Bezpieczny Bank
2(59)/2015

Aneta Hryckiewicz-Gontarczyk*
Joanna Wierusz-Wróbel**

THE EFFECT OF RECENT CHANGES IN FOREIGN BANKS' BEHAVIOR ON BANKING SECTOR CONCENTRATION – FIRST EVIDENCE FROM 53 COUNTRIES[1]

1. INTRODUCTION

Over the last two decades many countries, particularly developing ones, have experienced a massive expansion of foreign banks. Their presence has been particularly seen in Latin America, Europe and Central Asia. This phenomenon has mainly been driven by increased liberalization of financial markets and deregulation in the form of the removal of entry barriers and introduction of technological innovations (Crystal et al., 2002). Indeed, in 41 percent of all emerging economies over 50 percent of the banking asset belongs to foreign-owned banks (Claessens et al., 2008). There are undoubtedly many benefits associated with foreign banks' presence in developing countries. These are increased competition in the banking sector of the host countries, better resource allocation, higher quality of domestic banking services and lower overall costs (Levine, 1996; Crystal et al., 2002). However, the experience of the recent financial crisis has

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* Aneta Hryckiewicz-Gontarczyk is an Assistant Professor at a Chair of Accounting at Kozminski University.
** Joanna Wierusz-Wróbel is second-year PhD candidate at Kozminski University.
1 Projekt został sfinansowany ze środków Narodowego Centrum Nauki przyznanych na podstawie decyzji DEC-2013/11/D/HS4/03747.

also shown that countries whose banking sectors rely heavily on the participation of foreign financial institutions can be more affected by the financial crisis. This is due to the banking sector of these countries being highly dependent on the situation in the countries where the parent banks operate (Allen et al., 2014). Moreover, de Haas and van Lelyveld (2010) state that weak parent banks may reduce or even completely discontinue their support during the financial crisis. It may even happen that financially weak parent banks will need support from their subsidiaries – a situation that took place in Russia and the Czech Republic at the end of 2008 when Lehman Brothers announced bankruptcy. In addition, many parent banks have decided to sell their operations in the emerging countries to increase their capital base.

The phenomenon of increased expansion of foreign banks was additionally accompanied by an intense consolidation process that had already started in the second half of the 1990s (Carletti et al., 2002). Bikker and Spierdijk (2009) state that this massive consolidation has been characterized by a major drop in the number of banks, higher concentration levels and the increase of the largest banks' market share. Interestingly, we have recently started to observe a reverse in this trend. We have noticed a large scale withdrawal of foreign banks from countries where those institutions represent a significant part of the banking sector. Poland alone has experienced a withdrawal of such banks as AIG Bank, Fortis Bank, Allianz Bank, West LB and KBC Group. The process of foreign bank withdrawals might thus once again change the concentration levels in the banking industry and as a result give rise to stability concerns.

The aim of this paper is therefore to assess how the changes in international banking over the past decade have changed the concentration of banking sectors worldwide. In particular, we try to assess how foreign banks' withdrawals have been affecting the concentration of the banking sectors. Although there have been a number of studies into the consolidation process on banking sector concentration (Carletti et al., 2002; Yeyati and Micco, 2007; Uhde and Heimeshoff, 2009), little has been written on the impact of the foreign banks' withdrawals on the banking industry concentration levels. In theory, we might expect two opposite effects of foreign banks' withdrawals on banking sector concentration. On the one hand, foreign banks withdrawing might lead to a greater concentration of the banking sector and thus increase all the negative mechanisms in the banks as "too big to fail", "too important to fail" decreasing the market discipline and thus encouraging the power banks to take on greater risk (Beck et al., 2006). This will be the case when the withdrawal occurs through the process of consolidation and a large domestic institution takes over the business of a divested bank. Such a situation has happened for example in Poland when the large domestic PKO BP bank decided to take over the activities of Nordea Bank Poland, increasing its market share from 15 to 18 percent and becoming the bank with the largest market share on the Polish

market. Indeed, Bikker and Haaf (2002) and Bikker and Spierdijk (2009) show that such takeovers increase the power and dominance of single banking institutions. On the other hand, foreign banks' withdrawals might also have a negative effect on concentration when a large dominant bank decides to close its operation and its business is divested among many banking players. In turn, such changes in the banking industry might break up the power of single institutions in the industry and decrease the concentration level. Efthyvoulou and Yildirim (2013), analyzing the changes in power of banks in the CEE countries before and after the mortgage crisis, do not find any significant changes. This might point toward a decreasing effect of foreign banks' withdrawals on banking sector concentration. Moreover, withdrawals might also be enhanced by greater market discipline (Hasan et al., 2013), which will have a positive effect on banking sector stability. Considering the importance of banking sector concentration on banking sector stability, the changes in this environment seem to be of great importance for policy-makers.

We want to fill the gap in the existing research literature and assess how foreign banks' withdrawals have affected the banking sector concentration. Our sample includes 53 countries over the period 1997–2008. We measure the changes in the banking concentration using the Herfindahl-Hirschman index. This measure has been commonly used in the banking literature to measure concentration and is the one most commonly employed by regulators. Moreover, in addition to other studies our analysis takes a deeper outlook than just the asset approach. We also analyze the concentration level on loan and deposit markets, and group the analyzed countries into 7 regions: Africa, Asia, Australia and Oceania, Central and Eastern Europe, Central and South America, North America and Western Europe.

The main findings in terms of banking concentration can be listed as follows. Firstly, the overall picture that emerges from the evolution of the Herfindahl-Hirschman indices suggests that the changing behaviour of banking concentration is rather mixed. In the case of developing regions (Africa, Asia, CEE countries) the sample could be split into two periods: from 1995 to 2000 and from 2000 to 2008. The first period was characterized by higher concentration levels, which can be explained by the fact that the foreign banks' expansion at that time was not yet at an advanced stage. The second period was characterized by lower concentration levels attributed to the emergence of foreign banks. In the case of developed regions (North America and Western Europe) the concentration levels were increasing at a constant rate. Secondly, the majority of the analyzed countries have experienced a higher degree of banking concentration after 2007. This behaviour may be attributable to the changes which happened on the banking market during the financial crisis of 2007. We have noticed a consolidation process in many countries as a result of divestment of banking activities. Our empirical investigation supports the hypothesis that foreign banks' withdrawals, in general, positively affect banking sector concentration, causing it to increase. The greatest magnitude of this effect

is seen with regard to the deposit market. The results might suggest that banks with a greater customer base are more likely to be sold off – results consistent with the findings of Hryckiewicz and Kowalewski (2011). Surprisingly, however, we do not notice a greater effect of the acquisition of divested banks on banking sector concentration, as compared to other forms of withdrawals. This might suggest a tendency for banking operations to be split up among many market players, especially when the foreign bank has been struggling with financial problems.

The remainder of the paper is structured as follows. Section 2 presents an overview of the literature. Section 3 describes the sample data. Section 4 presents the evolution of the Herfindahl-Hirschman index for the regions analyzed. Section 5 describes the model, and Section 6 discusses the empirical results. Finally, Section 7 concludes the discussion.

2. LITERATURE OVERVIEW

The literature review on determinants of concentration levels in various countries can be considered for two periods: the consolidation process, which happened in the 90s and early 2000s, and the period afterwards. During the first period we could notice a trend in worldwide consolidation of banks. Bikker and Spierdijk (2009) state that this massive consolidation was characterized by a major drop in the number of banks, higher concentration levels and increase in the largest banks' market share. This process has occurred within countries and across countries as well as within business lines and across business lines (OECD, 2010). As a result of the consolidation process, countries like Australia, Canada, Belgium, France, Netherlands and Sweden have experienced high levels of banking concentration (Carletti et al., 2002). Consequently, the consolidation trend has also led to an increase in the power of banks in many countries (Bikker and Spierdijk, 2009). Nevertheless some countries have stayed resistant to the consolidation trend, for example United States or Germany.

During this period developing countries experienced a massive expansion of foreign banks. This phenomenon was mainly driven by increased liberalization of financial markets and deregulation in the form of the removal of entry barriers and introduction of technological innovations. Clarke et al. (2003) find that this trend was particularly pronounced in countries like Argentina, Chile, Czech Republic, Hungary and Poland, where more than 50 percent of all banking assets are controlled by foreign banks. Similarly, Crystal et al. (2002) report that the expansion of foreign banks was particularly prevalent in Latin America and Eastern Europe, where foreign ownership accounts now for 50 percent of banking system assets. The increas in foreign banking ownership has mostly been proven to have a positive effect on domestic banking sector. Claessens and van Horen (2012) argue

that concentration has decreased in those countries, yet competition has increased. The authors indicate that foreign banks may enhance competition since they are characterized by greater operational efficiency. Their marginal costs are lower due to the economies of scale, so are their funding expenses as a result of the better access to liquidity provided by their parent banks. Similar results find De Haas and van Lelyveld (2010). The authors claim that foreign owed banks foster competition as they have better lending opportunities on international financial markets. Weill (2011), however, studies the evolution of competition in all European Union countries in the 2000s. The author reports that in general banking competition has improved and developing countries of the EU tend to converge towards the same competition levels that are achieved by developed countries in the European Union. Pawlowska (2012) however argues that the concentration level of the Polish banking sector increased significantly between 2000 and 2006. This was mainly a result of the consolidation process realized by large banks during this period. Overall, though, the concentration level of the Polish banking sector has been assessed as moderate.

Contrary to the trend observed in the 90s and the beginning of the 2000s in many countries, we have recently noticed a reverse process in the financial market structure. Many foreign banks have decided to withdraw from countries where they constituted a significant part of the banking sector. Hryckiewicz and Kowalewski (2011) notice that in times of financial crises the probability that a foreign bank will withdraw its operations from the host country or sell its subsidiaries or branches increases significantly. De Haas and Lelyveld (2003) state, however, that a deteriorating economic situation in the home country may force parent banks to sell their subsidiaries. The authors claim that foreign operations are the first to be scaled down. Poland alone has recently experienced the withdrawal of such banks as AIG Bank, Fortis Bank, Allianz Bank, West LB, KBC Group and Nordea Bank. This phenomenon might have had serious consequences, as it has certainly impacted the levels of concentration and competition of the banking industry.

In the empirical literature, there is no evidence how the foreign banks' withdrawals affect banking sector concentration. In theory, however, we can expect two opposite effects. Firstly a positive one – withdrawal of foreign banks s causes an increase in banking sector concentration as a result of the consolidation process between withdrawing and existing banks in a country. This may lead to greater concentration in the banking sector, increase negative mechanisms in the "too big to fail", "too important to fail" banks, thus encouraging the power of banks to take a greater risk. Indeed, according to a report issued by OECD (2010) the mergers that took place during the recent financial crisis have significantly increased the concentration levels of the banking industry. Consistently, the report argues that between 2005 and 2009 the United States experienced an 8 percent increase in the deposit market share of the top five financial institutions while France saw a rise

of 3 percent. A similar change has also been observable in the loan market. Thus, the process of consolidation associated with the foreign banks' withdrawals has certainly changed the concentration and competition levels in the banking industry and as a result has given rise to stability concerns. On the other hand, foreign bank withdrawals may also lead to a decrease in banking sector concentration. Such a situation might happen when a divesting bank closes its operation due to losses, or an asset of such a bank has been split among many banking players. For example, Pawlowska (2012) finds that concentration in the Polish banking sector decreased during the mortgage crisis. However Efthyvoulou and Yildirim (2013) find that, for the majority of CEE countries, the power of banks did not significantly change during the financial crisis of 2007–2010.

3. DATA DESCRIPTION

3.1. Sample

The data on foreign bank withdrawal was hand-collected using Bureau van Dijk's Bankscope and Zypher databases as well as various public resources such as annual reports and newspapers. Moreover, the same database on foreign banks' withdrawals was used by Hryckiewicz and Kowalewski (2011) in the paper "Why do foreign banks withdraw from other countries" published in International Finance Vol. 4 in 2011. We can therefore consider highly reliable.

In our study, we define withdrawal from a host country as a parent bank closing its subsidiary or selling it to an investor. We consider the term foreign bank subsidiary to mean locally incorporated banks with over 50% foreign ownership. Based on these criteria we identified 140 foreign bank divestments in 53 different countries during the period 1997–2008. In our sample, most of the foreign bank subsidiaries were liquidated by sale to a domestic or foreign investors. The sample includes commercial and savings banks but excludes state banks and agencies of foreign banking operations. The countries considered are: Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, Colombia, Croatia, the Czech Republic, Denmark, El Salvador, France, Germany, Guatemala, Honduras, Hong Kong, Hungary, Indonesia, Ireland, Israel, Italy, Japan, Kenya, Kyrgyzstan, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Panama, Paraguay, Peru, the Philippines, Poland, Portugal, Romania, Singapore, Slovakia, Spain, Suriname, Switzerland, Thailand, Turkey, Ukraine, the United Kingdom, Uruguay, the USA, Uzbekistan and Venezuela. In order to obtain a better outlook of how the banking sector concentration has been changing, we grouped all the analyzed countries into 7 regions: Africa, Asia, Australia and Oceania, Central and Eastern Europe, Central and South America,

North America and Western Europe. Table 1 presents the number of foreign banks' divestment by host country over the period 1997–2008.

Table 1. Number of banks in the sample used for the Herfindahl-Hirschman Index

Number of banks in the sample used							
	Africa	**Asia**	**Australia and Oceania**	**Central and Eastern Europe**	**Central and South America**	**North America**	**West Europe**
1995		13	6	21	57	18	43
1996		15	7	34	56	19	101
1997		20	7	44	56	18	103
1998		20	7	49	66	20	114
1999		31	7	55	72	24	119
2000	4	34	8	59	95	29	138
2001	4	29	8	54	102	31	155
2002	3	31	7	67	104	30	169
2003	4	29	6	64	95	27	178
2004	9	28	9	75	86	26	182
2005	9	29	9	79	85	25	196
2006	10	26	10	77	84	25	192
2007	8	26	10	72	80	25	182
2008		6	6	25	51	24	65
Total	**51**	**337**	**107**	**775**	**1089**	**341**	**1937**

Note: Regions are defined as following: Africa includes Kenya; the Asian region includes Hong Kong, Indonesia, Israel, Japan, Kyrgyzstan, Philippines, Thailand, Singapore, Turkey, Uzbekistan; Australia and Oceania includes Australia and New Zealand; the Central and Eastern European region includes Austria, Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Poland, Romania, Slovakia and Ukraine; Central and South America includes Argentina, Bolivia, Brazil. Chile, Colombia, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela; North America includes Canada and the USA, and finally the Western European region includes Belgium, Denmark, France, Germany, Ireland, Italy, Luxemburg, the Netherlands, Norway, Portugal, Spain, Switzerland and the United Kingdom.

Source: BankScope.

To investigate the effect of foreign banks' withdrawals on the banking sector's concentration we additionally collected financial data for all their peers. However

banks which lacked variables needed to calculate the concentration ratio and its determinants were eliminated. Our panel is therefore unbalanced, includingatotal of 4,239 observations. Data on a country's variables were collected from the OECD and World Bank. Table 2 shows our sample properties.

Table 2. Number of foreign bank divestments by host country and year

Countries	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Argentina		1				4	1	1	1	1	1		10
Australia		1										1	2
Austria		1	1		1								3
Belgium			1					1	1				3
Bolivia										1			1
Brazil			2			1	4			1			8
Bulgaria				1									1
Canada								1	1				2
Chile							1			1			2
Colombia							1		1				2
Croatia							1			1			2
Czech Republic						1	1	1		1		1	5
Denmark								1	1				2
El Salvador												1	1
France						1	2	1		1	1		6
Germany		1	1				1					1	4
Guatemala							1			1			2
Honduras							1				1		2
Hong Kong							1	2					3
Hungary		1		1	1		1			1			5
Indonesia				1	3	1	2						7
Ireland									1				1
Israel								1					1
Italy												3	3
Japan						1						1	2
Kenya					1								1

Countries	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
Kyrgyzstan				1									1
Latvia				1									1
Luxemburg					2	1		1		1			5
Mexico							1						1
Netherlands							1						1
New Zealand							1						1
Norway												1	1
Panama				1	2		1		1	1			6
Paraguay								1		1	1	1	4
Peru										1			1
Philippines				1									1
Poland						2	1						3
Portugal					1			1					2
Romania				2	1								3
Singapore												1	1
Slovakia											1		1
Spain	1	2	1				1						5
Suriname				1									1
Switzerland				1	2		1	1			1		6
Thailand								1					1
Turkey			1					1		1			3
Ukraine													0
United Kingdom									1	1			2
Uruguay									1				1
USA					2	1	1						4
Uzbekistan										1			1
Venezuela						1				1			2
Total	**1**	**7**	**7**	**11**	**16**	**14**	**26**	**15**	**9**	**17**	**6**	**11**	**140**

4. CONCENTRATION OF THE BANKING SECTORS – EVOLUTION OF THE HH INDEX

4.1. HH Index as concentration measure

We use the Herfindahl-Hirschman Index (HHI) to measure banking sector concentration, as this is the most frequently used measure of market structure, especially in the banking sector (for example Fernández de Guevara et al., 2005). It is defined as the sum of the squared market shares:

$$H = \sum_{i=1}^{N} s_{it}^2 \tag{1}$$

where:
s_{it} – stands for the market share of a bank i and time t
N – indicates the number of banks on the market

A market share is the ratio of a bank's total assets to the total assets in a banking industry. A Herfindahl-Hirschman index below 1 percent represents highly competitive market, while a Herfindahl-Hirschman between 1 percent and 15 percent indicates an unconcentrated market. A Herfindahl-Hirschman between 15 percent and 25 percent indicates moderate concentration while a Herfindahl-Hirschman index above 25 percent means a highly concentrated market.

4.2. Evolution of the Herfindahl-Hirshman Index

We start by exploring the evolution of banking sector concentration over the period 1995–2008 for each country and each year as well as grand averages for 7 regions and years. However the interpretation of the data for the year of 2008 should be explored carefully due to the lack of many financial data for our sample banks at the time of data collection, which undoubtedly boosted the index for some countries. Nevertheless we decided to include this year for the purpose of our analysis to see the changes in the trend in the concentration ratio in individual countries. The regions considered are Africa, Asia, Australia and Oceania, Central and Eastern Europe, Central and South America, North America and Western Europe. Table 3 presents the estimated banking concentration (measured by the Herfindahl- Hirschman index in terms of total assets) for each region and year, as well as the resulting averages for all regions and all years. Figures 1–7 show the evolution of banking concentration in terms of total assets, total loans and total deposits for each region.

Table 3. Descriptive statistics for Herfindahl-Hirschman Index

	Sample period (1997–2008)				
Variable	**Obs.**	**Mean**	**StDv**	**Min**	**Max**
HHI for asset	4239	0.365	0.25	0.04	0.98
HHI for loans	4220	0.385	0.255	0.05	0.98
HHI for deposits	4222	0.391	0.266	0.05	0.98
Net new entry	4251	0.04	0.17	–0.45	0.50
Inflation rate	4251	2.73	2.19	–3.69	9.27
Entry restrictions	4250	66.99	17.42	20.00	90.00
Property rights	4250	70.08	21.77	25.00	90.00
GDP per capita (log)	4251	9.47	1.24	5.77	11.63
Deposit growth	4246	16.69	23.73	–52.34	87.82

The overall picture that emerges from the evolution of the Herfindahl-Hirschman indices suggests that the changing behaviour of banking concentration is rather mixed. In the case of developing regions (Africa, Asia, CEE countries) the sample could be split into two periods: from 1995 to 2000 and from 2000 to 2008. The first period was characterized by higher concentration levels which can be explained by the fact that the foreign banks' expansion at that time was not yet at an advanced stage. The second period was characterized by lower concentration levels after 2000 when we could notice a significant emergence of foreign banks. Moreover, the process of bank consolidation intensified during this period. In the case of developed regions (North America and Western Europe), the concentration levels increased at a constant rate. Nevertheless, almost all regions experienced higher concentration levels in 2008, which may be attributable to the experience of the recent financial crisis during which many parent banks decided to withdraw from host countries. Below we present a brief description of the changing behaviour of banking concentration by region.

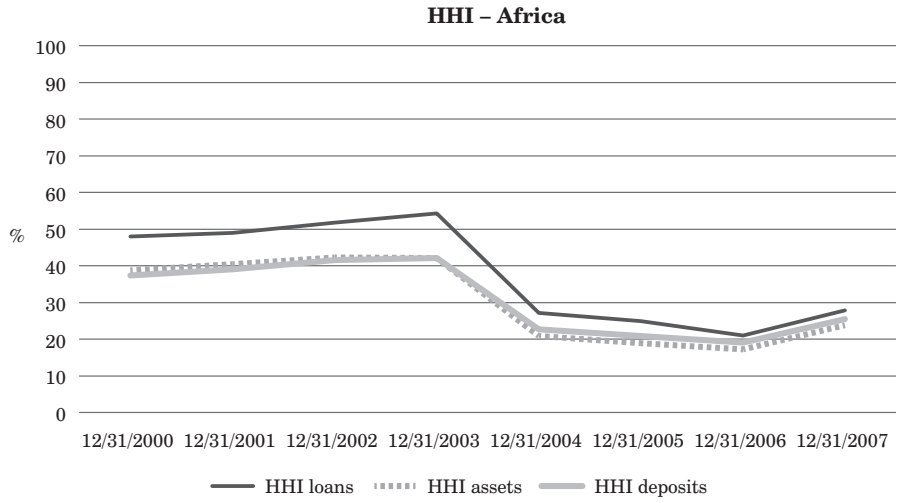
Africa

The Herfindahl-Hirschman indices for this region range from 17.2 percent to 42.3 percent.[2] There is greater concentration in bank loans than in bank deposits or total assets. The banking concentration pattern can be split into two periods – the first covers the years from 2000 to 2003 with HHI equal on average to 40 percent, and the second one covers the years from 2004 to 2007 with HHI equal on average to 20 percent. The reason for this is that until 2000 few foreign banks

[2] Please note that banks' financial data are available for this region yet since 2000.

were operating in African countries. This is particularly true of countries like Algeria and Kenya. Only since the 2000s has there been a noticeable emergence of foreign banks like Societe Generale, Citibank, Barclays Bank or ABN Amro Bank.

Figure 1. Banking concentration by region



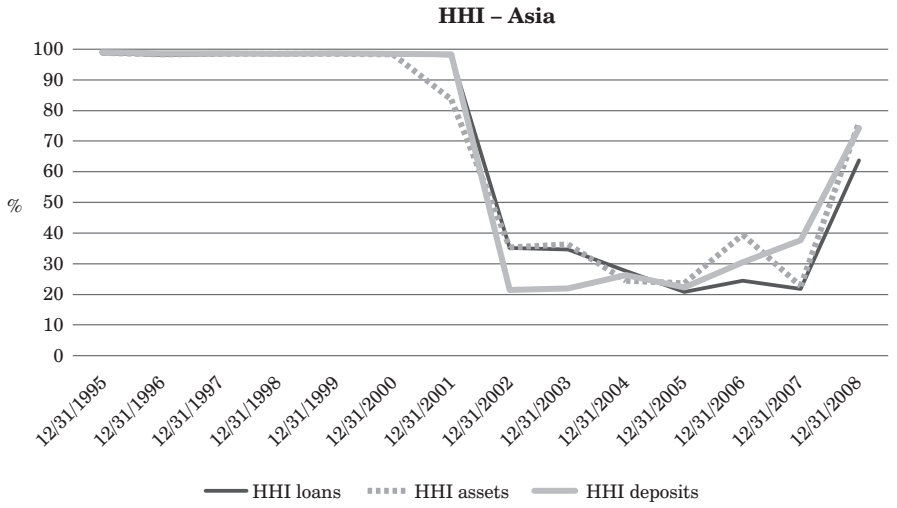
Source: BankScope and own elaboration.

Asia

For banks operating in Asia, the BankScope provides data for the whole period analyzed, that is for the years 1995 to 2008. The Herfindahl-Hirschman indices for that region range from 22.6 percent to 99.8 percent and the changing trend for bank deposits, loans and total assets is rather mixed, with some countries being more concentrated than others. The most concentrated countries in this region are Israel, Kyrgyzstan, the Philippines, Singapore, Thailand, Turkey and Uzbekistan. Countries in this region which have a lower banking concentration are Hong Kong and Indonesia which average 40 percent and 49 percent, respectively. As in Africa, the banking concentration pattern for Asia can be split into two periods - the first covers the years from 1995 to 2001 with HHI equal on average to 98 percent, and the second one covers the years from 2001 to 2008 with HHI equal on average to 30 percent. It should also be emphasised that in 2008 there was a notable increase in banking concentration ranging from 63.7 percent for bank loans to 76 percent for bank assets. All countries from this region, excluding Indonesia, experienced an abrupt increase in banking concentration. This situation can be explained by the events of the recent financial crisis where many banks have merged, been taken over or decided to sell their subsidiaries. Indonesia is the country which

experienced the highest number of withdrawals, particularly between 2000 and 2003. However, when it comes to the changing behaviour of banking concentration during the first two periods, we assume that it could have been influenced by the events of East Asian Economic crisis of 1997. Countries that have been affected by the Asian crisis were characterized by a high degree of banking concentration. This particularly refers to the Philippines, Thailand and Singapore. Following the Asian crisis, the banking sector of some Asian countries has become more fragmented.

Figure 2. Banking concentration by region

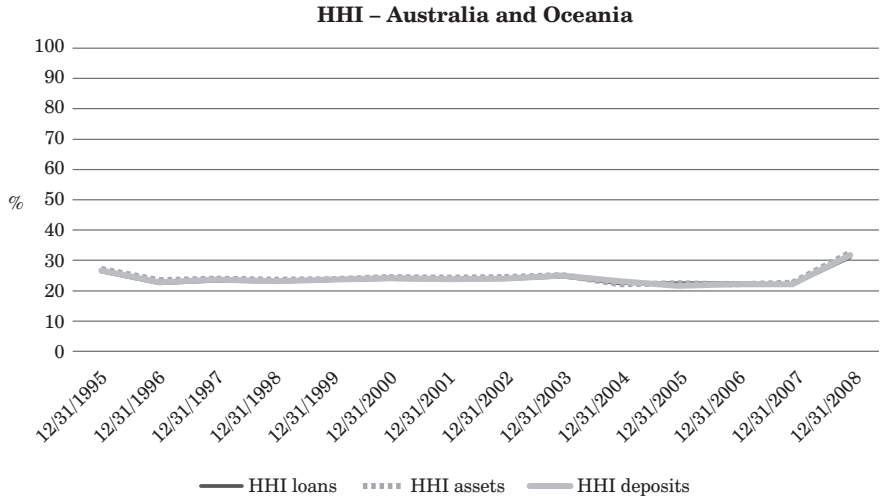


Source: BankScope and own elaboration.

Australia and Oceania

The Herfindahl-Hirschman indices range from 22.1 percent to 32.6 percent and show a consistent trend averaging 24.5 percent over the whole analyzed period. In 2008 alone the banking concentration in that region experienced a more significant increase of 10 percent. This was particularly influenced by the changing behaviour of banking concentration in Australia, as New Zealand displays a rather stable trend. Similar findings are outlined in the report issued by Deloitte (2014) on competition in retail banking where it is stated that following the global financial crisis of 2008, Australia has experienced an increase in banking concentration. This situation has been influenced by bank acquisition processes and withdrawals from the market. As regards the concentration for bank loans, deposits and total assets, the trend is similar over the period analyzed.

Figure 3. Banking concentration by region



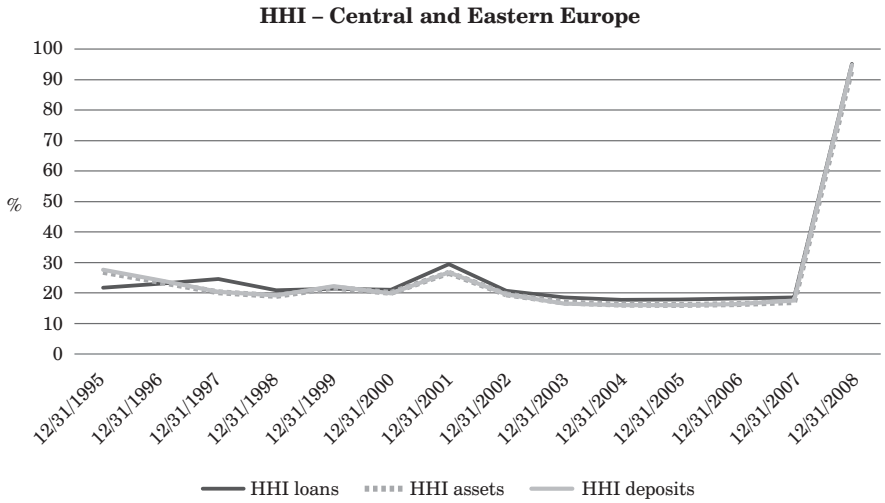
Source: BankScope and own elaboration.

Central and Eastern Europe

The Herfindahl-Hirschman indices for the CEE region range from 16.1 percent to 93.8 percent and the changing trend for bank deposits, loans and total assets is rather mixed. The most concentrated banking sectors are in Hungary (averaging 70 percent for the whole period), Austria (averaging 65 percent for the whole period) and countries like Latvia, Romania or Slovakia with HHI averaging at approximately 50 percent for the whole analyzed period. Countries with relatively low degrees of concentration are Poland (averaging 35 percent for the whole period analyzed), the Czech Republic (averaging 26 percent for the whole period analyzed) and Croatia (averaging 33 percent for the whole period analyzed). The banking concentration pattern for the CEE region displays a consistent trend with the exceptions of 2001 and 2008, when the majority of CEE countries experienced an increase in the concentration levels of the banking industry. However, as has already been noted this major increase in the banking concentration in 2008 can be skewed due to some missing financial data from banks for this period. Nevertheless, as in the case of the Asia and Australia and Oceania regions, the CEE countries have also experienced an increase in banking concentration as a result of the recent financial crisis, whereas the higher reported concentration in 2001 can be attributed to the bank consolidation process that has intensified in developing countries since the 2000s or even since the second half of the 1990s (Carletti et al., 2002). Countries that have experienced rather a diverging trend as regards the

concentration for bank total assets, loans and deposits are Austria, Hungary and Romania. In the case of the rest of the CEE countries, the concentration for bank total assets, loans and deposits shows rather a consistent trend.

Figure 4. Banking concentration by region



Source: BankScope and own elaboration.

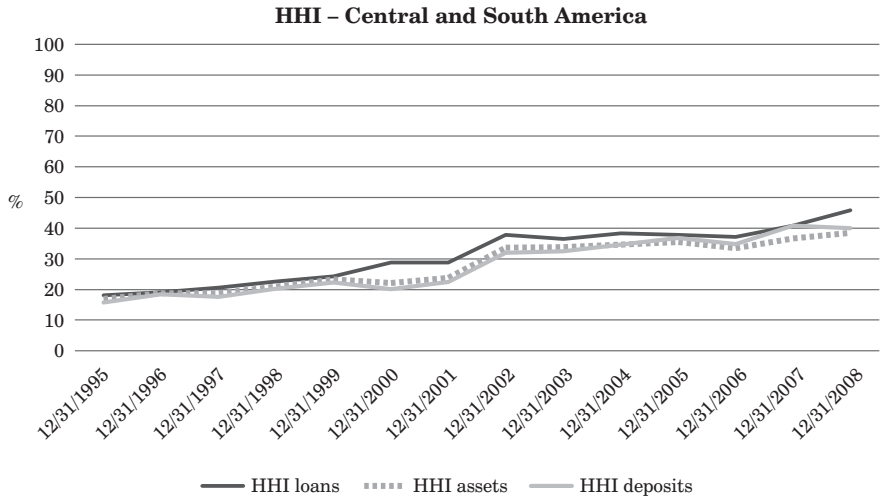
Central and South America

The Herfindahl-Hirschman indices for the Central and South America region range from 16.9 percent to 38.4 percent, and the banking concentration averages 27.9 percent over the whole sample period[3]. As regards the concentration for bank loans, deposits and total assets, this follows a similar trend over the analyzed period with the exceptions of Guatemala and Mexico. In the case of these two countries the trend is mixed. From 1995 to 2000 the concentration for bank loans in Guatemala exceeded the concentration for bank deposits and total loans. Also, the banking concentration in Mexico does not display a consistent trend since concentration for bank total assets exceeds concentration for bank loans and deposits until 1997 and then the trend was reversed, with concentration for bank loans and deposits exceeding the concentration for bank total assets. The most concentrated banking sectors are in Peru (averaging 86 percent over the whole period), Honduras (averaging 81.5 percent over the whole period), Bolivia (averaging 77.5 percent over the whole period), Venezuela (averaging 65.6 percent

[3] There are some missing observations for banks in Uruguay for years 1995–1998, and for banks in Suriname for years 2002–2008.

over the whole period), Mexico (averaging 56.1 percent over the whole period) and El Salvador (averaging 50.8 percent over the whole period). Brazil is the country characterized by the lowest degree of banking concentration in that region. Overall, the banking concentration for the Central and South America region displays an increasing trend. Notably, after 1999 the majority of countries from that region experienced an increasing concentration in the banking sector. Chortareas et al (2011) state that deregulation and liberalization that started in the early 1990s encouraged merger and takeover activities. Thus, higher concentration levels can be attributed to both the banks' consolidation process and to foreign banks' withdrawals. Central and South America is the region with the highest number of foreign banks' withdrawals. Like in other regions the banking concentration has increased since 2007, however not as significantly as in the case of the Asia or CEE regions.

Figure 5. Banking concentration by region



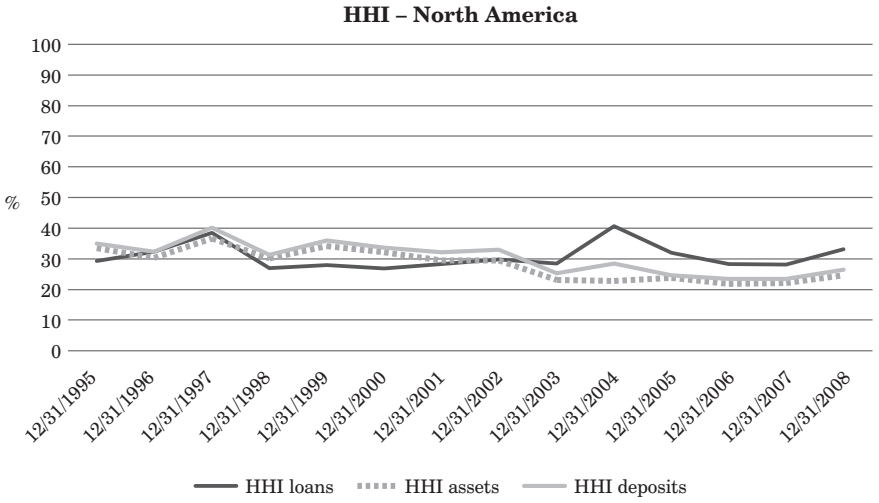
Source: BankScope and own elaboration.

North America

The Herfindahl-Hirschman indices for the North America region range from 21.8 percent to 36.6 percent, and the banking concentration averages 28.1 percent over the whole sample period. The changing trend for bank deposits, loans and total assets concentration is rather mixed. As regards Canada, the concentration for bank loans exceeds the concentration for total assets and deposits over the whole period, while with regard to the United States the concentration for bank loans is lower than the concentration for bank total assets and deposits, although the trend

has reversed since 2003. Also, Canada has a notably more concentrated banking sector than the banking sector of the United States. The banking concentration for the North America region displays a mixed trend. However in the case of Canada, the banking concentration displays an increasing trend whereas in the case of the United States the banking concentration is relatively low and stable. We have not observed significant changes in the concentration ratio in that region following the financial crisis of 2007.

Figure 6. Banking concentration by region



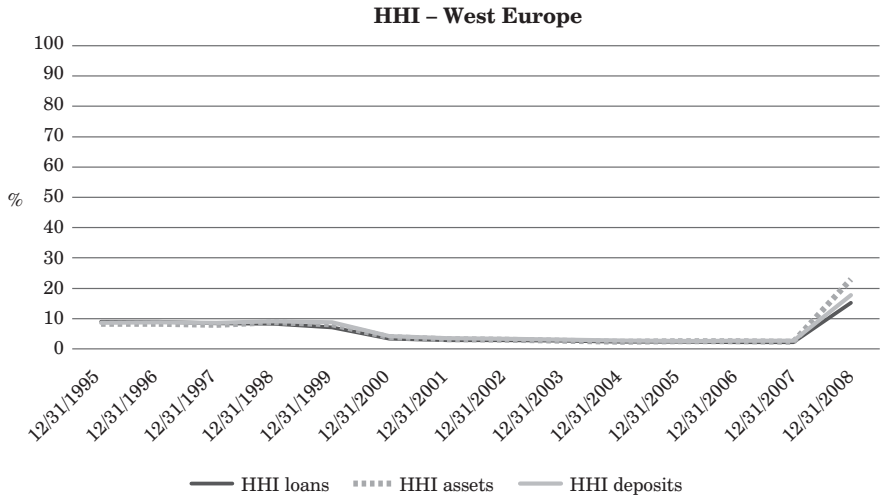
Source: BankScope and own elaboration.

Western Europe

The Herfindahl-Hirschman indices for the Western Europe region range from 2.3 percent to 22.9 percent, and the banking concentration averages 6.1 percent over the whole sample period. As regards the concentration for bank loans, deposits and total assets, it follows a similar trend over the analyzed period. The most concentrated banking sectors are in Portugal, Switzerland and the Netherlands with banking concentration averaging 74.7 percent, 69.4 percent and 61.4 percent respectively. Spain and Luxembourg are the countries characterized by the lowest degree of banking concentration in this region with HHI averaging 13.6 percent and 14.8 percent respectively. The banking concentration for the Western Europe region displays a consistent trend. However, in 2008 the majority of Western European countries experienced an increase in the concentration of the banking sectors. For the region as a whole, this figure increased by nearly 20 percent.

However, as has been already noted this significant increase in the banking concentration in 2008 may have been overstated by a lack of financial data for our sample banks in this region.

Figure 7. Banking concentration by region



Source: BankScope and own elaboration.

5. THE RELATIONSHIP BETWEEN FOREIGN BANKS' WITHDRAWALS AND CONCENTRATION – EMPIRICAL MODEL

In order to test how changes in the banking structure have influenced the concentration in the banking sector, we regress three concentration measures defined as the Herfindahl-Hirschman index for bank total assets, total deposits and total loans. However in case of the Herfindahl-Hirschman index for total deposits and total loans we use total assets as a proxy for total banking output. The final regression estimated to analyze the determinants of the Herfindahl Hirschman Index takes the following form:

$$\begin{aligned} \mathrm{HHI}_{\mathrm{TASSETS}} = \beta_0 + \beta_{1WITHDRAWAL\_DUMMY} + \beta_{2NET\_NEW\_ENTRY} + \\ + \beta_{3INST\_RESTRICTION} + \beta_{4INST\_PROPRIGHTS} + \beta_{5INFLATION\_RATE} + \beta_{6LN\_GDP} + \varepsilon \end{aligned} \quad (2)$$

$$\begin{aligned} \mathrm{HHI}_{\mathrm{TLOANS}} = \beta_0 + \beta_{1WITHDRAWALDUMMY} + \beta_{2NETNEWENTRY} + \\ + \beta_{3INSTRESTRICTION} + \beta_{4INSTPROPRIGHTS} + \beta_{5INFLATIONRATE} + \beta_{6LNGDP} + \varepsilon \end{aligned} \quad (3)$$

$$\begin{aligned} \mathrm{HHI}_{\mathrm{TDEPOSITS}} = \beta_0 + \beta_{1WITHDRAWALDUMMY} + \beta_{2NETNEWENTRY} + \\ + \beta_{3INSTRESTRICTION} + \beta_{4INSTPROPRIGHTS} + \beta_{5INFLATIONRATE} + \beta_{6LNGDP} + \varepsilon \end{aligned} \quad (4)$$

We use Withdrawal dummy where 1 indicates that a bank withdrew its operations from a given country and 0 indicates that there was no withdrawal by the bank. We expect that bank withdrawals contribute to a greater concentration of the banking system.

Net new entry, which is measured by the percentage change in the number of organizations in the market. This variable was applied in the study conducted by Rhoades (2000) into the bank mergers and banking structure in the United States in 1980 and 1998. This was the most significant variable among other explanatory variables of the market structure in the United States. Rhoades (2000) states that the result obtained indicates that with a decrease in the percentage change of the number of organizations on the market, the Herfindahl-Hirschman Index tends to increase less compared to markets with smaller decreases

Institutional variables are represented by two components of the Economic Freedom Index: financial freedom and property rights. We expect that a higher value of the institutional variables can decrease the Herfindahl-Hirschman Index as greater financial freedom and hence lower barriers imposed on foreign banks entry may increase the number of participants in the banking market and hence decrease its concentration. According to Gonzales (2009), if the number of market participants influences the market competitiveness (Claessens and Laeven, 2004), it is probable that restrictions on banking may lead to a situation where less efficient firms will be taken over by more efficient firms. Stricter restrictions on foreign banks entry may thus contribute indirectly to diminished market concentration and the more efficient banks' market share.

We also include Macroeconomic variables proxied by the inflation rate and the natural logarithm of GDP. Demirgüc-Kunt et al. (2004) indicate that a higher level of inflation increases banks' margins and profitability whereas the natural logarithm of GDP has been applied in order to control for the effect of a country's size. Efthyvoulou and Yildirim (2013) argue that the effects of inflation on banks' profitability are ambiguous. Angelini and Cetorelli (2003) state that in an inflationary environment banks are characterized by a higher degree of risk premiums. Demirgüç-Kunt and Huizinga (2000) indicate that in an inflationary environment bank expenses may be higher as a result of a greater number of transactions as well as an expansion of branches.

In the robustness analysis we also include the *Deposits growth*, which is measured as the ratio of a bank's deposits to total market deposits. According to Smirlock (1985), rapid growth of deposits provides better profit opportunities for banks that are operating on the market. For this reason we expect that greater increases in the deposits growth reflect increasing market power of financial institutions, which may translate into higher concentration levels.

Table 4 presents the descriptive statistics for our data and Table 5 presents the correlation matrix.

Table 4. Evolution of banking concentration by region. The Herfindahl-Hirschman Index (%)

Year(s)	Africa	Asia	Australia and Oceania	Central and Eastern Europe	Central and South America	North America	Western Europe
1997		98.50	24.10	20.20	18.70	36.60	7.90
1998		98.50	23.70	19.10	20.90	30.10	8.70
1999		98.50	23.90	21.80	23.30	34.10	8.10
2000	38.70	98.40	24.50	20.10	22.10	32.20	3.80
2001	40.40	83.60	24.30	26.60	23.80	29.50	3.20
2002	42.30	35.40	24.50	19.60	33.60	29.40	3.10
2003	42.00	36.30	25.10	16.80	33.90	23.00	2.70
2004	20.90	24.40	22.10	16.10	34.70	22.80	2.30
2005	18.80	23.60	22.40	16.10	35.50	23.80	2.50
2006	17.20	39.50	22.10	16.40	33.40	21.80	2.40
2007	23.80	22.70	22.70	17.10	36.60	22.10	2.40
2008		76.00	32.60	93.80	38.40	24.70	22.90
1995–2008	**30.50**	**66.60**	**24.50**	**25.30**	**27.90**	**28.10**	**6.20**

Source: BankScope and own elaboration.

As we can see from Table 4, our data does exhibit great variation. This, however, is not surprising given the large sample of both developing and developed countries in our analysis. In particular, the HH indices indicate that countries differ in their concentration ratios, which was also widely discussed in the previous section. The correlation matrix shows that our data does not exhibit any multicollinearity problems. We only notice a high and positive correlation between property rights variable and GDP per capita, which might indicate that more institutionallydeveloped countries are also more economically developed.

Table 5. The data presents the correlation matrix for the major variables used in our analysis

	HHI for asset	HHI for loans	HHI for deposits	withdraw-dummy	Infl. rate	entry rest.	proper. rights	gdpper-capita	net new entry
HHI for asset	1								
HHI for loans	0.875*	1							
HHI for deposits	0.931*	0.922*	1						
withdrawal dummy	0.026	0.018	0.020	1					
inflation rate	0.046*	0.025	0.033*	0.002	1				
entry restrictions	–0.019	–0.070*	–0.015	–0.027	–0.112*	1			
property rights	0.044*	0.078*	0.111*	–0.077*	–0.141*	0.542*	1		
gdppercapita	–0.072*	–0.038*	0.002	–0.079*	–0.187*	0.538*	0.795*	1	
net new entry	0.004	0.035*	0.007	–0.027	0.023	–0.013	–0.024	–0.101*	1
change in deposits	0.107*	0.101*	0.096*	0.019	0.002	–0.067*	–0.047*	–0.087*	0.075*

* indicates significance level of at least 5%

6. THE EFFECT OF FOREIGN BANKS' WITHDRAWALS ON BANKING SECTOR CONCENTRATION – EMPIRICAL RESULTS

Analyzing the evolution of the concentration across various countries, it is difficult to state unambiguously how the foreign banks' withdrawals have affected the concentration of the domestic banking markets. In some countries we have observed an increasing trend in concentration ratios as in Western Europe, in others we do not notice such an unambiguous correlation. This is in line with the theoretical literature that suggests that foreign banks' withdrawals might impact the concentration ratio in either direction depending on the nature of the transaction.

To empirically test the effect of foreign banks' withdrawals on banking sector concentration for bank asset, loans, and for deposits, we calculate the models presented in the Section 5. Table 6 presents the results on the effect of foreign banks' withdrawals on banking sector concentration over the entire sample period.

Table 6. The effect of foreign banks' withdrawals on banking sector concentration
The empirical results present the OLS estimation on the full sample.
The robust standard errors have been clustered on the country-level

	HHI for total asset		**HHI for total loans**		**HHI for total deposits**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Withdrawal dummy	0.038**	2.020	0.034*	1.750	0.041**	2.020
Inflation rate	0.000	1.300	0.000	0.360	0.000	1.250
Entry restrictions	0.000	–0.140	–0.002	–0.850	–0.001	–0.530
Property rights	0.004**	2.270	0.005**	2.410	0.005**	2.330
GDP per capita (log)	–0.070**	–1.980	–0.059	–1.580	–0.055	–1.460
Net new entry	–0.019	–0.640	0.015	0.490	–0.009	–0.270
Constant	0.753**	2.600	0.732**	2.580	0.662**	2.150
R2	**0.13**		**0.19**		**0.21**	
Number of observations	**4664**		**4660**		**4662**	

*** indicate significance level at 1%; ** indicate significance level at 5%; * indicates significance level at 10%.

The results indicate that foreign banks' withdrawal leads to a greater banking sector concentration. The withdrawal dummy is positively and statistically significantly correlated with all HH indices. This result is consistent with the OECD report (2010) arguing that foreign banks' withdrawals have affected the concentration of the banking sector and the intensity of competition after the mortgage crisis. Importantly, we notice that the highest correlation between foreign banks' withdrawal and the HHI for total asset, which has a significance level of 5%. With the latter two (HHI for total loans and deposits) we find such a correlation with a 10 percent significance level. This result might point towards an increase in the size of the existing banks. Interestingly, we also notice that the highest magnitude is for the concentration measure for total deposits. The results might support the findings of Hryckiewicz and Kowalewski (2011) that parent banks decide to sell their most profitable subsidiaries with a wide customer base to get the highest price. This might indicate a greater concentration on the deposit market. Weaker banks might be liquidated or split up among many investors.

Analyzing the effect of other explanatory variables, we find that the institutional variable proxying for property rights is statistically significant at a 5 percent significance level and its coefficient exhibits a positive sign. The result obtained is, however, contrary to our expectations since the coefficient of this independent variable is positive which means that a greater degree of property right protection in a given country increases concentration for bank total assets. We would have rather expected that greater protection of property rights would lead to lower banking concentration since, there would be greater entry of foreign banks and hence the overall number of financial institutions in a given country would increase. However, this result may also mean that greater protection of property rights increases the market power of the banks operating in a given country and this translates into higher levels of banking concentration. Among macroeconomic variables, GDP per capita becomes statistically significant, although showing a negative sign. The result seems to suggest that less developed countries are characterized by greater concentration for both bank total loans and deposit market. The result is consistent with many existing studies.

As already argued, our sample has suffered from limited bank coverage provided by our data provider. This is especially true for African countries. Moreover, 2008 was also not fully covered at the time of our data collection, therefore we estimate the model excluding both the African region and the year 2008 to see how these shortcomings in our database could impact our results. Table 7 presents these results.

As can be seen, the results remain the same as in the previous table. We notice that the withdrawal dummy has a positive and statistically significant impact on the concentration ratio of the countries analyzed. Consequently, the result suggests that foreign bank's withdrawal increases the concentration of the banking sectors.

As a result, the withdrawals might lead to greater power of the remaining banks. The reason for such an effect might come from the fact that most of the withdrawals occur through acquisition of the divested bank by domestic competitors, at the same time increasing the concentration ratio.

Table 7. The effect of foreign banks' withdrawals on banking sector concentration
The empirical results present the OLS estimation excluding Africa and the year of 2008. The robust standard errors have been clustered at the country level

	HHI for total asset		**HHI for total loans**		**HHI for total deposits**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Withdrawal dummy	0.035**	1.990	0.031*	1.660	0.037*	1.940
Inflation rate	0.000	1.380	0.000	0.420	0.000	1.330
Entry restrictions	0.000	–0.170	–0.002	–0.840	–0.001	–0.520
Property rights	0.004**	2.250	0.004**	2.370	0.004**	2.320
GDP per capita (log)	–0.064**	–2.000	–0.054	–1.580	–0.052	–1.490
Net new entry	–0.039	–1.510	–0.013	–0.480	–0.032	–1.090
Constant	0.734***	2.680	0.717***	2.670	0.651***	2.240
R2	**0.11**		**0.21**		**0.22**	
Number of observations	**4224**		**4220**		**4222**	

*** indicates significance level of 1%; ** indicates significance level 5%; * indicates significance level of 10%.

In order to verify the hypothesis that withdrawals through acquisition do indeed create higher concentration of the domestic banking sectors, we run the regressions including the acquisition dummy variable. The *acquisition* variable takes a value of 1 if withdrawal occurs through acquisition of the divested bank, and zero for all other forms of withdrawals. A positive and statistically significant coefficient of this variable would indicate that withdrawal through acquisition of the divested bank by an existing bank on a market generates a greater effect on the concentration ratios than any other form of withdrawals. Table 8 presents the results.

Table 8. The effect of the form of foreign banks' withdrawals on banking sector concentration

The empirical results present the OLS estimation excluding Africa and the year of 2008. Additionally, we include the acquisition dummy that equals one if withdrawal occurs through a takeover of a divested bank by a domestic bank or government, otherwise it takes zero. The robust standard errors have been clustered at the country level

	HHI for total asset		**HHI for total loans**		**HHI for total deposits**	
	Coefficient	**t**	**Coefficient**	**t**	**Coefficient**	**t**
Withdrawal dummy	0.042**	2.590	0.040**	2.130	0.045**	2.540
Acquisition dummy	0.036	1.200	0.057*	1.850	0.052	1.600
Inflation rate	0.000*	1.660	0.000	0.650	0.000	1.620
Entry restrictions	0.000	–0.080	–0.002	–0.770	–0.001	–0.430
Property rights	0.004**	2.280	0.004	2.410**	0.004**	2.360
GDP per capita (log)	–0.063*	–1.970	–0.054	–1.550	–0.051	–1.460
Net new entry	–0.037	–1.420	–0.011	–0.390	–0.030	–1.010
Constant	0.708**	2.590	0.694	2.580**	0.625**	2.140
R2	**0.154**		**0.145**		**0.161**	
Number of observations	**4224**		**4220**		**4222**	

*** indicates significance level of 1%; ** indicates significance level of 5%; * indicates significance level of 10%.

The estimation results indicate that withdrawal of foreign banks increases the concentration of the domestic banking sectors. All withdrawal dummies are statistically significantly correlated with the HH indices and exhibit positive signs. Again, the we notice highest effect with respect to HHI for deposits. Surprisingly, our results also document that acquisition dummy itself is not statistically significant, which would suggest that withdrawals through acquisitions do not exhibit higher effects on concentration than any other forms. This result seems to be inconsistent with some studies that suggest that the consolidation of the banking industry which happened as a result of themortgage crisis has increased the concentration of the banking sectors (OECD, 2010), especially in developed countries. However, this is consistent with studies on less advanced countries, such as CEE countries, which claim that despite many withdrawals of foreign banks from these countries, the concentration of the banking sectors has not changed

significantly. In the case of loans, we report a statistically significant effect of this variable on our concentration measure, yet at a 10 percent significance level. The result might suggest that banks with better portfolio quality are more likely to be sold off to the investors entirely, causing higher concentration on the loan market. Weaker banks might be either split among many investors or acquired by governments to limit potential contagion effects coming from their liquidation (the example of the Latin American countries), thus without any significant change on the concentration ratio as compared to other forms of withdrawal.

6.1. Robustness Check

Finally, to check the robustness of our results, we add into our regressions a variable proxying market opportunities in the domestic market. According to Smirlock (1985) the rapid growth of deposits provides better profit opportunities for banks operating on the market. For this reason we expect greater increases in the deposit growth to reflect an increasing market power of financial institutions, which may translate into higher concentration levels. Consistently, we include into our regressions the variable Deposit growth. Table 9 presents the result of the estimations.

Table 9. Robustness check: the effect of foreign banks' withdrawals on banking sector concentration after controlling for deposit change as market opportunities control

The empirical results present the OLS estimation excluding Africa and the year 2008. To verify the robustness of our analysis we additionally include changes in the deposits. The robust standard errors have been clustered at the country level

	HHI for total asset		**HHI for total loans**		**HHI for total deposits**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Withdrawal dummy	0.036*	1.720	0.032*	1.500	0.039	1.740
Inflation rate	0.000	1.400	0.000	0.430	0.000	1.350
Entry restrictions	0.000	–0.110	–0.002	–0.820	–0.001	–0.500
Property rights	0.004**	2.210	0.004**	2.360	0.004**	2.270
GDP per capita (log)	–0.067*	–1.870	–0.057	–1.490	–0.053	–1.370
Net new entry	–0.024	–0.810	0.010	0.330	–0.015	–0.430

	HHI for total asset		HHI for total loans		HHI for total deposits	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Change in deposits	0.000*	1.750	0.000*	1.650	0.000*	1.720
Constant	0.731**	2.470	0.712**	2.460	0.640**	2.040
R2	**0.14**		**0.22**		**0.23**	
Number of observations	**4224**		**4220**		**4222**	

*** indicates significance level of 1%; ** indicates significance level of 5%; * indicate significance level of 10%.

As we can see, the estimations prove the robustness of our results. The variable coefficients do not change considerably. We can still notice a positive effect of the withdrawal dummy on HHI for total asset and total loans, however we lose its statistical significance for HHI deposits. The result might suggest that greater market opportunities discourage banks from withdrawing from the market, and in turn might foster competition between the banks on the deposit market. We thus notice a drop in the statistical significance of the withdrawal dummy on HHI for deposits. The new Deposit growth variable is statistically significant, yet at 10 percent of significance level. All other effects remain unchanged.

7. CONCLUSIONS

The structure of the financial system has undergone many changes over the last two decades. The foreign banks' expansion, the process of bank consolidation and the large scale of foreign banks' withdrawals have undoubtedly influenced the changing pattern of banking concentration.

The objective of this paper was to assess how foreign banks' withdrawals affect banking sector concentration. This research question is of great importance due to changes in foreign banks' behaviour over the past decade and to the importance of banking sector concentration on financial stability. Our regression model was run over the period 1997–2008 for 53 countries, however to spot trends in the evolution of banking sector concentration we analyze the HHI indices since 1995.

Our results prove that foreign banks' withdrawals contribute to higher levels of banking sector concentration. We notice the highest magnitude of the coefficient with respect to HHI for deposits. Interestingly, we cannot find that acquisitions of the divested banks by domestic banks generate higher effects than any other

forms of withdrawals, which can possibly be explained by the nature of the transaction. This in turn depends on the financial condition of the parent bank and its subsidiary. Finally, our results seem to be robust to many specifications.

The analysis of the determinants of banking concentration also shows the importance of property right protection and the degree of the countries' development in explaining the differences in the concentration of the banking industry. Our conclusions indicate a rise worthy of concern for policy-makers about the banking sector stability in the post-crisis period.

Abstract

The aim of this paper is to assess the impact of foreign banks' withdrawals on banking sector concentration. The past decade has been characterized by large scale foreign bank withdrawals from countries where these institutions represent a significant part of the banking sector. An empirical analysis has been conducted for the banking sectors of 53 countries over the period 1997 to 2008. The major finding is that the foreign banks' withdrawals are positively correlated with banking concentration. The greatest magnitude of the effect can be seen with respect to the deposit market. Surprisingly, however, we do not notice any greater effect of acquisition of divested banks on banking sector concentration as compared to other forms of withdrawals. This might suggest a tendency to split up banking operations among many market players.

Key words: bank concentration, banks' withdrawals, financial stability

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