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A global analysis of imperfect competition in the banking systems and the latest Israeli
regulation dealing with market failures.

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A global analysis of imperfect competition in the banking systems and the latest Israeli
regulation dealing with market failures.

Abstract: The high concentration of the banking sector is a cross-border phenomenon that has high impact on local and global economies. This paper's main goal is to analyze the factors that impact concentration in the banking systems around the globe. The innovation of this paper is that we combined economic, "economic environment", and culture variables as explanatory variables for this analysis. We found among other things that regulation in the banking system is helpful in order to keep it competitive. We also found that when the society has more individual values rather than collective ones, its banking sector is less concentrated. In the second part of the paper we focused on the Israeli case, showing that although recent indicators of the Israeli banking system indicate a higher level of concentration and lower level of competition, it seems that the recent trend is moving toward less concentration and higher competition.

1 Introduction

Banking systems around the world are characterized by a high level of concentration. This could affect the economic growth and welfare of a nation due to fact that the banking system plays a fundamental role in the economy as the main financial intermediary between savers and investors. A higher concentration of the banking systems could lead to reduced competition levels and thus to higher intermediation costs, which can cut the number of sources available for investment. This has a wide range of negative impacts, such as lower economic growth and loss of social welfare.

In the past few decades it seems that the level of concentration in the banking systems around the world has increased. For example, between 1980 and 1997 the total number of banks in the United States fell from 36,000 institutions to 20,000, and by the end of 2002 the figure had dipped to only 9,300 (Zaretsky, 2004). In Europe the number of institutions fell from 9,500 to 7,000 during this same period. It seems that this trend is a worldwide phenomenon. The concentration of the banking system is even higher in developing countries than in the developed countries raising the fear that the trend of reducing the inequality in world welfare could be halted..

The remainder of this article is organized as follows. Section 2 presents a literature review and the main goal of the paper. In Section 3 we describe the data and methodology used in this research. The fourth section reports the empirical results. Section 5 reviews the Israeli case, dealing with the high concentration of its banking sector. Finally, the sixth section concludes the paper and discusses the implications of our finding.

2 Literature review

According to Jansen and Haan (2003), the following trends can be observed in the banking sector: an increase in the scope of mergers and acquisitions; a national focus in consolidation activities; a declining number of banks; and an increasing degree of concentration in most European countries. Actually, in the 1990s banks in Europe greatly intensified their merger and acquisition activities (see Berger et al., 1999). Banks mobilize, allocate, and invest much of society's savings, so bank performance has substantive repercussions on capital allocation, firm growth, industrial expansion, and economic development. Thus the consolidation of banks around the globe in recent years has intensified public policy debates on the influences of concentration and competition in the banking industry.

It is generally agreed that market concentration is one of the most important determinants of competitiveness (Nathan and Neave, 1989). The relationship between market concentration and competitiveness in the banking sector has been examined in detail for many countries, and the results indicated that high concentration tends to reduce competitiveness in this sector (Bikker and Groeneveld, 2000). However, Jansen and Haan (2003) found that concentration and competition are not related. Demircuc-Kunt and Maksimovic (1998) found that higher bank concentration is associated with greater financing obstacles, especially for smaller firms, and thus could harm the level of activity of those firms. Actually, in countries in which the banking system is more concentrated the average firm size is relatively larger (Cetorelli, 2001, 2003). In markets with concentrated banking, new firms face greater difficulty gaining access to credit compared to markets in which banking is more competitive (Cetorelli and Strahan, 2006).

Deidda and Fattouh (2005) found that banking concentration is negatively associated with per-capita income growth and industrial growth only in low-income countries. This suggests that reducing concentration is more likely to promote growth in developing countries than in developed ones. Xiaoqiang and Degryse (2006) investigated the Chinese provinces over the

period 1995-2003, and found that there is a higher positive significant impact on local economic growth in provinces where the banking system is less concentrated.

A higher level of concentration could create a monopolistic market power of banks, which would raise the opportunity costs of capital, and thus would tend to make financing more expensive (Smith, 1998). Lack of adequate competition in banking could thus adversely affect economic development. There is a positive significant connection between concentration and profitability (Molyneux and Forbes, 1995) The reasoning for this is as follows: In markets with a high degree of concentration firms have more market power, which allows them to set prices above marginal costs and achieve higher profits (Goldberg and Rai, 1996).

Garmaise and Moslowitz (2006) showed that neighborhoods that experience more bank mergers are subject to higher interest rates, diminished local construction, lower prices, an influx of poorer households, and higher property crime in subsequent years. Beck et.al. (2004) found negative effects of bank market power on access to credit, especially for developing countries, and especially for small-size firms. According to the results of Maudos and Nagore (2005), in developing countries the concentration of the banking industry is much higher than in the developed countries. This means that all of the economic problems presented in the literature above will have a greater impact in developing countries.

Measures of concentration and competition in the banking industry and characteristics that cause higher levels of concentration, and their implication upon economic welfare, are very important for the policy makers. Understanding the causes of high level of concentration and its implication upon economic and social performance could help in initiating the appropriate policy.

The main goal of the paper is to try to assess which factors can be attributed to a higher level of concentration in the banking industry. We will analyze economic differences, together with culture differences in order to explain the variations in concentration levels between the countries.

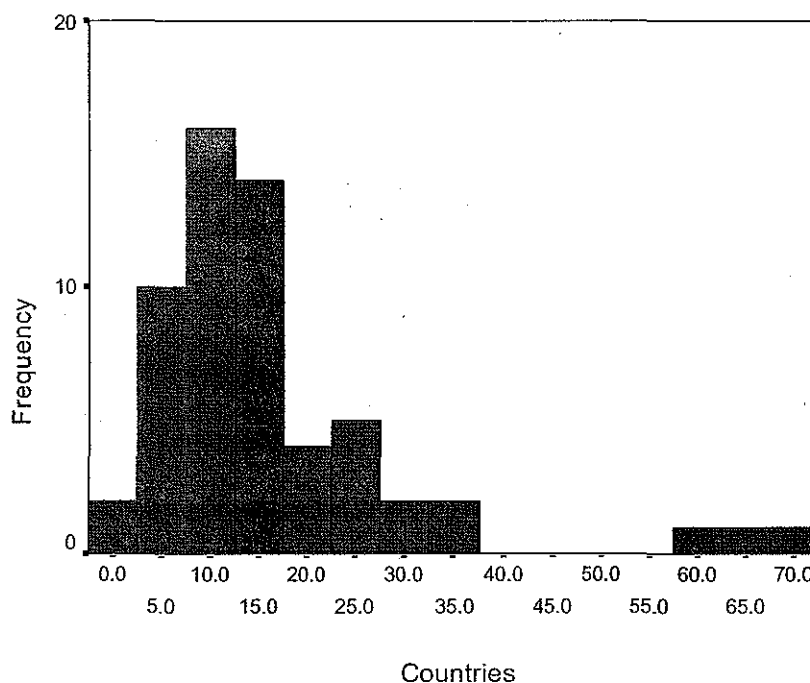
In addition, we will analyze how a public policy that aims to achieve a structural change in the banking system affects the concentration level in the Israeli banking system.

3 Method

3.1 Sample

Our sample includes 42 countries out of the 58 countries for whom had concentration factors for their banking industry. There were two categories of countries were not included in the empirical analysis, the first includes countries that didn't have culture characteristics as delineated by Hofstede (1980, 1983), and the second includes three countries that had a very high and unusual concentration in their banking system, as can be seen in Figure 1.

Figure 1 Concentration index by countries



Each of the three countries on the right side of the figure that had an unusual concentration are developing countries: Panama, Botswana and Zambia. Table 1 presents the countries in the sample.

Table 1: Country list

Country	HHI	CR(3)
Argentina	653	24.98
Australia	980	26.13
Austria	769	21.36
Bangladesh	1,273	36.47
Belgium	165	25.16
Brazil	956	3.84
Canada	1,149	34.13
Chile	1,541	41.69
China	1,511	46.40
Czech Republic	1,312	34.87
Denmark	118	28.62
Finland	2,590	39.62
France	396	15.53
Germany	188	8.91
Ghana	2,941	44.97
Greece	1551	46.82
Guatemala	984	25.17
Hungary	2,461	43.35
India	629	22.60
Indonesia	1,689	24.79
Ireland	858	35.94
Israel	1,689	48.81
Italy	322	13.80
Jamaica	2,367	56.82
Japan	285	12.68
Kuwait	1,193	32.73
Malaysia	616	22.45
Mexico	924	34.27
Netherlands	1,246	39.19
New Zealand	1,490	54.60
Peru	1,696	46.80
Poland	1,436	35.12
Portugal	722	27.50
Romania	3,718	56.28
South Africa	1,170	31.51
Spain	468	16.61
Sweden	959	31.68
Switzerland	1,520	32.10
Thailand	784	24.29
United Kingdom	362	17.98
United States	130	5.59

As can be seen from the Table we have a diverse sample, with countries from all around the globe exhibiting a wide range of wealth.

3.2 *The Variables*

We used two variables to measure the concentration of the banking industry in the sample. The values of the two variables for each country are displayed in Table 1. The first variable is the Herfindahl-Hirschman index (HHI) for the banking system. The HHI index for concentration was chosen mainly because of its simple structure. The HHI is the most widely used measure of concentration in the theoretical literature, and often serves as a benchmark for the evaluation of other concentration indices (Bikker and Haaf, 2002; Zaretsky, 2004)

HHI is calculated by squaring each bank's share of assets in a market and then adding these squared shares.

$$HHI = \sum_{i=1}^n s_i^2,$$

where n represents the number of banks and s_i represents the share of the bank i in the market.

We assume that the flow of banking goods and services produced by a bank is proportional to its total assets. So market shares in that case equal the bank's assets divided by total bank assets in the economy.

The index number can range from zero (a perfectly competitive market) to 10,000 (a pure monopoly). For example, the perfectly competitive market would consist of many firms, each with about the same market share. As the number of firms in this market increases, each firm's share decreases, until it approaches the limit of zero. The square of zero is zero, so the sum of those squares is still zero. The pure monopoly market would have only one firm that controls 100 percent of the market. The square of 100 is 10,000.

According to the anti-trust guidelines in the United States, a market can be broadly characterized as unconcentrated if the HHI is less than 1,000 points, as moderately concentrated if the HHI is between 1,000 and 1,800, and as highly concentrated if the HHI is above 1,800. These thresholds apply not only to banking but to all industries in the United States. In the United States,

the HHI plays a significant role in the enforcement process of antitrust laws in banking. An application for the merger of two banks will be approved without further investigation if the basic guidelines for the evaluation of the concentration in the markets are satisfied. Those guidelines specify that the post-merger market HHI does not exceed 1,800 and that the increase of the index from the pre-merger situation is less than 200 (Cetorelli, 1999).

The second variable we used to measure concentration is the CR(3)- market share of the three largest banks in the country. We used this additional variable that measures concentration in order to check the robustness of the results. The HHI and CR(3) data were taken from Maudos and Nagore (2005). The independent variables are of three types – culture variables, socio-economic variables, and those variables reflecting the "economic environment".

The culture variables

Cultural differences affect the way people think and react. A major research study on national cultural differences published by Hofstede (1980; 1983) is based on research conducted on IBM personnel from 50 countries, using 116,000 questionnaires. The questions regarding employee values demonstrated the differences among countries in four cultural dimensions: Power Distance, Individualism, Masculinity and Uncertainty Avoidance. Hofstede's culture dimensions are still key players in culture evaluations and empirical tests (Crotts and Erdmann, 2000; Downey et al., 2005; Dwyer et al., 2005). The four dimensions produced two variables representing the country's culture in regards to tolerance of concentration in the banking sector.

Power Distance Index (PDI) focuses on the degree of equality, or inequality, among people in the country's society. A high Power Distance ranking indicates that inequalities of power and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of all its citizens. A low Power Distance ranking indicates the society de-emphasizes the differences between its citizens' power and wealth. In these societies equality and opportunity for everyone is stressed.

Individualism (IDV) – focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A low Individualism ranking typifies societies of a more collectivist nature. These cultures reinforce extended families and collectives where everyone takes responsibility for fellow members of their group.

Hofstede measures continue to enjoy strong support among researchers (e.g., Sivakumar and Nakata, 2001), and serve as a *de facto* set of benchmark measures.

The socio-economic and "economic environment" variables

Gini index (distribution of family income) – The Gini Index is a calculation of income distribution within a country. 0.00 equals perfectly equitable income distribution in the population, while 100.00 equals perfectly inequitable income. The Gini index is one of the most popular indices to measure inequality (Allison, 1978; Morduch and Sicular; 2002). The data were collected from the CIA World Fact Book.

FDI (foreign direct investment) – the share of foreign direct investment from the GDP. This index could be an indicator for the level of integration of the economy of a country with the economy of the world. We preferred this index because it is more likely to affect the capital markets.

Economic freedom index- Economic freedom is defined as the absence of government coercion or constraint on the production, distribution, or consumption of goods and services beyond the extent necessary for citizens to protect and maintain liberty itself. In other words, people are free to work, produce, consume, and invest in ways they feel are most productive.

Economic freedom categories:

Score	
1-1.99	Free
2-2.99	Mostly free
3-3.99	Mostly unfree
4-5	Repressed

These data were collected from "The Heritage Foundation/Wall Street Journal Index of Economic Freedom".

Time required to start a business – the average time in days to start a business. This index could indicate the atmosphere and the level of bureaucracy that the business works with.

Time required to enforce a contract – average in days to enforce a contract. This index could imply, for example to the costs of maintaining a law department that should be part of the business.

4. Results

At the first stage we conducted a Kolmogorov-Smirnov goodness-of-fit test on the two dependent variables. The results showed that the HHI sample does not distribute normally and because the sample was a small one (n=42); we used a logit regression to test the HHI variable. We used a dichotomy variable as the independent variable where all of the countries with HHI higher than the average HHI were considered as a country with a concentrated market in the banking systems, and thus got a 1 in the HHI index. All of the other countries were considered as countries with no concentration in the banking system and thus got 0 in the HHI index. The result of the regression is displayed in Table 2.

Table 2: Logit HHI	
Variable	Coefficients
C	9.82
GINI	-.278*
PDI	-.145*
IDV	-.127*
Economic freedom	2.63 ⁺
FDI	.64*
Time required to start a business	.04 ⁺
Time required to enforce a contract	.003
* P-VALUE<0.05 +P-VALUE<0.1 P-VALUE	
REGRESSION = 0.000 Negelkerke R ² =0.69 Overall	
Classification Percentage=90.2	

The CR(3) dependent variable was normally distributed according to the Kolmogorov-Smirnov goodness-of-fit test, so we used a OLS regression. The GINI variable was left out because it was not significant and it reduced the Adjusted R^2 of the regression. The results of the CR(3) regression are displayed in Table 3.

Table 3: OLS CR(3)

Variable	Coefficients
C	41.8**
PDI	-363**
IDV	-27*
Economic freedom	10.16*
FDI	1.38*
Time required to start a business	.0003
Time required to enforce a contract	.02
** P-VALUE<0.01 * P-VALUE<0.05 P-VALUE	
REGRESSION = 0.021 Adjusted R^2 = 0.332	

As can be seen from Table 2, when the inequality in income distribution as reflected in the GINI index is greater, the concentration in the banking industry as reflected in the HHI index is higher. The motivation for this result is as follows: The higher the GINI index, the higher the share of few people in the total income; that could lead to a greater number of banks, due to the necessity of scattering risks by the banks. Let's assume that there is total inequality, i.e., one person gets all of the income and the rest gets zero income. In this situation one bank is not enough, due to high risk exposure. Therefore, more banks should operate in order to scatter the risks in the banking activity. A counter-example is when the distribution of income is totally equal. In that case even one bank could operate, due to the fact that the risk is scattered among many customers.

From both regressions (although just in the first it is significant) we can see that as the time required to start a business is longer (in days), the HHI is higher. Actually, the longer time

required to start a business indicates that the business bureaucracy is higher, and that could be an entrance barrier to the economic activity, and to the banking market in particular. This could lead to a situation where only few banks operate, thus leading to a higher concentration in the system. Also, as the time required to enforce a contract is longer the banking system is more concentrated. This is due to the fact that small banks could be prevented from entering the systems, due to the relatively high costs of enforcement, which requires an expensive justice department and lawyers. This creates an economic of scale advantage for the bigger banks.

The regression results show that when markets are more globalized as measured by the share of FDI out of the GDP, the concentration level increases. This could stem from economics of scale, which means that only the bigger banks could survive and merge with the international banks. Ernst (1997) found that globalization may well increase concentration and market power. It has been argued that this perplexing result is likely to occur in any industry which is characterized by significant scale economies and sunken costs. In addition Heasman (1997) found that globalization is characterized by concentration at regional, national and international levels.

As can be seen in both regressions the IDV coefficient is negative, which means that as the society has more individual values rather than collective values, its banking sector is less concentrated. Hofstede (1983) found that there is a positive correlation between the IDV factor and the wealth of the society. This is consistent with Maudos and Nagore's (2005) findings that developing countries have a higher HHI than developed countries.

As for the PDI, we found an interesting result that as the power distance of a society culture is higher, the expected concentration of its banking system is lower. This result requires deeper research in the culture field, although we think that it can be explained as follows: As the society is characterized by more castes, a more diversified banking system is required (i.e., each caste has different requirements from the banking services). This leads to diversified demands

that can only be fulfilled by a greater number of banks, resulting in less concentration in the banking system.

When economic freedom is high the HHI and the CR(3) are higher as well. Economic freedom means less regulation. Less regulation allows for mergers of banks, and that leads to a higher HHI index. Less regulation suggests a weaker antitrust policy, which means that it is easier to cartelize the branch or even monopolize it by mergers and acquisitions. A good example of this phenomena is the United States banking industry. Most states either prohibited branching altogether or limited it until the 1970s. Between 1970 and 1994, however, 38 states deregulated their restrictions on branching. In addition to facing restrictions on within-state branching, the Douglas Amendment to the 1956 Bank Holding Company (BHC) Act prohibited a BHC from acquiring banks outside the state where it was headquartered. States had the option of allowing out-of-state BHCs to enter, but none exercised this until 1978, when Maine permitted such transactions. As part of the Garn-St Germain Act, federal legislators in 1982 amended the BHC Act to allow failed banks and thrifts to be acquired by any bank holding company, regardless of state laws (Kroszner and Strahan, 1999). Many states then entered regional or national reciprocal arrangements, whereby their banks could be bought by any other state in the arrangement. Several recent developments have contributed to the removal of geographic barriers limiting bank expansion. In the mid-1980s, the Office of the Comptroller of the Currency took advantage of a clause in the 1864 National Bank Act to allow nationally chartered banks to branch freely in those states where savings institutions did not face branching restrictions. The Comptroller's action was instrumental in introducing state wide branching in several southern states. Another impetus behind deregulation was the rash of bank and thrift failures in the 1980s (Kane 1996). Since 1994 a series of bills before Congress have proposed consolidating all bank supervisory responsibilities under a new single federal regulator, separate from the Federal Reserve. Proponents of such legislation have argued that bank supervision only distracts the Federal Reserve from its central

task of conducting monetary policy (Peek et.al, 1999). As a result of this deregulation and freedom the number of banks in the United States has decreased dramatically in the last two decades, as was discussed in Section 2 of this paper.

What are the economic impacts of a higher concentrated banking system? We examined the correlations between the HHI index and the interest rate spread, which means the average gap between the lending interest rate and the deposit interest rate. We found a positive correlation between the HHI and the interest rate spread. This result was expected, due to the fact that a higher HHI index could imply that the banking system is less competitive, and thus allows the banks to take a higher "mediation" fee and increase their profits.

The impact of a higher interest spread could be destructive to economic activity. For example, a higher interest rate to the lenders could be an entrance barrier for small business from all branches of economic activity, and thus could harm growth. Another example is from the deposits side, as when the interest rate on deposits is smaller it reduces the willingness to save, and thus reduces the capital supply available for investments.

Another correlation that we consider to be important is between the HHI and the number of branches per 1,000 people. We found a significant negative correlation which means that the higher the HHI the lower the number of branches per 1,000 people. This could imply that the total welfare that the banking system creates is smaller; for example, higher travel costs to the local branch or longer queues.

5 Analyzing the case of Israel

The Israel regulator understood that higher freedom in the banking industry leads to a higher concentration, resulting in monopolistic prices and high interest rate. Therefore, the regulator created a new reform in the Israeli banking system.

In April 2004, the Finance Minister appointed the Bachar Committee, named after its chairman. The Committee recommended a few actions required for establishing an efficient and competitive capital market in Israel. In Israel, both the commercial banking and the financial intermediation are completely dominated by the banks, as Table 4 shows.

Table 4: Israeli banking market (2004)

Banking	Mutual funds	Provident funds	Underwriting
Deposits	Assets managed	Assets managed	Number of issues
Poalim-30%	Poalim-36%	Poalim-41%	Poalim-27%
Leumi-30%	Leumi-31%	Leumi-19%	Leumi-24%
IDB-18%	IDB-13%	IDB-13%	Clal-14%
78%	80%	73%	65%

In addition to the banks' domination of the capital market, the commercial banking industry itself is also highly concentrated and virtually controlled by two banking groups, Poalim and Leumi.

The Bachar Committee's main recommendation that became a law was that banks and controlling shareholders of a bank are not permitted to hold any interest at all in a company that manages a provident or mutual fund, nor are they be permitted to hold more than a 5% interest in any firm or institution that holds more than a 5% interest in a company that manages such funds.

The governor of the Bank of Israel, Stanley Fischer, stated in 2005¹, "With regard to the Bachar Committee, the high degree of concentration in the capital market has an adverse effect on economic growth and efficiency. It is very difficult to pursue a policy of economic reforms without dealing with this issue in a thorough and comprehensive manner. The proposals of the Bachar Committee offer a good solution to the problems of concentration afflicting Israel's capital market. Most of the credit market is in the hands of the banks, and although non bank credit has been expanding recently, the rate at which this is happening still leaves the bulk of credit within the banking system."

Rotenberg (2005) showed that the Israeli banking system is relatively highly concentrated in comparison to other countries. This is consistent with Bikker et al. (2006), who found that the level of competition in the banking system in Israel is four time less than the average level of competition in the world.

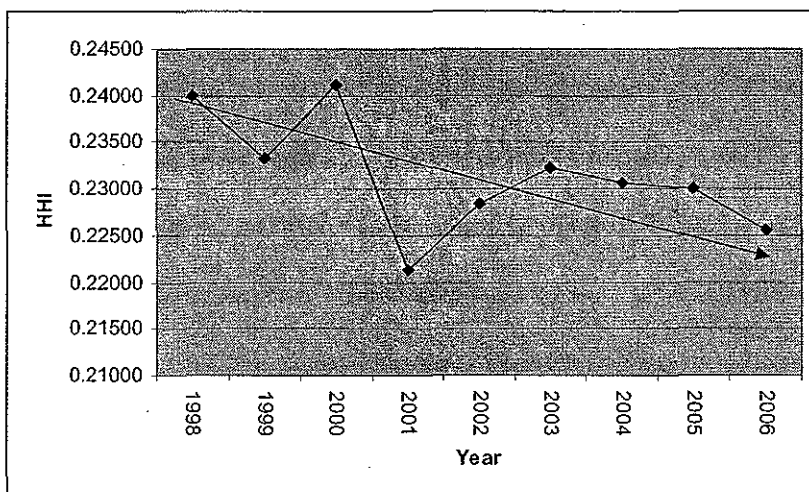
New will now analyze the trends in the banking system in Israel in recent years. In general, the trend of the concentration in assets as measured by the HHI in Israel is toward decreasing the level of concentration. This can be seen in Figure 2.

We found a positive and significant correlation of 0.447 ($p < 0.01$) between the HHI in Israel and the interest gap (as we found in the cross country comparison). This relation suggests that a higher level of concentration allows the banks to operate in a less competitive market, and thus leads them to increase their "mediation fee", which is reflected, among other things, in the interest spread.

In recent years, as the concentration in the banking system decreased, the interest spread decreased as well. Actually, from 1999 the HHI index decreased by about 3% while the interest spread decreased by about 1% (this reflects a decrease of about 38% in the interest spread).

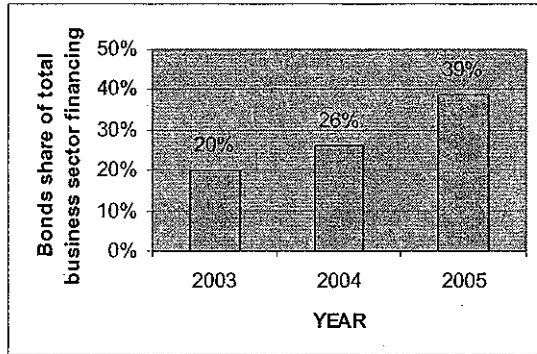
¹See: The Governor, Stanley Fischer – Address by the Governor of the Bank of Israel, Professor Stanley Fischer, today to the Knesset Finance Committee 30.5.2005
<http://www.bankisrael.gov.il/deptdata/neumim/neum180e.htm>

Figure 2: The trend of the HHI in assets in Israel since 1998



As can be seen in Figure 2, the decrease of the HHI during these years wasn't smooth. In 2001-2003 the HHI increased, however since 2003 it has decreased again. The decrease in the concentration index since 2003 could be explained by the trends of selling pension funds and other long-term deposits funds by the banks to other companies that aren't from the banking system. In preparation for the Bachar Committee's reform, we should bear in mind that the banks with the highest market share had the largest pension funds and other investment funds. One more possible reason for the decrease in the HHI since 2003 is the rapid increase of the bonds share of total business sector financing, from 20% to 39%. This trend could decrease the market share of the bigger banks, due to the fact that big and medium debtors could raise part of their credit in the bonds market rather than from the banks. According to Rotenberg (2005), The bigger banks have a higher market share of the big debtors in the economy.

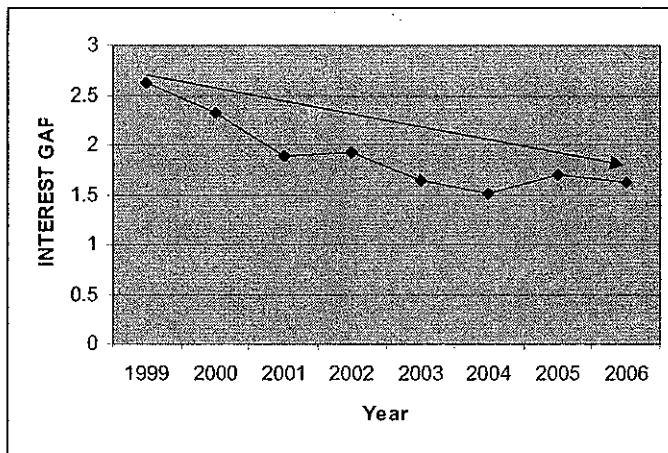
Figure 3: Bonds share of total business sector financing



The rapid increase in the bonds share of total business sector financing probably had a significant impact on the interest gap in the market, due to the fact that the bond market is a substitute for the credit and deposit activity in the banks.

When the substitute is more effective and takes place as a profound player in the market, the bargaining power of the bigger customers of the banks is higher, and that could lead to a decrease in the interest gap in the market.

Figure 4: The interest gap trends in Israel



However, the recent indicators of the Israeli banking system show a higher level of concentration and lower level of competition. It seems that the recent trend is towards less concentration and higher competition.

6 Conclusions and implications

In this paper we analyzed the factors that impact concentration in the banking systems around the world. We used the Herfindahl-Hirschman Index as a concentration index, together with the CR(3) index. We found evidence that as the economic freedom in the country is higher, the concentration in the banking system is also higher. We concluded that regulation in the system is necessary in order to keep in competitive (e.g., credit history as a market failure in the banking system).

An additional interesting result is that if the society has more individual values rather than collective values, its banking sector is less concentrated. Hofstede (1983) found that there is a positive correlation between the IDV factor and the wealth of the society. This is consistent with Maudos and Nagore's (2005) results that developing countries have a higher HHI than developed countries.

After we explained the factors that affect the level of concentration, we looked into the impact of the concentration on the actual economic activity. We found that as the banking system is more concentrated, the interest gap is higher and the number of branches per 1000 people is smaller. This led us to the conclusion that higher concentration could harm the economic activity and welfare of consumers.

Our conclusion is that the regulatory system should interfere in the free banking sector in order to obtain a more competitive market that will lead to lower interest rate gaps and higher growth. This is especially true in developing countries, because they suffer from higher concentration than the developed countries. The paper brings into focus how a regulatory act in Israel helped to minimize the concentration in the capital and banking sectors.

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