(3.99)	(3.58)	(3.11)
GDP growth	7.663***	7.714***	8.527***	8.642***	86.959***	87.761***	69.062***	70.113***
	(10.51)	(10.48)	(8.93)	(9.01)	(11.60)	(11.57)	(10.09)	(10.17)
Equity to total assets	0.059***	0.060***	0.062***	0.062***	-0.088***	-0.083**	-0.091***	-0.095***
	(7.08)	(7.06)	(8.22)	(8.39)	(2.64)	(2.49)	(2.76)	(2.88)
Cost to income	-0.028***	-0.028***	-0.047***	-0.047***	-0.291***	-0.290***	-0.326***	-0.326***
	(19.69)	(19.44)	(10.05)	(10.03)	(23.22)	(22.92)	(8.98)	(8.92)
Constant	1.586***	1.754***	-0.109	0.355	28.390***	30.152***	1.178	7.182
	(5.15)	(5.75)	(0.12)	(0.44)	(12.45)	(13.75)	(0.18)	(1.18)
Observations	4961	4829	2208	2203	4935	4803	2191	2186
R-squared	0.36	0.36	0.43	0.43	0.28	0.27	0.32	0.32

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 8. Determinants of bank profitability during the pre-crisis 2005-2007.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	0.400**		1.342**		6.412***		3.055	
	(2.32)		(2.49)		(4.24)		(1.09)	
Herfindahl-Hirschman index		0.659		1.780***		13.009***		10.519**
		(1.55)		(2.82)		(3.74)		(2.20)
Market share	0.602	0.721	-2.102***	-1.986***	11.451***	14.076***	3.184	0.145
	(1.44)	(1.50)	(2.80)	(2.76)	(2.91)	(3.56)	(0.90)	(0.04)
Overheads to total assets	25.390***	25.680***	75.823***	76.456***	135.624***	131.503***	332.926***	332.085***
	(3.46)	(3.30)	(5.85)	(5.91)	(4.10)	(3.84)	(8.10)	(8.17)
Interest rate spread	-4.580***	-4.728***	0.510	0.495	-39.175***	-41.125***	-0.446	-0.744
	(4.44)	(4.49)	(0.67)	(0.67)	(6.14)	(6.27)	(0.21)	(0.39)
Inflation	-4.077	-5.217	1.072	0.916	-50.555	-79.930**	15.228**	15.943**
	(1.18)	(1.35)	(0.64)	(0.56)	(1.59)	(2.28)	(2.43)	(2.57)
Log bank assets	-0.010	-0.010	0.195**	0.189**	0.027	-0.053	0.369	0.549
	(0.42)	(0.36)	(2.43)	(2.38)	(0.20)	(0.36)	(1.07)	(1.63)
GDP growth	0.875	1.811	3.813	4.698*	23.644	25.624	26.810**	29.068**
	(0.32)	(0.60)	(1.38)	(1.67)	(1.11)	(1.20)	(2.41)	(2.52)
Equity to total assets	0.073***	0.075***	0.104***	0.103***	-0.356***	-0.346***	-0.337***	-0.332***
	(3.38)	(3.34)	(5.32)	(5.33)	(3.67)	(3.55)	(6.01)	(6.30)
Cost to income	-0.041***	-0.042***	-0.091***	-0.090***	-0.324***	-0.329***	-0.474***	-0.473***
	(7.56)	(7.40)	(8.20)	(8.21)	(13.55)	(13.16)	(12.29)	(12.30)
Constant	2.515***	2.723***	-0.363	0.264	29.409***	33.869***	27.089***	24.584***
	(3.84)	(3.79)	(0.23)	(0.18)	(8.91)	(9.70)	(3.72)	(3.63)
Observations	1233	1163	545	545	1225	1154	540	540
R-squared	0.59	0.59	0.66	0.66	0.34	0.34	0.50	0.50

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 9. Determinants of bank profitability during the financial crisis 2008-2010.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	-0.878***		1.195**		-3.368		15.862***	
	(2.67)		(2.43)		(1.08)		(3.84)	
Herfindahl-Hirschman index		-2.347***		2.474***		-6.726		22.030***
		(2.80)		(3.62)		(0.88)		(3.74)
Market share	-0.147	0.170	-1.165	-1.194	0.509	2.730	-17.912**	-13.571*
	(0.27)	(0.31)	(1.45)	(1.64)	(0.07)	(0.36)	(2.35)	(1.92)
Overheads to total assets	6.213***	5.580***	34.161***	34.024***	37.598***	38.593***	223.159***	223.021***
	(3.02)	(2.68)	(5.14)	(5.20)	(4.87)	(5.19)	(5.67)	(5.73)
Interest rate spread	-5.389***	-4.611***	-1.204	-1.256*	-33.139***	-30.449***	-6.915	-7.208*
	(4.19)	(3.40)	(1.51)	(1.66)	(3.31)	(3.10)	(1.55)	(1.72)
Inflation	9.788*	7.210	0.336	0.205	84.354	49.746	1.331	0.001
	(1.85)	(1.45)	(0.35)	(0.21)	(1.44)	(0.95)	(0.29)	(0.00)
Log bank assets	-0.014	-0.012	0.179***	0.188***	-0.529**	-0.628***	2.490***	2.354***
	(0.65)	(0.54)	(3.02)	(3.21)	(2.24)	(2.86)	(5.06)	(4.88)
GDP growth	5.448***	4.700***	8.689***	8.695***	36.519***	29.026***	81.754***	81.108***
	(4.50)	(3.97)	(6.15)	(6.22)	(3.71)	(2.85)	(6.15)	(6.13)
Equity to total assets	0.036**	0.052**	0.039***	0.039***	-0.016	-0.032	-0.035	-0.039
	(2.10)	(2.54)	(3.18)	(3.28)	(0.19)	(0.43)	(0.66)	(0.74)
Cost to income	-0.029***	-0.029***	-0.042***	-0.042***	-0.286***	-0.282***	-0.302***	-0.302***
	(9.49)	(9.25)	(11.20)	(11.17)	(11.17)	(11.53)	(7.56)	(7.56)
Constant	2.732***	2.340***	-1.571	-1.292	34.185***	34.637***	-29.232***	-20.171**
	(4.36)	(3.60)	(1.33)	(1.25)	(6.50)	(7.41)	(2.89)	(2.24)
Observations	1358	1435	646	646	1348	1424	640	640
R-squared	0.26	0.27	0.42	0.42	0.21	0.20	0.40	0.40

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 10. Determinants of bank profitability during the post-crisis 2010-2014.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	-0.210		0.311		0.548		0.664	
	(0.88)		(0.98)		(0.23)		(0.22)	
Herfindahl-Hirschman index		-0.868		0.963		-2.387		-1.741
		(1.45)		(1.49)		(0.40)		(0.28)
Market share	-0.696	-1.639	-0.913	-1.137*	-6.977	-5.829	1.150	2.075
	(1.28)	(1.40)	(1.51)	(1.89)	(0.95)	(0.80)	(0.20)	(0.35)
Overheads to total assets	5.963***	5.622***	10.385*	10.432*	36.621***	34.119***	38.406	36.727
	(5.55)	(5.34)	(1.90)	(1.88)	(4.66)	(4.47)	(0.92)	(0.86)
Interest rate spread	-2.568**	-3.138***	-2.090***	-2.078***	-20.148**	-22.551**	-11.314***	-11.380***
	(2.22)	(2.64)	(3.21)	(3.19)	(2.10)	(2.30)	(3.31)	(3.32)
Inflation	-1.786	-1.564	-1.936*	-2.027*	42.274	45.858	-12.503	-14.414
	(0.48)	(0.41)	(1.66)	(1.72)	(1.05)	(1.11)	(1.46)	(1.64)
Log bank assets	-0.036**	-0.024	0.135***	0.150***	-0.451**	-0.428**	0.980**	0.931*
	(2.04)	(1.10)	(2.75)	(2.91)	(2.43)	(2.19)	(2.14)	(1.93)
GDP growth	8.135***	8.099***	4.416*	4.228*	100.766***	100.739***	29.159	32.512
	(4.70)	(4.61)	(1.79)	(1.65)	(4.69)	(4.62)	(1.26)	(1.37)
Equity to total assets	0.031**	0.033**	0.058***	0.059***	0.054	0.068	0.116**	0.112**
	(2.37)	(2.48)	(8.26)	(8.34)	(0.79)	(0.99)	(2.09)	(2.03)
Cost to income	-0.023***	-0.023***	-0.033***	-0.033***	-0.259***	-0.256***	-0.264***	-0.257***
	(11.38)	(10.99)	(6.26)	(6.13)	(14.68)	(14.06)	(4.92)	(4.77)
Constant	2.301***	2.120***	-0.420	-0.591	26.672***	26.639***	3.432	4.458
	(4.42)	(3.92)	(0.41)	(0.58)	(6.56)	(7.01)	(0.35)	(0.45)
Observations	2155	2062	994	985	2146	2052	988	979
R-squared	0.27	0.27	0.38	0.37	0.21	0.21	0.23	0.22

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 11. Determinants of bank profitability using only active banks 2005-2014.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	0.297**		0.778***		4.782***		6.464***	
	(2.52)		(2.60)		(3.72)		(2.97)	
Herfindahl-Hirschman index		0.429		1.340***		7.613**		7.839**
		(1.24)		(2.88)		(2.22)		(2.48)
Market share	-0.122	0.070	-0.650*	-0.580	3.690	5.878	-0.321	1.718
	(0.41)	(0.23)	(1.72)	(1.63)	(0.88)	(1.41)	(0.09)	(0.50)
Overheads to total assets	8.744***	8.835***	43.577***	43.506***	76.465***	75.110***	286.835***	286.619***
	(5.16)	(5.03)	(7.14)	(7.11)	(7.28)	(7.03)	(7.51)	(7.46)
Interest rate spread	-4.894***	-4.964***	-0.431	-0.443	-30.543***	-31.860***	-0.949	-1.048
	(5.90)	(5.91)	(0.43)	(0.45)	(4.59)	(4.77)	(0.29)	(0.32)
Inflation	5.002**	4.824**	0.760	0.659	75.849***	73.459***	4.493	3.580
	(2.56)	(2.45)	(0.98)	(0.85)	(4.11)	(3.89)	(1.07)	(0.85)
Log bank assets	-0.015	-0.017	0.072**	0.073**	-0.438***	-0.441***	0.732***	0.650**
	(1.45)	(1.53)	(2.11)	(2.04)	(3.53)	(3.49)	(2.89)	(2.42)
GDP growth	6.379***	6.499***	10.190***	10.335***	87.798***	90.169***	86.044***	87.223***
	(9.38)	(9.45)	(9.46)	(9.55)	(10.38)	(10.58)	(10.47)	(10.51)
Equity to total assets	0.067***	0.067***	0.045***	0.046***	-0.194***	-0.186***	-0.244***	-0.246***
	(7.60)	(7.62)	(4.70)	(4.76)	(4.15)	(4.10)	(6.64)	(6.69)
Cost to income	-0.024***	-0.024***	-0.064***	-0.064***	-0.287***	-0.285***	-0.445***	-0.441***
	(15.86)	(15.61)	(14.26)	(14.26)	(20.93)	(20.78)	(14.69)	(14.66)
Constant	1.541***	1.700***	1.135	1.412	28.690***	30.524***	11.462**	15.516***
	(5.72)	(6.24)	(1.51)	(1.96)	(11.00)	(11.91)	(2.25)	(2.98)
Observations	3140	3063	1523	1519	3118	3040	1511	1507
R-squared	0.38	0.38	0.44	0.44	0.28	0.28	0.34	0.34

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 12. Determinants of bank profitability during the pre-crisis using only active banks 2005-2007.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	0.552***		0.904*		6.903***		0.387	
	(2.69)		(1.68)		(4.30)		(0.13)	
Herfindahl-Hirschman index		1.553***		1.206		16.680***		6.825
		(3.09)		(1.44)		(4.31)		(0.85)
Market share	0.611	0.607	-1.897***	-1.790**	8.278**	10.126***	2.107	-0.647
	(1.44)	(1.21)	(2.59)	(2.43)	(2.14)	(2.63)	(0.61)	(0.15)
Overheads to total assets	13.984**	13.722**	95.166***	95.530***	119.576***	110.893**	422.791***	419.142***
	(2.50)	(2.25)	(6.58)	(6.60)	(2.70)	(2.42)	(10.26)	(10.05)
Interest rate spread	-4.268***	-4.753***	2.321	2.348	-32.575***	-37.398***	3.430	3.290
	(3.19)	(3.47)	(1.58)	(1.59)	(3.52)	(3.98)	(1.11)	(1.06)
Inflation	-0.782	-4.428	-2.335	-2.407	-15.958	-55.781	14.294**	15.458**
	(0.19)	(0.97)	(1.28)	(1.32)	(0.43)	(1.41)	(2.18)	(2.32)
Log bank assets	-0.030	-0.032	0.237***	0.232***	0.223	0.155	0.570	0.751**
	(1.52)	(1.29)	(3.21)	(3.13)	(1.53)	(0.91)	(1.61)	(2.12)
GDP growth	4.004	5.757*	8.183***	8.758***	48.877**	50.940**	39.655***	39.654***
	(1.56)	(1.78)	(3.17)	(3.35)	(2.04)	(2.10)	(3.42)	(3.39)
Equity to total assets	0.085***	0.089***	0.119***	0.119***	-0.316***	-0.290***	-0.436***	-0.426***
	(5.03)	(4.92)	(4.16)	(4.17)	(2.79)	(2.70)	(7.04)	(7.01)
Cost to income	-0.034***	-0.036***	-0.098***	-0.097***	-0.307***	-0.307***	-0.521***	-0.521***
	(7.00)	(6.84)	(7.60)	(7.55)	(9.58)	(9.11)	(12.49)	(12.23)
Constant	2.294***	2.604***	-1.152	-0.736	23.410***	27.557***	26.514***	22.924***
	(4.24)	(3.94)	(0.75)	(0.51)	(5.91)	(6.47)	(3.54)	(3.13)
Observations	917	851	447	445	911	845	443	441
R-squared	0.52	0.52	0.68	0.68	0.32	0.32	0.52	0.52

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 13. Determinants of bank profitability during the financial crisis using only active banks 2008-2010.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	-0.554*		1.058*		1.931		19.752***	
	(1.67)		(1.68)		(0.76)		(3.29)	
Herfindahl-Hirschman index		-1.363		2.066***		6.396		26.448***
		(1.58)		(2.97)		(1.08)		(3.30)
Market share	0.489	0.806	-1.584*	-1.518**	1.892	3.665	-22.732***	-17.177**
	(0.72)	(1.26)	(1.91)	(2.10)	(0.25)	(0.49)	(2.78)	(2.30)
Overheads to total assets	9.244*	9.114*	36.246***	36.798***	81.459***	80.639***	352.214***	352.307***
	(1.71)	(1.81)	(5.27)	(5.30)	(2.92)	(3.10)	(5.47)	(5.45)
Interest rate spread	-4.040***	-3.795***	0.159	0.169	-36.343***	-35.751***	-0.665	-0.132
	(2.84)	(2.85)	(0.28)	(0.30)	(3.03)	(3.07)	(0.16)	(0.03)
Inflation	3.955	-0.400	0.323	0.203	25.617	-9.545	2.086	0.510
	(0.61)	(0.07)	(0.34)	(0.21)	(0.51)	(0.21)	(0.48)	(0.12)
Log bank assets	-0.017	-0.034	0.214***	0.219***	-0.749***	-0.842***	2.321***	2.130***
	(0.68)	(1.53)	(3.03)	(3.22)	(2.82)	(3.44)	(4.00)	(3.70)
GDP growth	3.579***	2.578**	9.239***	9.315***	31.857***	25.951**	85.863***	84.947***
	(3.41)	(2.47)	(5.57)	(5.66)	(2.87)	(2.24)	(5.38)	(5.36)
Equity to total assets	0.051**	0.049*	0.009	0.010	-0.181*	-0.204**	-0.179**	-0.182**
	(1.98)	(1.95)	(0.44)	(0.49)	(1.92)	(2.11)	(2.33)	(2.35)
Cost to income	-0.026***	-0.025***	-0.049***	-0.049***	-0.286***	-0.279***	-0.403***	-0.394***
	(6.77)	(6.98)	(7.03)	(6.89)	(8.35)	(8.74)	(6.78)	(6.55)
Constant	2.286***	2.390***	-1.534	-1.264	36.377***	38.212***	-25.541**	-14.345
	(3.17)	(3.77)	(0.93)	(0.89)	(6.80)	(7.70)	(2.04)	(1.29)
Observations	863	929	454	454	854	919	449	449
R-squared	0.29	0.27	0.35	0.35	0.24	0.22	0.35	0.35

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 14. Determinants of bank profitability during the post-crisis using only active banks 2010-2014.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	-0.468		-0.495		-3.429		-2.826	
	(1.59)		(1.24)		(1.03)		(0.72)	
Herfindahl-Hirschman index		-1.777*		-0.580		-16.120*		-12.654
		(1.95)		(0.73)		(1.65)		(1.63)
Market share	-0.703	-0.507	0.082	-0.128	-0.885	0.444	4.985	7.657
	(0.81)	(0.56)	(0.13)	(0.19)	(0.09)	(0.05)	(0.73)	(1.04)
Overheads to total assets	5.460***	5.476***	10.379	10.746	49.848***	47.943***	15.226	13.771
	(3.66)	(3.55)	(1.07)	(1.11)	(4.84)	(4.66)	(0.21)	(0.19)
Interest rate spread	-3.110**	-3.426**	-2.317	-2.173	-24.206*	-28.019**	-21.478	-21.001*
	(2.27)	(2.44)	(1.34)	(1.25)	(1.77)	(2.03)	(1.77)	(1.74)
Inflation	-5.862	-7.422	-1.980	-2.133	-84.929*	-96.350*	-15.395	-18.363
	(1.32)	(1.55)	(1.55)	(1.64)	(1.76)	(1.90)	(1.43)	(1.63)
Log bank assets	-0.022	-0.026	0.087**	0.094**	-0.813***	-0.817***	0.737	0.599
	(1.08)	(1.12)	(2.10)	(2.05)	(3.69)	(3.54)	(1.55)	(1.13)
GDP growth	6.147***	6.325***	4.515	4.816	99.606***	105.530***	44.966	48.393
	(3.10)	(3.21)	(1.32)	(1.37)	(4.15)	(4.41)	(1.40)	(1.47)
Equity to total assets	0.065***	0.065***	0.044***	0.043***	-0.063	-0.056	0.081	0.072
	(4.62)	(4.38)	(5.25)	(5.16)	(0.67)	(0.58)	(1.12)	(1.00)
Cost to income	-0.017***	-0.018***	-0.047***	-0.048***	-0.251***	-0.247***	-0.352***	-0.348***
	(10.08)	(9.51)	(8.81)	(9.18)	(12.51)	(11.81)	(6.89)	(7.15)
Constant	1.663***	1.707***	1.618**	1.290	36.525***	36.444***	14.126	16.019*
	(3.25)	(3.17)	(2.13)	(1.52)	(7.20)	(7.39)	(1.64)	(1.65)
Observations	1252	1180	616	614	1249	1176	611	609
R-squared	0.32	0.31	0.36	0.36	0.24	0.23	0.22	0.22

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 15. Fixed effect with clustered standard errors 2005-2014.

	ROAA				ROAE			
	Advanced Economies		Emerging Economies		Advanced Economies		Emerging Economies	
	1	2	3	4	5	6	7	8
Four firm concentration	1.481***		1.768**		21.055***		17.735***	
	(3.02)		(1.99)		(4.48)		(2.65)	
Herfindahl-Hirschman index		2.271**		3.757**		34.875***		30.609**
		(1.97)		(2.54)		(3.07)		(2.29)
Market share	-0.382	-0.292	3.629*	3.723**	22.661	23.365	40.303**	44.416**
	(0.21)	(0.15)	(1.73)	(1.99)	(1.17)	(1.12)	(2.11)	(2.52)
Overheads to total assets	6.767	7.324	15.260**	14.865**	6.808	10.898	69.057	66.329
	(1.46)	(1.62)	(2.48)	(2.39)	(0.27)	(0.44)	(1.56)	(1.47)
Interest rate spread	3.042**	3.777***	-1.204	-0.686	21.912	26.279*	42.962	48.858*
	(2.26)	(2.68)	(0.36)	(0.21)	(1.63)	(1.88)	(1.62)	(1.82)
Inflation	5.534***	7.472***	1.637***	1.585***	48.183**	69.856***	12.017***	11.421***
	(3.08)	(3.92)	(2.64)	(2.60)	(2.40)	(3.40)	(3.05)	(2.96)
Log bank assets	0.069	0.053	-0.366***	-0.369***	0.323	0.068	-2.464***	-2.708***
	(0.48)	(0.37)	(2.97)	(3.21)	(0.35)	(0.07)	(2.89)	(3.37)
GDP growth	6.404***	6.543***	5.047***	5.091***	76.688***	77.823***	46.431***	47.650***
	(10.77)	(10.21)	(5.26)	(5.27)	(10.34)	(10.06)	(6.06)	(6.28)
Equity to total assets	0.062**	0.059**	0.115***	0.110***	0.087	0.069	-0.048	-0.097
	(2.54)	(2.42)	(5.87)	(6.02)	(0.76)	(0.61)	(0.52)	(0.96)
Cost to income	-0.028***	-0.028***	-0.050***	-0.050***	-0.316***	-0.317***	-0.391***	-0.391***
	(10.52)	(10.48)	(8.61)	(8.57)	(14.27)	(14.35)	(8.65)	(8.55)
Constant	-0.527	0.287	6.281***	6.943***	6.167	17.923	49.837***	60.725***
	(0.20)	(0.11)	(2.68)	(3.47)	(0.36)	(1.07)	(2.97)	(4.14)
Observations	4961	4829	2011	2006	4935	4803	1994	1989
R-squared	0.29	0.29	0.41	0.41	0.29	0.29	0.32	0.32

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 16. Summary variables of interest

		Advanced Economies				Emerging Economies			
		ROAA		ROAE		ROAA		ROAE	
		1	2	3	4	5	6	7	8
2005-2014 All banks	Four firm concentration	0.273**		3.755***		1.111***		8.806***	
	HHI		0.147		4.298		1.914***		10.779***
	Market share	-1.269**	-1.097**	2.436	3.766	-0.854**	-0.685*	-1.587	1.802
2005-2007 All banks	Four firm concentration	0.400**		6.412***		1.342**		3.055	
	HHI		0.659		13.009***		1.780***		10.519**
	Market share	0.602	0.721	11.451***	14.076***	-2.102***	-1.986***	3.184	0.145
2008-2010 All banks	Four firm concentration	-0.878***		-3.368		1.195**		15.862***	
	HHI		-2.347***		-6.726		2.474***		22.030***
	Market share	-0.147	0.170	0.509	2.730	-1.165	-1.194	-17.912*	-13.571*
2011-2014 All banks	Four firm concentration	-0.210		0.548		0.311		0.664	
	HHI		-0.868		-2.387		0.963		-1.741
	Market share	-0.696	-1.639	-6.977	-5.829	-0.913	-1.137*	1.150	2.075
2005-2014 Only active banks	Four firm concentration	0.297**		4.782***		0.778***		6.464***	
	HHI		0.429		7.613**		1.340***		7.839**
	Market share	-0.122	0.070	3.690	5.878	-0.650*	-0.580	-0.321	1.718
2005-2007 Only active banks	Four firm concentration	0.552***		6.903***		0.904*		0.387	
	HHI		1.553***		16.680***		1.206		6.825
	Market share	0.611	0.607	8.278**	10.126***	-1.897***	-1.790**	2.107	-0.647
2008-2010 Only active banks	Four firm concentration	-0.554*		1.931		1.058*		19.752***	
	HHI		-1.363		6.396		2.066***		26.448***
	Market share	0.489	0.806	1.892	3.665	-1.584*	-1.518**	-22.73***	-17.177**
2011-2014 Only active banks	Four firm concentration	-0.468		-3.429		-0.495		-2.826	
	HHI		-1.777*		-16.120*		-0.580		-12.654
	Market share	-0.703	-0.507	-0.885	0.444	0.082	-0.128	4.985	7.657

Robust t statistics in parentheses

* significant at 10%

** significant at 5%

*** significant at 1%

Table 17. Descriptive statistics of dataset in emerging economies.

Emerging economies	Obs.	Mean	St. Dev.	Min	Quantiles			
					.25	Mdn	.75	Max
ROAA	2938	1.39	3.31	-15.98	0.54	1.28	2.23	18.44
ROAE	2937	8.98	16.16	-83.97	4.31	10.68	16.78	47.63
Four Firm	3882	0.69	0.15	0.44	0.59	0.65	0.79	1
HHI	3844	0.17	0.1	0.08	0.12	0.14	0.2	0.7
Market share	2943	0.07	0.09	0	0.01	0.03	0.1	0.49
Overheads to total assets	2934	0.03	0.03	0.01	0.02	0.02	0.04	0.28
Interest rate spread	2273	0.04	0.03	-0.15	0.03	0.04	0.05	0.1
Inflation	3786	0.05	0.06	-0.15	0.01	0.04	0.08	0.2
Log bank assets	2945	15.01	1.67	10.94	13.8	15.08	16.26	18.35
GDP growth	3819	0.04	0.04	-0.08	0.02	0.04	0.07	0.13
Equity to total assets	2944	18.6	17.8	2.86	8.89	12.13	18.78	96.88

Table 18. Descriptive statistics of dataset in advanced economies.

Advanced economies	Obs.	Mean	St. Dev.	Min	Quantiles			
					.25	Mdn	.75	Max
ROAA	6807	0.78	2.18	-9.97	0.15	0.46	0.98	16.25
ROAE	6803	6.05	13.79	-94.28	2.45	6.56	11.78	49.24
Four Firm	9239	0.59	0.16	0.38	0.48	0.57	0.71	0.95
HHI	9027	0.13	0.06	0.06	0.08	0.10	0.17	0.30
Market share	6817	0.02	0.05	0.00	0.00	0.00	0.01	0.33
Overheads to total assets	6798	0.04	0.08	0.00	0.01	0.02	0.03	0.66
Interest rate spread	5416	0.04	0.03	-0.03	0.02	0.03	0.05	0.21
Inflation	9176	0.02	0.01	-0.02	0.01	0.02	0.02	0.04
Log bank assets	6818	16.17	2.20	10.52	14.63	16.19	17.60	21.39
GDP growth	9152	0.01	0.02	-0.06	0.00	0.01	0.03	0.06
Equity to total assets	6817	12.59	15.48	0.61	5.01	7.60	12.58	94.56

Table 19. Average market concentration and number of banks.

Country	Average four-firm concentration	Nr. of banks
Austria	54,60%	49
Bahrain	67,32%	36
Belgium	67,99%	33
Bulgaria	75,15%	17
Cyprus	92,72%	14
Czech Republic	89,29%	14
Denmark	74,18%	34
Egypt	94,48%	7
Estonia	97,23%	9
Finland	85,56%	23
France	51,14%	163
Germany	47,40%	98
Greece	95,10%	9
Hungary	63,22%	20
Ireland	76,75%	25
Iran	89,85%	13
Israel	79,53%	13
Italy	63,17%	83
Jordan	58,61%	14
Kuwait	68,42%	29
Latvia	66,52%	18
Lebanon	60,98%	28
Lithuania	95,51%	7
Luxembourg	68,60%	27
Malta	89,44%	8
Netherlands	79,41%	57
Oman	100,00%	3
Poland	57,04%	23
Portugal	68,88%	27
Qatar	83,00%	13
Romania	82,40%	12
Saudi Arabia	58,29%	13
Slovakia	84,16%	10
Slovenia	78,81%	11
Spain	69,42%	58
Sweden	85,83%	37
Syria	95,14%	5
Turkey	51,78%	48
UAE	58,51%	31
United Kingdom	40,74%	189
Average	*74,15%*	*33*