Economics and business economics

"Your mortgage as a cash cow"

A research on the effects of the state-aid on the competition in the Dutch banking sector

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Contents

Preface

I do this research because the subject interests me personally. The government and their actions interest me and the banking sector interest me as well, so this research is right on the 'bridge' between these subjects. So that motivates me for this research. Of course the chance to finish my Bachelor Economics and Business Economics is also a huge motivation.

Of course it is not possible to do such a research completely on my own. The institutions that provided me the data helped me with this research. I also wish to say thanks to the Erasmus University, that gives me the possibility to do this research and given me the knowledge necessary to do such a research. I also want to thank my supervisor, Dr. Karamychev, who provided me with great feedback and insights on how to perform such a research.

1. Introduction

"Your mortgage as a cash cow" is the title of a famous Dutch documentary called Zembla. The documentary addressed the problem that the interest rates on mortgages are higher in the Netherlands than at the surrounding countries, while they were almost the same before the economic crisis. According to the documentary, this was because a lack of competition in the Dutch banking sector (Zembla, 2012).

The documentary addresses that the competition in the banking sector in the Netherlands was low and therefore the people were paying too much interest on their mortgages. This research aims to check whether the claims made by the documentary are true.

In this introduction I describe the following thing; First, I describe the relevance of this research. Second I formulate a research question and partial research questions. Thereafter I give insight in the economic theory on the state-aid and competition. Next I describe briefly some other research on this theme. Thereafter I describe the methodology and the collection of the data. The introduction finishes by some remarks on the reliability and validity of this research.

In my opinion this subject is relevant, because of the recent banking crisis. The recent banking crisis shows us that we can't control the economy completely, even in these modern days. Governments had to deal with the banking crisis bud did not know what the exact effects of their actions where (Zembla, 2012). This paper tries to make these effects more clear, so the knowledge about these effects can expand. Also theoretically this paper is relevant. There is economic theory with respect to state-aid and competition, but not theory that focuses on the banking sector only. And as the banking sector is special, because people store their money there, additional knowledge on this subject is relevant.

The next step of this research is to structure the research by making research questions. The first thing to do this is to set up the goal of this research. The goal is: identifying the effects of the state-aid and the price leadership ban on the competition in the Dutch banking sector. The main research question should logically aim to achieve the goal. The main research question is: what do the state-aid and the price leadership ban in the Dutch banking sector have for effects on the competitiveness of the Dutch banking sector?

To further structure the research, it is also necessary to formulate partial research questions, which helps me to reach an answer on the main question. The partial questions are:

- What does economic theory say about the effects of state-aid on competition?

- What research is done before on similar subjects?

- How did the concentration rate and the relative profit margin develop during the crisis?

- How did the state-aid and the price leadership ban affect the concentration?

- How did the state-aid and the price leadership ban affect the relative profit margin?

The next step is to describe the theory about the effect of state-aid on competition. By looking at the theory it is possible to understand the problem and to know where to look first for an effect of state-aid on competition

For the paper I want to make it clear what the definitions of state-aid and competition are. State-aid is in this paper defined as any money that comes from public funds which is not revenue. This is an adequate definition, because we look at money the banks receive from the state, but the banks could also receive money because they have given the state a loan. This is revenue for the bank, and with this definition this is excluded.

For competition, I define it as the rivalry in which each seller tries to get what others also want at the same time: profit, sales and market share, by offering the best combination of price, quality and service (BusinessDictionary, 2013). With this definition it is clearer what is actually meant by competition in this paper, because everyone uses different explanations for the same word.

But the question is how these two concepts relate to each other. First I focus on the link between these two concepts in general and thereafter I look at some issues with this link that theoretically specially apply to the banking sector.

First the state-aid can decrease competition because the firm that receives state-aid engages in a predatory strategy. Because they receive aid from the state they can ask lower prices for example, forcing other companies to merge with them or go to bankruptcy. This decreases competition, because less companies makes the market goes more towards a monopoly (Spector, 2009).

The banking sector could also be under credit constraints. If someone receives aid in such a sector, then they have a large advantage in gaining access to the most important inputs in these sectors, according to the theory. This may cause the rivals costs to rise, because the large part of the input is

controlled by the aid recipient, and make them compete less aggressively. By acquiring those inputs, the aid receiving company has a huge advantage which could harm customers (Spector, 2009).

When we look at the banking sector only, the state-aid has a huge problem of moral hazard, according to theory. Let me explain this. A bank has a huge function in society; it stores and lends people money. Under normal conditions, the people have access to their savings in order to buy products. But when a bank collapses and defaults, people can't access their savings for a period of time, so they can't buy other products. In addition, people can lose (parts of) their savings. So, the consumers can lose a lot of money when a bank collapses, which could harm the economy very badly. So the government tries to prevent this by giving aid to banks with problems. But the bank knows they receive aid when things go bad, so this may give them an incentive to take much risk. This is called 'moral hazard'. The bank also knows they are 'too big to fail'; the government can't let them collapse, because too many people are hurt in that case. But because of some banks being too big to fail, while smaller banks are not, this may cause the too big to fail banks to take more risk than the smaller banks and make the smaller banks compete less aggressively (Bijlsma & Mocking, 2013).

But the state-aid can also have a positive effect on the competition. For example, when a bank receives state-aid, the bank is more likely to pay his debts and so on. Because banks having a lot of interdependency, the saving of one bank can actually benefit the situation of the competitors, according to theory. This can enhance competition. Because of some externalities, a bank receiving state-aid can enhance competition. Giving state-aid to a bank can also benefit the economy as a whole, because the bank can still lend money. This can get the economy going and benefit other banks, enhancing competition as well (Reynders & Verbist, 2010).

The European Commission also imposed price leadership bans, which I also address in my paper. The theoretical effect on the competition also needs to be addressed. There is some theory on this addressed in the documentary (Zembla, 2012). The price leadership ban prevents the concentration of the market to rise, because the state-aid receiving banks are prohibited to enter in a predatory strategy. But the relative profit margin will increase, because the banks compete less on price. This because a part of the market can't lower its prices below the others, creating a price that is too high (Zembla, 2012).

Another question is how a less competitive market could hurt or benefit customers. In general, the consumer is better off with a more competitive market, I assume. The competition forces the company to meet the consumers demand: making the best quality product for the lowest price. In a competitive market, if a company is not trying to meet this, someone else will do and the consumers will buy their products, forcing the other company to also try and meet the consumer's demands. If

there is less competition in the market, a company is not forces to meet the consumer's demands, because there is no other company that adequately tries to do this, so the consumer is worse off. This has the typical effect that the consumer pays too much for a too low quality product.

For the next section, I describe some research done by others. By doing this, I get a better insight in the results and methods of other researchers.

In Belgium, roughly the same research has been done. The authors use very much different models to find their results. After going through a lot of models they found the result that state-aid actually increases competition. They say this is firstly because of the interdependency; state-aid to one bank decreases the financial turbulence and avoids interbank loan defaults. Secondly they argue that the state-aid is not free. The receiving bank has to pay a fee for the aid or have to accept an equity dilution for the shareholders. If those prices are high enough they could effectively counter the negative competition effects. Secondly, they argue that the state-aid could distress other firms, because the banks are dependent on each other by for example interbank loans. Thirdly they say that the banks that did not receive state-aid may become more competitive. This because of the government pressure on the state-aid receiving bank and because the customers also know about the state-aid receiving bank. This may force the state-aid receiving bank to become less aggressive. The other banks can see this as an opportunity to gain more customers and become more aggressive (Reynders & Verbist, 2010).

In terms of methodology, the research done by Reynders and Verbist is very extensive. The two have spent a lot of time on this research along with multiple professors. They also use different models for competition and test these models statistically. For this Bachelor thesis it is not possible to reproduce their methodology for the Netherlands, because there is not enough time and/or manpower. But the arguments and information they give are very useful for my research. They also use the number of banks and the concentration rate to describe competition, which gives me the idea to do that as well.

Furthermore, we have to look for a way to measure 'competition'. Competition is a concept that doesn't have his own statistic or something. So it can be a bit hard to measure it. An important part of competition is the concentration. This is calculated by the Herfindahl-Hirschman Index. The Herfindahl-Hirschman index could give us a better insight in the concentration of the market. But it depends a lot on the number of banks, so I should also look at the number of banks. Another good things to look at are the developments of the interest rates. Interest rates and the spread between the saving and borrowing interest rates can be seen as the price for the banks products. As the competition decreases, the price usually increases. The Dutch government also imposed rules that prohibit the state-aid receiving banks for being the price leader. So, we should look at the differences

in interest rates spread between state-aid receiving banks and non-state-aid receiving banks (Bikker & Haaf, 2002).

Next, it is necessary to describe how I do this research. The economic theory coming with state-aid and competition is already described here above. So next it is logical to give a description of the situation and the state-aid banking sector. I do this by giving information at the start of my analysis.

Next, I calculate the Herfindahl-Hirschman index and give a historical insight in this index for the Dutch banking sector, and then I can analyze this and see if we can see some effect with regard to concentration of the Dutch banking sector. As I described in the previous section, the number of banks is also very important. So I also take a look at that. Also some historical insight will be provided.

The paper is focusing on data between the start of 2008 and April 2014. This is just before the start of the crisis in Europe until the most recent available data. So this paper mainly focuses on the effects within the crisis. It is important to set a certain space of time, because it makes the research more clear.

Furthermore I take a look at the interest rate and the spreads between borrowing and saving in particular. By analyzing this, I can also see if there is an effect of the state-aid. This can also come together with some historical analysis on the spreads. I do this by calculating the relative profit margin. I do this by the following formula: (Interest the bank receives-Interest the bank pays)/Interest the bank pays. By looking at this number we get a clearer view of a potential price effect.

But only making some basic graphs is not enough. I also try to make some models using regression. This measures the analysis of state-aid on the above variables individually but also together. I also make a dummy variable to see the effect of the crisis.

After all this have been done, I give a conclusion and some implications for the policy, and I also address the interesting topics for further research.

With respect to the collection of the data, the Dutch government produced a report last year with information on the Dutch banking (Commissie structuur Nederlandse Banken, 2013). This report gives an insight in the development of the Dutch banking sector and provides me some statistics on the Dutch banking sector that are useful for my research. The government also produced some info on the market shares of the Dutch banks and the number of the banks in the Dutch banking sector (Dijsselbloem, 2013). With respect to the interest on borrowing and saving, the European central bank (ECB) collects a lot of data. There is also a documentary on this subject (Zembla, 2012). This subject also has a lot of attention from the media and politicians, so there is a lot of data on this

subject. But the problem is that I also need data on trust in the banking sector, which isn't available. I also find out that other things also affect the dependent variables, but it is not possible to have data on this subject. This is the case with the marketing strategies and concentration, which will be explained later.

The next thing to do is to make a brief analysis of the reliability and validity. This can be seen as a reflection on the used methods. The reliability mostly focus on the reproducibility of the results, can someone with the same data, reading this research, produce the same results? The validity more focuses on whether the models and the results actually approach the reality.

With respect to the reliability, my opinion is that it is quite good. The methods I used are pretty clear and straightforward. The data is also openly available, so everybody can use that. Of course there is always some human interpretation necessary, but in the end I think the reliability is good.

The validity is a bit more problematic. First the banking sector is very complex. This complexity makes it hard to make a model that approaches the reality. Secondly, not at necessary data is at hand, so that makes it even harder to make a valid model. Of course I try to make it as valid as possible, but that could be hard in the short period of time.

2. Main Analysis

In the main analysis, I start with giving a historical insight in the state-aid during the crisis in the Dutch banking sector. Next I give an analysis on the data by looking at the graphs and I finish this part with making and describing models to give an insight in the effects of the state-aid and the price leadership ban.

The first part of this analysis consists of giving a historical insight in the state-aid given to Dutch banks during this crisis. It all starts on the 3th of October, when the Dutch government decided to take over Fortis/ABN Amro. The Dutch government paid 16.8 billion Euros for this. This was necessary to save the bank for going into default. The Dutch government called the bank a 'system bank'. Six days later, on the 9th of October 2008, the Dutch government provided 20 billion Euros to banks and insurers. ING bank borrowed 10 billion Euros, AEGON 3 billion Euro and SNS 750 million Euros. On the 23th of October 2008, the Dutch government introduced a guarantee system. The idea was that the Dutch government would guarantee on loans between banks. In total, the Dutch government guaranteed for 50 billion Euros. On the 26th of January 2009, ING bank received state-aid for the second time. The Dutch government guaranteed on American 'garbage mortgages'. On the 1st of February 2013 the Dutch government paid 3.7 billion Euro to own SNS REAAL (NOS, 2013).

When we look to the necessity of the state-aid, the situation was moreproblematic at ABN-Amro/Fortis and SNS REAAL than at the other banks. The other banks used funds that were supposed for healthy banks, to make them provide more funds for the companies. But ABN-Amro/Fortis and SNS-REAAL were taken over by the Dutch government because the situation was really problematic. In other words, the Dutch government used de-privatization rather than giving money when the situation was really problematic. So, the Dutch government was holding ABN-Amro shares for a while. Later they possesed certrificates (Rijksoverheid, 2014). This is interesting for my analysis, because a bank where the situation is more stressfull is probably less capable in gaining a competetive advantage through the state-aid, because they are busy saving themselves. The ABN Amro is also more restricted in this, because they are 'supervised' by the Dutch government for a long period of time.

2.1 Data

2.1.1. Concentration

For the next part of this analysis, I take a look at the concentration. For the concentration in the Dutch banking sector, I look at the Herfindahl-Hirschman Index. As explained earlier, this index gives

us insight in the concentration in the Dutch banking sector, and the concentration can tell us something about the competition. As I also mentioned, the number of banks is also very important, because this could bias the Herfindahl-Hirschman Index. So this number also comes into the analysis.

However, there is no data on the market shares of all banks in the Dutch Banking sector separately. This means that it is not possible to calculate the Herfindahl-Hirschman Index myself. Luckily, the Dutch national bank (DNB) calculated the Herfindahl-Hirschman Index and published this on the internet. So, I used this information by De Nederlandsche Bank and put it in graph 1(De Nederlandsche Bank, 2014) below.
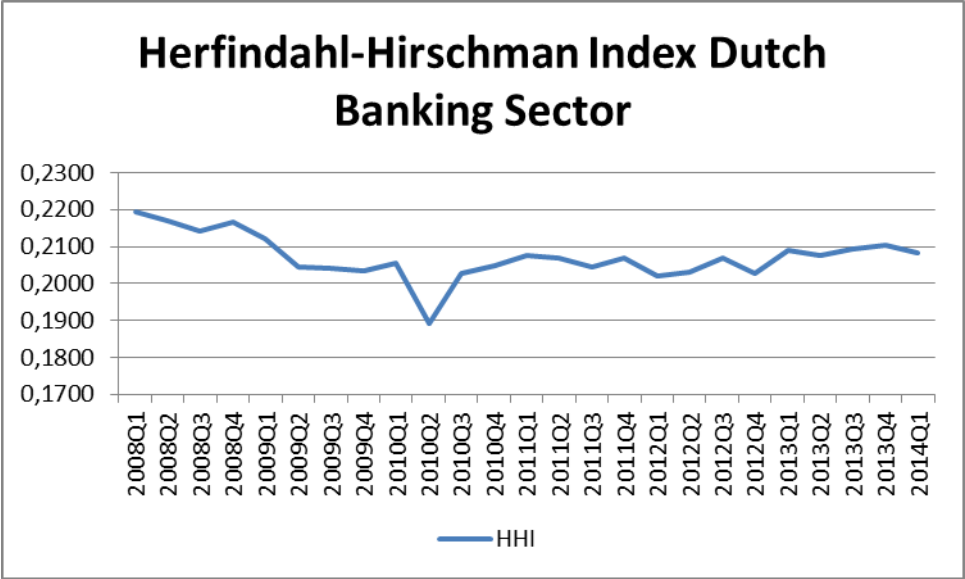
Graph 1

If we take a look at this graph, one thing directly draws the attention; the Herfindahl-Hirschman Index is not increasing. But as explained earlier, the Herfindahl-Hirschman index is biased towards the number of banks, an increasing number of banks could cause the Herfindahl-Hirschman index to drop. In other words, if the number of banks increased in this period it could explain the decrease of the Herfindahl-Hirschman Index. De Nederlandsche Bank also published information on the number of banks. This is displayed in Graph 2(De Nederlandsche Bank, 2014) below.
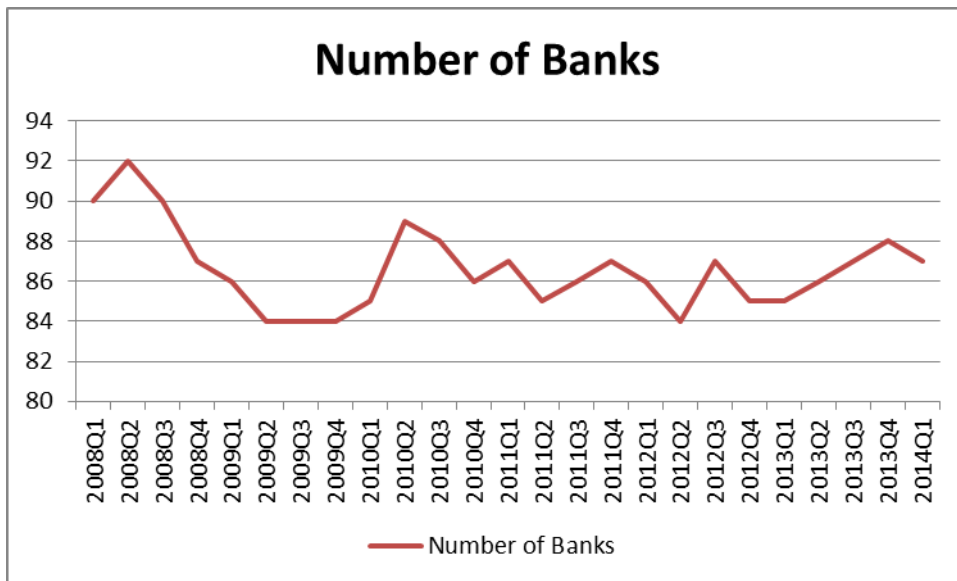
Graph 2

Looking at Graph 2, it becomes clear that the number of banks did not increase that much, they actually decreased a bit. So this technical bias of the Herfindahl-Hirschman Index does not have a role in the decrease of this index.

So, if we take a look at the Herfindahl-Hirschman Index in Graph 1, it is actually decreasing. This means the concentration is lower. When taking a look at the moments of the first stake aid, 2008Q4 and 2009Q1, it becomes clear that the concentration actually decreases in the period thereafter.

The big question is now: why does the concentration rate decrease, while our theory predicted it to increase? It could be causes by a lack of trust in the bank. If a consumer distrusts its bank it can change banks, changing market shares. This distrust can be caused by the fact that the bank receives state-aid. Or the cause could be some rule implied by the European Commission. This rule and its effects will be described later.

2.1.2. Profit margins

Next, I look at the profit margins in the banking sector. As I explained earlier, an increasing profit margin is a sign of a decreasing competition. But as banks do not have a simple price and cost structure, I take a look at the interest rates of borrowing and saving and compare those.

First, I take a look at the Dutch saving interest versus the interest on the lending for house purchase. I used those to calculate the relative profit margin. The data is provided by the ECB (European Central Bank, 2014). The data can be seen in Graph 3.

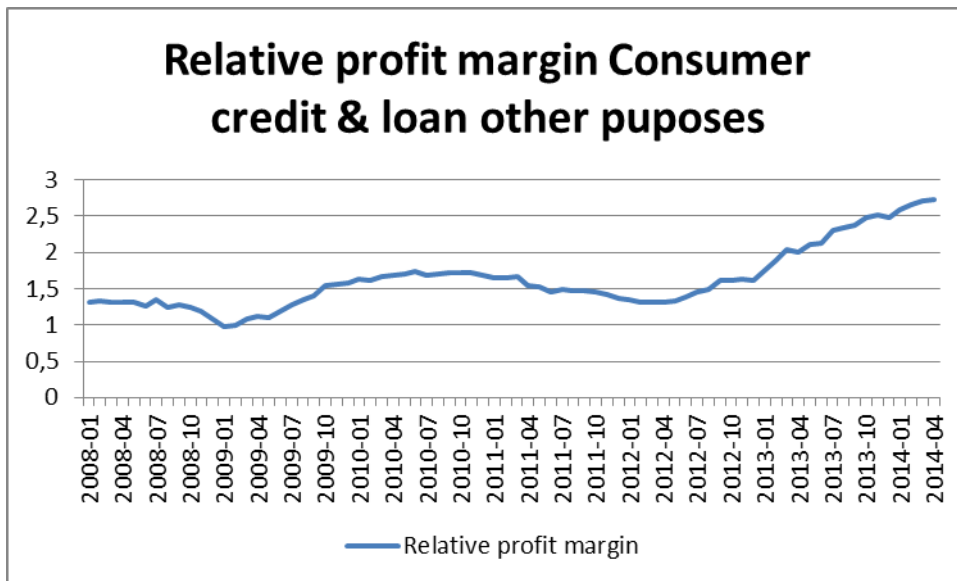**Relative profit margin housing loans**
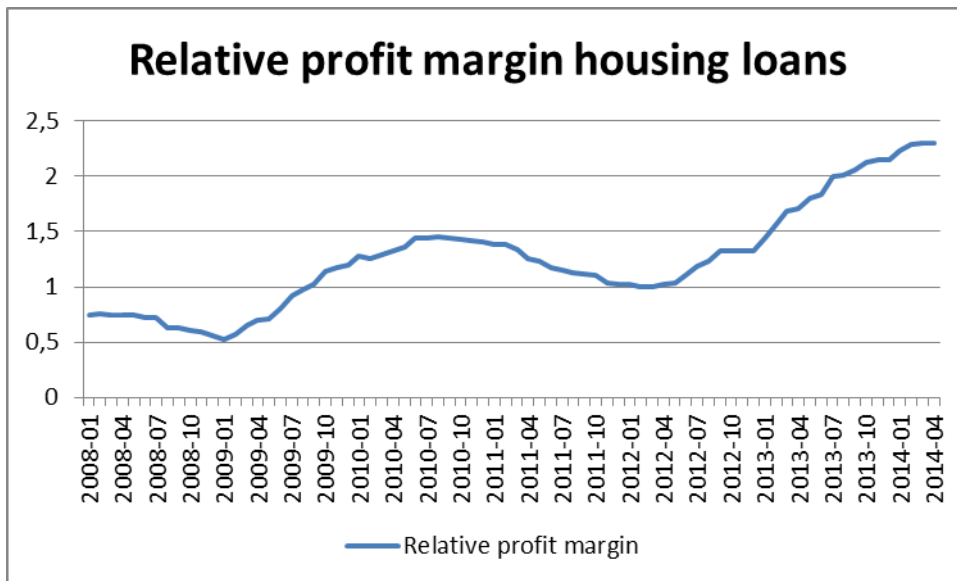
Graph 3

If I look at this graph, one thing is directly visible: the relative profit margin is three times as much as it was at the start of 2008. After the moments of the state-aid, at the end of 2008 and the start of 2013 is a growth visible.

So if you take a look at this graph, man can say that the relative profit margin increases and state that the competition decreases. But the big question is whether this is true. This loan serves the Dutch housing market. A market that is under pressure and causes the house prices to drop. Some houses are worth less than their mortgage. The bank dislikes this risk and raises interest. Furthermore the European Commission has imposed a prohibition to be the price leader to three of the four largest banks. These banks are: ING Bank, ABN Amro and AEGON. Together with the Rabobank, these banks covered 79% of the Dutch mortgage market in 2012 (Zembla, 2012). The rule by the European Commission prohibited the banks receiving state-aid to be the price leader. These banks could not offer the lowest interest on their mortgages. This prevented the state-aid receiving banks from pricing the non-state-aid receiving banks out the market. But in this case, it led to higher prices and higher profit margins on the housing loans. This because the Rabobank was the only one able to set the interest, and the others mandatory had to follow this interest. So this became a way to make profit for the banks (Zembla, 2012).

But there is more than the housing market. Banks also loan money to non-housing goals. The question is how the relative profit margin changes on this market. The data is found in Graph 4(European Central Bank, 2014) below.

Relative profit margin Consumer credit & loan other puposes

Graph 4

If you take a look at this graph, the pattern looks quite like the graph with the housing loans. But the growth is less spectacular. This relative profit margin doubles, while the one on the housing loans is three times as much. The question is once again whether this is the effect of a decreasing competition or of other problems cause by the economic crisis. The economic crisis could make it more likely for the customer to default on its debt. This causes the bank to charge a higher interest.

2.2. Explaining the results: some models

The next step is to model the data. First I model the data with respect to the concentration and next with respect to the relative profit margin. In the following paragraphs I introduce different variables. Those variables are abbreviated in the SPSS tables. Therefore it is useful to provide a legend.

HHI	Herfindahl-Hirschman Index
No.banks	Number of banks
PLBAEG	Price leadership ban on AEGON
PLBABN	Price leadership ban on ABN Amro
PLBING	Price leadership ban on ING
Econcrisis	Economic crisis
STATEAID	Period of state-aid
RelProfHouse	Relative profit margin on housing loans
RelProfOther	Relative profit margin on loans for other purposes

2.2.1. Concentration

One of the first things that cross my mind when thinking about an interesting variable is the trust in the bank. This because the trust can have an influence on the concentration. A declining trust could make people to switch banks, I assume. This could change the concentration. The trust could also decline because of the state-aid, causing the state-aid to have an indirect effect on the concentration. But there is no adequate data on the trust in the Dutch banking sector. So we cannot put this in our model. But we can introduce a variable for the state-aid and a dummy variable for the economic crisis. We can also introduce a dummy variable for the price leadership ban (PLB), because someone else being the price leader could change the concentration in the end. And the number of banks should be included, because a decrease in this number can change the concentration, because the people are forced to change banks.

Furthermore, I am aware of the fact that marketing strategies and so on also have a huge influence on the concentration. But the problem is that these things cannot be put into a variable. So this makes it hard to come up with a reliable model as I can't put in all the variables that I want to. But I make a model with the interesting variables I have at hand.

The equation for this model is as following:

$$HHI = Constant + \beta_1 * PLBABN + \beta_2 + PLBING + \beta_3 * PLBAEG + \beta_4 * Econcrisis + \beta_5 * STATEAID + \beta_6 * No.banks$$

The results are presented in table 1 below.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,218	,035		6,225	,000
	PLBABN	-,001	,001	-,057	-,500	,619
	PLBING	-,006	,001	-,487	-4,882	,000
	PLBAEG	,003	,001	,189	2,146	,035
	Econcrisis	-,004	,003	-,121	-1,260	,212
	STATEAID	-,007	,003	-,358	-2,157	,034
	No.banks	1,685E-005	,000	,006	,043	,965

a. Dependent Variable: HHI

Table 1

Of course this table requires some explanation. Most of those variables are so called dummy variables. These are variables that either have the number zero or one. The number is banks (and the constant of course) are no dummy variables. In the other cases, the dummy variable is having number one when it is active. In other words, in the months the price leadership ban on ABN Amro was active, that dummy variable adopts number one. I use dummy variables because it is difficult to model things by another way.

If we look at the numbers itself, we see an R-squared of 0,565. This means that 56,5% of the variance is explained by the model. Knowing that we are missing some important variables, this score is quite high. The R-squared tables can be found in appendix 1.

The next thing to do is take a look at the numbers. If we look at the significance, we see four things that are significant at the 5% level, the constant, PLB ING Bank, PLB AEGON and the state-aid. Not taking a look at the constant, the state aid and the price leader ban on ING Bank have quite some negative influence on the Herfindahl-Hirschman Index. This while the price leader ban on the AEGON bank has a positive influence.

The question is what causes these effects. As for state aid, the state aid can affect someone's trust in a bank, causing the people to move to a smaller bank and changing the Herfindahl-Hirschman Index. The price leadership ban also can change the concentration, because it prohibits someone from being the price leader. Others can take advantage of this and compete heavier on price, also changing the concentration. The effect, positive and negative apparently differs per bank. But the state aid at least does not increase concentration as is predicted by the theory.

2.2.2. Profit margins

Now, it is time to do the same thing for the profit margins. First I take a look at the profit margins on loans for housing, where the price leadership ban is important, and second I look at the loans for other purposes.

The equation for the model regarding the relative profit margin on housing loans is as follows:

$$RelProfHouse = Constant + \beta_1 * PLBABN + \beta_2 + PLBING + \beta_3 * Econcrisis + \beta_4 * STATEAID + \beta_5 * PLBAEG$$

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,296	,135		17,011	,000
	PLBABN	-,593	,074	-,594	-8,024	,000
	PLBING	,315	,067	,336	4,713	,000
	Econcrisis	-,178	,165	-,074	-1,074	,286
	STATEAID	-,744	,113	-,513	-6,608	,000
	PLBAEG	,173	,085	,130	2,043	,045

a. Dependent Variable: RelProfHouse

Table 2

77,1 % of the variance is predicted by this model, according to the R-squared (the R-squared tables can be found in appendix 1). Except the economic crisis, all variables are significant at the 5% level. Furthermore, we see a strong negative effect of the state-aid on the relative profit margin. This may be caused by some trust effect, causing people to leave after state aid. This can cause their profit margins to drop, because they have to adjust the interest to gain more customers. For the price leadership bans, we see two positive numbers and one bigger negative number. In other words, the effect of the price leadership ban is mixed. Theoretically, the relative profit margin would rise because there is less competition on price, but the model says it drops with the price leadership ban on the ABN Amro. This can be causes by the ABN Amro being under government control. As stated earlier, the government wanted banks to loan out money to the companies, this to stimulate the economy. For this, the interest must not be too high; otherwise the companies could not afford it. So when the European Commission imposed the price leadership ban, the ABN Amro was also under government

supervision. This could prevent the ABN Amro from raising the profit margin too much, keeping interest as low as legal possible, while the others tried to raise the interest to gain more profit.

Next, we head on to the loans for other purposes.

The equation for the model regarding the relative profit margin on the loan for other purposes is as follows:

RelProfOther=Constant+β1*PLBABN+ β2+PLBING+ β3*Econcrisis+ β4*STATEAID+ β5*PLBAEG

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,692	,122		22,073	,000
	PLBABN	-,404	,067	-,449	-6,052	,000
	PLBING	,158	,060	,187	2,611	,011
	Econcrisis	-,230	,149	-,106	-1,540	,128
	STATEAID	-,763	,102	-,584	-7,502	,000
	PLBAEG	,117	,076	,097	1,530	,131

a. Dependent Variable: RelProfOther

Table 3

If we take a look at table 3 the table is quite similar with table 2. But now, the price leadership ban for AEGON is also not significant. Furthermore, the positivity or negativity of the effects is the same, only the numbers differ. R-squared is also a bit lower (the R-squared tables can be found in appendix 1). The constant is also a bit higher. But the results are quite the same.

3. Conclusion

Reading those results, one thing is directly clear: the results are not what the standard economic theory predicts. The concentration is not rising for instance. One of the reasons for this is that the banking sector is a different sector than others. Trust plays an important role; a lack of trust in a bank could drive a bank into default. The banking sector is also one of the most important sectors, as it stores the money that is needed to buy goods in other sectors. This is also one of the reasons that the banking sector is really complicated. This makes is hard to make adequate models because you always miss some variables and data.

The next thing to do is to answer the main question. The competitiveness that is addressed in the main question is split into two pieces: concentration and the profit margin. With regard to concentration, which is measured by the Herfindahl-Hirschman Index, I showed in the graph that the concentration did not rise in the period I looked at. When I made a model, we saw that the state-aid did not cause the concentration to rise, but to decrease. This could be explained by a declining trust in the state-aid receiving bank. This could have changed the concentration, but I cannot model this as I do not have the data.

The relative profit margin was the other half of the equation. The relative profit margin increased sharply during the reviewed period. But the modeling concluded that this was not the effect of the state-aid itself. This could again be the result of the trust problem; banks could not increase their profit margins because people trust them less. With regard to the price leadership ban, the ban for ING Bank and AEGON caused the relative profit margin to increase. There is less competition on price because of the ban and this caused the relative profit margin to rise. For ABN Amro, this was not the case. ABN Amro was supervised and owned by the government and was in really big problems when the government acquired their shares. But the government was not looking to increase the relative profit margin as they wanted the bank to loan more money to companies. ABN Amro was also busy to save them instead of increasing profit. But for the other banks there is an effect, as is acknowledged by some media.

Generally speaking, there is no increase in the concentration as a result of the state-aid and the rules, but there is an increasing effect on the relative profit margin, caused by the price leadership ban. This raised the question whether the interventions by the government where good or bad. There has been some critique on the government and especially on the price leadership ban imposed by the European Commission. My opinion is that there is no Pareto optimal decision. So the government chose this policy in order to boost financial stability, to save the banks from going into default. The price leadership ban worked to prevent the banks to go in some predatory pricing strategy. The

disadvantage is a relative profit margin that increased. It is easy to say that it is wrong to do that. But, as there is probably no solution that benefits everyone, the government had to make a choice.

Finally, I have to nuance this research a bit. First, I had to do this in a limited amount of time. Secondly, not all the necessary data was at hand, which made it hard to create an adequate model. This could make the model less reliable. So for future research, I suggest to look more at trust in the banking sector by the consumers and the effects of this on the competition and the effects of the state-aid in trust.

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Appendix 1

R-squared concentration model

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,751[a]	,565	,527	,00408051

a. Predictors: (Constant), No.banks, PLBAEG, PLBABN, Econcrisis, PLBING, STATEAID

b. Dependent Variable: HHI

R-squared relative profit margin model – Housing loans

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,878[a]	,771	,754	,23374

a. Predictors: (Constant), PLBAEG, Econcrisis, PLBABN, PLBING, STATEAID

b. Dependent Variable: RelProfHouse

R-squared relative profit margin model – Loans other purposes

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,877[a]	,769	,753	,21125

a. Predictors: (Constant), PLBAEG, Econcrisis, PLBABN, PLBING, STATEAID

b. Dependent Variable: RelProfOther