Profitability – Financial Liquidity Relation Under Bank Dependence During the Financial Crisis. Case of Polish Companies

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Abstract:

The aim of the paper is to find the impact of financial crisis on profitability, financial liquidity, and on the relation between profitability and financial liquidity. We did it by including additional dimension: companies' dependence on bank financing (companies that rely and do not rely on the bank financing). Our analysis covers the country that was perceived as resistant one to financial crisis – Poland. The analysis was conducted for panel sample of 183 companies listed on Warsaw Stock Exchange for the period of 2005-2016 (8,784 quarter-company observations). We found that Polish companies seem to be quite robust to the financial crisis impact in general. The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis. As for companies with low and high bank dependence we found that high bank dependent companies underwent the financial crisis more heavily – their profitability and financial liquidity decreased radically during financial crisis time but also after financial crisis (in the short and long-term).

Keywords: profitability-financial liquidity trade-off; net working capital management; financial crisis; bank-dependence.

JEL Classification: G30; L21; M20.

Introduction

Profitability shows the company ability to generate profit on invested money. Profitability reflects the owners' interest because they expect high rate of return. Financial liquidity is the term reflecting how quickly company can turn the current assets into cash to meet short term obligation. Financial liquidity management refers also to working capital management and it depends on the level of liquid (current) assets such as: inventory, receivables, cash and short-term liabilities (operating cycles). Financial liquidity reflects managers' interests because they are required to ensure the business safety and continuity.

It is important to decide on the priority: profitability (owners' interests - growth) or financial liquidity (managers' interests – company financial security) as in corporate finance there is trade-off between profitability and financial liquidity identified. The decision on this priority is important especially during the crisis (slowdown) period.

We contribute to the research on corporate finance by conducting comprehensive research using different proxies for financial liquidity and profitability. We also include specific economic situation regarding recent financial crisis (before, during and after) and specific company situation as for bank financing use (companies with or without bank dependence).

The rest of the paper is organized as follows: next, it reviews the literature on financial liquidity and profitability during financial crisis. This part also reviews the specificity of Polish economy and financial market during financial crisis. Third, it describes the research design. Fourth, it presents the empirical findings. Last one, it contains discussion with previous research. Finally, it concludes the study.

1. Literature review

1.1. Financial liquidity and profitability

Profitability shows the company ability to generate profit on sales revenue (return on sales) or on invested money (by owners – return on equity or by company – return on assets). It is a measure of business efficiency. The higher profitability the better. Profitability reflects the owners' interest because they need higher rate of return. Company investing owners' money effectively is able to develop, and create wealth which is essential for growth.

Financial liquidity is the term reflecting how quickly company can turn the current assets into cash to meet short term obligation. Financial liquidity is measured as the relation of current assets to short-term liabilities. Financial liquidity management refers also to working capital management and it depends on the level of liquid (current) assets such as: inventory, receivables, cash and short-term liabilities (operating cycles). Financial liquidity reflects managers' interests because they need to ensure the business safety and continuity. Company having financial liquidity is able to survive and avoid bankruptcy (Berryman 1983, Dunn and Cheatham 1993). According to Chandra (2001, 72), normally a high financial liquidity is considered to be a sign of financial strength and safety.

It is important to decide on the priority: profitability (owners' interests - growth) or financial liquidity (managers' interests – financial security of the business) as in corporate finance there is trade-off between profitability and financial liquidity identified. Maintaining a proper financial liquidity indicates that the company has to cover costs of maintaining current assets and this might affect negatively the overall profitability of the firm. In other words, increasing financial liquidity would tend to reduce firm's profitability. Therefore, firms should always strike to maintain a balance between conflicting objectives of financial liquidity and profitability. The firm's financial liquidity should not be too high or too low. Excessive financial liquidity indicates the accumulation of not working funds that don't earn any profits for the firm but generate costs. On the other hand, insufficient financial liquidity might damage the firm's goodwill, deteriorate firm's credit standings. Insufficient liquidity might lead to forced liquidation of firm's assets. In this situation the relationship between financial liquidity and profitability might be positive, especially when a low financial liquidity is linked with low profitability. Low financial liquidity does not allow a company to function and generate profits. Too low level of inventory or cash makes it impossible to manufacture and sell and generate sales revenue and profits.

The level of financial liquidity is the result of the working capital elements management (level of inventory, accounts receivable, cash pool and accounts payable). They have direct effects on firm financial liquidity (Chiou and Cheng 2006, Kim *et al.* 1998, Moss and Stein 1993, Opler *et al.* 1999, Schilling 1996) Net working capital elements have also impact on profitability (Deloof 2003, Garcia-Teruel and Martinez-Solano 2007, Gill *et al.* 2010, Enqvist *et al.* 2014, Vu and Phan 2016, Nhung *et al.* 2019).

There is quite big number of research proving negative relation between profitability and financial liquidity. But it is difficult to compare the result because of different methodology adopted (different way of calculating profitability and financial liquidity). Jose *et al.* (1996) in his study, by using return on assets (ROA) and return on equity (ROE) as proxies for profitability, found a negative association with the cash conversion cycle (CCC) for a sample of 2,718 firms. Similar results were obtained by Deloof (2003) for a sample of 1,009 Belgian firms using gross operating profit and net operating profit as profitability measures. Eljelly (2004) also found negative relationship between profitability and financial liquidity (measured by current ratio and CCC). Higher profitability associated with a smaller cash conversion cycle was also supported by Garcia-Teruel and Martinez-Solano (2007), Falope and Ajilore (2009) and Quayyum (2011), among others. Raykov (2017) also found weak but clearly negative relationship between financial liquidity (quick ratio) and profitability for Bulgarian companies. Shin and Soenen (1998) also proved that there is a contra-relationship between cash conversion cycle and profitability of firms. They encouraged firms to reduce cash conversion cycle to increase profitability. Studied the influence of working capital elements on profits of companies in the food industry of Poland and some other European countries during 2005-2009 by using the Linear Regression, Bieniasz and Golas (2011) confirmed that lower cash pool increase profitability. In order to increase profits, firms should also reduce accounts receivables and inventory and lengthen payment time to suppliers.

So far the researchers have shown the important role of financial liquidity and working capital elements for the profitability of the enterprise. But firstly, there is no consensus on whether the relation between the profitability and liquidity is positive or negative. And secondly, the impact of the environment, especially in the context of the economic crisis is often ignored. In this perspective, we try to fill the gap by focusing on the relation between financial liquidity and working capital elements and profitability. We use different proxies of financial liquidity, working capital elements and profitability. But we also add to our research different economic environment conditions by analyzing the years before financial crisis, years of financial crisis and after crisis with the reference

to short and long-term perspective recovering from financial crisis. Our research refers to Polish companies. Poland is thought to be not severely hit by the financial crisis. What is more, Polish financial market has low bank concentration which should expose Polish economy to a bigger negative reaction to financial crisis (Gonzales 2015, Berlin and Mester 1999, Petersen and Rajan 1995). We also add company's bank dependence perspective to detect whether companies with low and high use of bank loans differ in their reaction to the financial crisis in terms of profitability and financial liquidity. There are research showing that companies that refrain from bank financing underwent the financial crisis quite softly (Chava and Purnanandam 2011).

1.2. Financial liquidity, and profitability, and net working capital management during financial crisis

The most important effect of recent financial crisis on real economy was increase in uncertainty. Large output losses were common to many crises. Also macroeconomic variables (consumption, investment and industrial production) registered significant declines (Claessens and Kose 2013). Uncertainty resulting from financial crisis led to lower demand for company products, lower sales revenue, lower profits. That is why a crisis had negative impact on profitability, and increased the volatility of earnings of non- financial corporations. Prasad *et al*. (2015) analyzed currency Asia crisis of 1997 and they showed that a financial crisis led to immediate drops in the profitability of firms, and the profitability levels at the end of 6 years after the crisis were still not at the pre-crisis levels.

Claessens *et al*. (2012) examined how the 2007-2009 crisis affected firm performance and they found that the crisis had a heavy negative impact on company performance. Brun *et al*. (2013) analyzed the impact of the financial crisis of 2007-2009 on profitability in the corporate sector in six European countries (Belgium, Germany, France, Spain, Portugal and Italy). They found too that most non-financial companies suffered a profitability slowdown. Also in euro area the drop in profitability was noticed (Corporate finance and economic activity in the Euro area 2013).

The financial crisis led also to an unprecedented drop in aggregate investment in the Euro area in 2009: gross fixed capital formation declined by 13% in real terms between 2008 and 2009 (Corporate finance and economic activity in the Euro area 2013). In the group comprising Greece, Ireland, Italy, Portugal and Spain, the investment downturn has been unusually deep and long (Unlocking lending in Europe 2014). Campello *et al.* (2010) surveyed 1,050 Chief Financial Officers (CFOs) in the US, Europe, and Asia to assess whether their firms are credit constrained during the global financial crisis of 2008. Their evidence indicates that constrained firms during financial crisis planned deeper cuts in tech spending, employment, and capital spending.

As for working capital, the theory assumes that in a recession firms should reduce their purchases as the attempt to offset the collapse of their sales. As a consequence, current assets (especially inventories and receivables) and liabilities (payables, trade credit) should quickly decline. The only one exemption is cash holdings - firms hold cash for two main reasons. First, they need cash to carry out transactions, *i.e.* to make payments without incurring the costs involved in converting non-cash assets into cash. Second, and perhaps more important, firms hold cash as a precautionary measure, to cover against the risk of potential cash shortfalls. During recession precautionary measure is more significant than transaction reasons which should lead to increase in cash holdings.

There is some research on working capital management which confirm the theoretical assumptions. As the statistics show, in euro area countries DSO (receivables collection period) ratios decreased by 9% (*i.e.* by five days) between 2006 and 2008, except in Portugal where the ratio remained considerably above the euro area average. At the end of 2008, the crisis interrupted this positive trend and DSO ratios significantly increased in the period 2009-10, with only two exceptions – France and Germany. In Germany, firms remained in a position to benefit from a renewed shortening of their DSO ratios in 2009. The ratio rose slightly in 2010, but only by one day of sales. In France, legal solution prevents any increase in the DSO ratios of non-financial companies during the crisis (Corporate finance and economic activity in the Euro area 2013). Ramiah *et al.* (2014) conducted a survey in Australia on changes in working capital management strategies. The results suggest that 52 percent followed conservative policies. These firms tended to tighten their credit controls, to focus on the preservation of cash and to reduce cash conversion cycles. They also reduced inventory and debt with the intention of keeping additional funding buffers. The average ratio of working capital to revenue for Australian listed companies is shown to have risen significantly in 2008. It was especially true for the companies that were underperforming (lower than industry average). The majority of the outstanding firms did not alter their working capital practices. Daisuke (2017) for Japanese firms found that during the global financial crisis, the level of working capital trade receivables, inventories, and trade payables increased during financial crisis. After late 2009, the level decreased and returned to its pre-crisis level. Scholleova (2012) for Czech companies found that firms that have had long-term ineffective conservative financing coped relatively well with the crisis by releasing excessive working capital strategies.

The various financial liquidity indicators also suggest that non-financial companies' ratios of short-term assets to liabilities have increased across euro area countries during the crisis. The increase is relatively large for most indicators in Cyprus, the Netherlands, France and Finland, while there has been a decline in all the financial liquidity measures in Slovakia, Slovenia, Ireland and Greece. The countries that consistently achieved relatively high financial liquidity ratios within these indicators include Estonia, Cyprus, Luxembourg and the Netherlands, while the opposite is the case for Italy, Portugal and Slovenia (Corporate finance and economic activity in the euro area 2013). Vu and Phan (2016) for Vietnamese listed companies found that receivables collection period (DSO) and inventory conversion period (DIO) and payables conversion period (DPO) has negative correlation with the firm's return on equity (ROE). Which means that declining profitability is accompanied by increase in the receivables, inventory, payables conversion period. Kahle and Stulz (2013) document that in the USA cash holdings faced sharp increase after the collapse of Lehman and through 2009. Pinkowitz *et al.* (2013) find an increase in abnormal cash holdings by US companies of 87% from before the crisis. The statistics for euro area show that non-financial corporations s between 2000 and 2010 hold a big part of their assets in the form of liquid assets with upward trend in the late 2000s, in spite of the associated opportunity costs. There is also identified a negative relationship between cash holdings and leverage (increasing cash holdings and decreasing leverage) (Corporate finance and economic activity in the Euro area 2013).

So, the first research question is as following: how profitability, financial liquidity and net working capital elements changed during and after financial crisis. We assume that:

H1: Profitability decreased during the financial crisis.

H2: Financial liquidity increased during the financial crisis.

H3: The net working capital increased during financial crisis with DIO and DSO increasing more than DPO.

Additionally, referring to the relation between profitability and financial liquidity we assume that:

H4: The relation between profitability and liquidity is negative – increase in financial liquidity is accompanied by decrease in profitability during financial crisis and decrease in financial liquidity with increase in profitability before and after financial crisis.

1.3. Specific reaction to the financial crisis in Poland

Central and Eastern Europe belongs to the regions most severely affected by the world economic crisis (Analiza sytuacji gospodarczej w krajach Europy Środkowej i Wschodniej 2010, Dullien *et al*. 2010, Terazi and Senel 2011).

But Poland has been recorded as the only European Union (EU) member state that did not record economic recession and it can boast economic growth throughout the entire crisis duration (Terazi and Senel 2011, Duszczyk 2014, Dogaru 2016). The moderate reaction is quite surprising as Poland belongs to countries having banking system with bank concentration rate (0.47) comparing with other European countries (Gonzalez 2015): Austria: 0.65, Belgium: 0.87, Denmark: 0.80, Finland: 0.96, France: 0.60, Germany: 0.70, Greece: 0.68, Italy: 0.47, Netherlands: 0.79, Norway: 0.93, Portugal: 0.85, Spain: 0.66, Sweden: 0.95, Switzerland: 0.85, the UK: 0.52. Gonzales (2015) found that the higher level of bank concentration is to reduce the negative impact of the financial crisis on corporate debt maturity. Also Berlin and Mester (1999) and Petersen and Rajan (1995) found that firm in less concentrated credit markets are subject to greater financial constraints. According to these results, Polish companies (running business in low bank concentrated environment) should by exposed to more difficult conditions and their reactions (in terms of financial liquidity and profitability) to the financial crisis should be deeper.

By the end of 2009 Poland was the only country that hasn't experienced a decline in GDP and reached the growth of 1.7 %. While investments (gross fixed capital formation) decreased in the region of Central and Eastern Europe in 2009 (an average of nearly 12%), the decrease was relatively small in the case of Polish (0.3%). The highest decrease in export of commodities and services was in Slovakia and Slovenia, and reached 16.5% and 15.6%. In Poland the decline amounted to 9.1%. The highest decline of industrial production was observed in Estonia and amounted to -25.6% comparing to the previous year. The lowest decrease in industry production was in Poland, at the level of 3.5%. The drop in production on an annual basis could be observed only in Slovenia, Lithuania and Bulgaria. On the contrary, in Slovakia and Poland there were the double-digit increases in industrial production (Kozub-Idźkowska and Proniewski 2011).

The quite stable economic situation in Poland made demand for corporate credit remain quite strong. But the financial crisis had impact on financial market in Poland. Although Polish financial institutions were not involved in the purchase of "toxic" international assets, the high foreign ownership made them vulnerable to the outbreak of the global financial crisis. Financial crisis affected Poland via the capital markets and decrease in foreign demand

on polish goods and services. The first three quarters of 2009 were characterized by a decrease in confidence on the interbank market, by a threefold jump in loan-loss provisions and write-downs compared to 2008. Bank profits and profitability dropped to around 50% of 2008 results in September 2009. But Polish banks are mostly domestic players and as such they have been partly insulated from the turmoil on foreign financial markets. In the result of financial crisis banks redefined corporate lending standards. Since the outbreak of the financial crisis, more than 80% of banks have raised their margins to corporate clients and nearly 60% expect higher guarantees to cover risk, while a third of them have reduced the maximum credit amounts available. Consequently, credits granted to the corporate sector decreased by 13.8% in the three quarters of 2009. In order to boost credit, the Polish central bank (NBP) has been steadily reducing its reference rate (Strojwas 2010).

To present the situation of Polish companies in general we analyzed the aggregated financial data of companies that are obliged to report to Main Statistical Office in Poland. The basic statistics of corporate finance in Poland are presented in the Figure 1 and 2 and 3. Figure 1 presents the level (left scale) and growth rate (right scale) of total assets, sales revenue and net working capital.

Figure 1. The basic descriptive statistics on assets and sales revenue for Polish companies
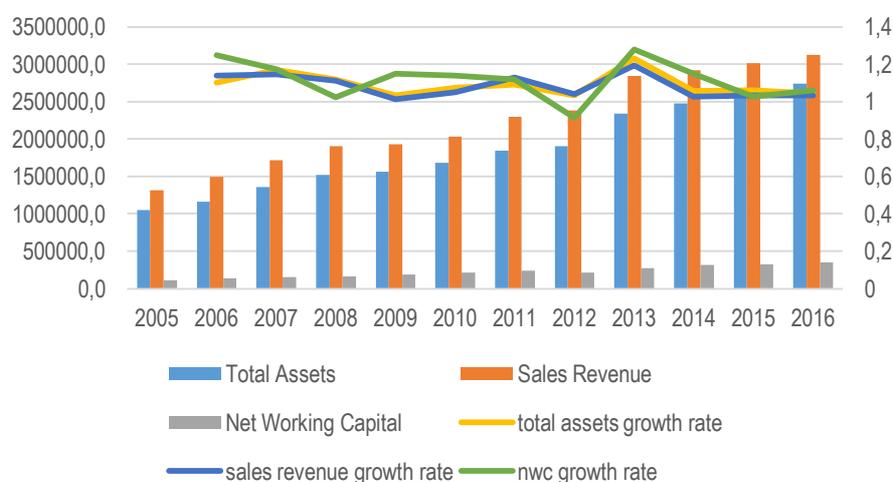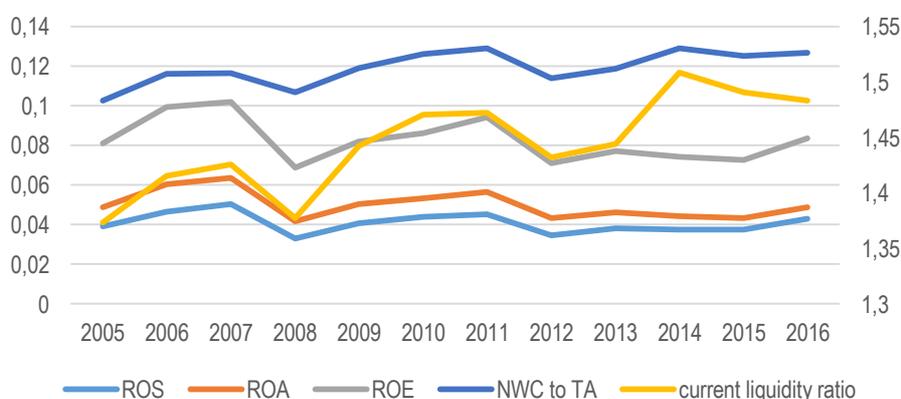

Source: Main Statistical Office in Poland.

The value of total assets, sales revenue and net working capital in Polish zloty increased over the whole period of 2005-2016 with the exception of 2009 and 2010 and after 2014. The value of sales revenue doubled its value over the whole period of 2005-2016 while the value of net working capital almost tripled. The value of total assets increased by 130%.

Additionally, data on financial standing of Polish companies confirm that there were no dramatic deterioration of financial liquidity and profitability. Figure 2 presents the data on profitability ratios (ROS, ROA, ROE – left scale) and financial liquidity ratios (net working capital to total assets – left scale and current liquidity ratio – right scale).

Figure 2. The basic descriptive statistics on profitability and liquidity for Polish companies

Source: Main Statistical Office in Poland.

Corporate profitability (ROS, ROA) remain positive for the whole period with high fluctuations and two bottoms in 2008 and 2012. The profitability in 2016 regain the level of 2005. Current liquidity ratio and NWC ratio increased slowly for the whole period of 2005-2016 with slight decrease in 2008 and 2012. The NWC ratio increased by almost 20% while current liquidity ratio increased by 8% over the analyzed period.

There is another aspect of financial crisis and companies' reaction. Because it was financial market in Poland that was more affected by the financial crisis (than the demand and the whole economy) we think that dependence on bank financing might have impact on the company's reaction to the financial crisis. Chava and Purnanandam (2011) found that firms that primarily relied on banks financing suffered larger valuation losses during this period and subsequently in the post crisis period they experienced a higher decline in their capital expenditure and profitability. The companies that depend on banking lending were more severely impacted by financial crisis and stricter lending conditions.

There are also other research proving that because of decline of bank lending to corporate sector during the global financial crisis period the firms were also enforced to sacrifice profitable investment opportunities (Ivashina and Scharfstein 2010, Campello *et al.* 2010, Cotugno *et al.* 2013, Akbar *et al.* 2013, Gaiotti 2013, Murni *et al.* 2019).

So, the third research question is as following: How did dependence on bank loans affect the relation between financial liquidity and profitability and on net working capital management. We assume that:

H5: Bank dependent companies observed bigger negative changes in profitability and financial liquidity and net working capital during financial crisis while companies with low bank dependence observed small negative changes.

2. Research design

We conducted our analysis on the data for Polish listed companies. We employed panel data for the companies listed on the Warsaw Stock Exchange. All the data cover the period 2005-2016 (12 years).

The panel data were restricted to the companies that were listed on WSE for the whole period of 2005-2016. We found 8,784 observations (quarter-company) for the panel data of listed companies (12 years and 183 companies). The panel data excludes companies acting within the financial, banking and insurance markets and with incomplete financial statements. All the financial data were collected by using Notoria Service.

We employed several ratios as the variables included in the analysis:
- Proxies for profitability: ROA - return on assets - the relation of net profit to total assets; ROS – return on sales - the relation of net profit to sales revenue; ROE – return on equity - the relation of net profit to equity.
- Proxies for financial liquidity: CR - current ratio – the relation of current assets to short term liabilities; QR - quick ratio – the relation of current assets less inventory to short term liabilities; CASH - the share of cash in total assets; NWCR - net working capital ratio – net working capital to total assets; CCC - cash conversion cycle – the sum of DIO and DSO minus DPO; DIO – days inventory outstanding – inventories x 90 days in the relation to sales revenue; DSO – days sales outstanding – receivables x 90 days in the relation to sales revenue; DPO – days payables outstanding – payables x 90 days in the relation to sales revenue.
- *Control variables*: SIZE - proxy for the size of the company – ln of Total Assets, TANG - proxy for tangibility – the relation of fixed assets to total assets; INVEST - proxy for the investment – increase in total assets in relation to total assets in period *t-1* (quarterly); GROWTH - proxy for the growth - increase in sales revenue in relation to sales revenue in period *t-1* (quarterly).
- All the analysis is conducted for subperiods: 2005-2007 - precrisis – PRECRIS; 2008-2010 - crisis – CRIS; 2011-2013 - short-term after crisis – SACRIS; 2014-2016 - long-term after crisis – LACRIS.

 Additionally, we decided to distinguish out of our sample two subsamples:
- low bank dependence – 10th percentile of the sample - companies using the lowest bank loan ratio in pre-crisis period (2005-2007) with 866 quarter-company observations (18 companies, 12 years),
- high bank dependence – 90th percentile of the sample - companies using the highest bank loan ratio in pre-crisis period (2005-2007) with 864 quarter-company observations (18 companies, 12 years).

Because we found our sample quite diversified we decided to exclude outliers. All necessary calculations are conducted on the corrected data (after excluding the outliers). We also employed regression analysis (OLS) to find out what impact on profitability and financial liquidity has financial crisis. To conduct regression analysis, we implemented following equation (where DV is the vector of dependent variables representing dependent variable in each regression model):

$$DV_{ti} = \beta_0 + \beta_1 CrisV + \beta_2 CV_{ti} + e_i \qquad (1)$$

We prepared eleven models for several dependent variables (DV): profitability (ROS, ROA, ROE), and financial liquidity (CR, QR, NWCR, CASH), net working capital (CCC, DIO, DSO, DPO). We employed four independent variables referring to the financial crisis (Crisis Variable – CrisV): PRECRIS – is represented by dummy variable that takes the value of 1 for the years 2005-2007, and 0 otherwise; CRIS – is represented by dummy variable that takes the value of 1 for the years 2008-2010, and 0 otherwise; SACRIS - is represented by dummy variable that takes the value of 1 for the years 2011-2013, and 0 otherwise; LACRIS - is represented by dummy variable that takes the value of 1 for the years 2014-2016, and 0 otherwise. We also want to include several control variables (CV): SIZE, TANG, GROWTH, and INVEST. We did all the calculations both for the whole sample and for two subsamples (with low and high bank dependence).

Eventually, to detect the relation between profitability and financial liquidity we calculated the correlation coefficient between the measures of profitability (ROS, ROA, ROE) and financial liquidity (CR, QR, NWCR, CASH) and net working capital elements (CCC, DIO, DSO, DPO). The correlation coefficient is calculated for each sub-period (PRECRIS, CRIS, SACRIS, LACRIS). Additionally, we did all the calculations both for the whole sample and for two subsamples (with low and high bank dependence).

3. Research findings

3.1 Descriptive statistics

The descriptive statistics for the whole sample and both subsamples (low and high bank dependence) are presented in Table 1. We present the descriptive statistics for all variables (dependent, independent and control). All the data were left without outliers. We employed the Shapiro-Wilk normality test and we got for all variables p-value equal 0 (zero) which allows us to assume that the distribution of our variables is not normal. Additionally, we compare the value of the descriptive statistics for both subsample (low and high bank dependent companies) by using non- parametric U Mann Whitney tests (for two independent samples with the not normal distribution). The null hypothesis is that the distributions of both populations are equal.

Table 1. Descriptive statistics for the sample

Variables	Total sample	Low bank dependent companies	High bank dependent companies	U Mann-Whitney Z statistics tests
Total Assets (mln PLN) -Median	348	105	649	-23,538
Mean	1,611	393	1,952	***
St. dev.	5,114	726	3,632	
Tangibility (%) - Median	50.1	51.5	51.8	-7,228
Mean	50.2	48.1	56.0	***
St. dev.	21.0	20.7	24.1	
Investment (%) - Median	1.5	1.4	1.5	-1,181
Mean	5.3	5.1	4.4	
St. dev.	97.1	22.4	23.2	
Growth (%) - Median	2.0	2.2	2.1	-0,561
Mean	15.6	13.7	18.2	
St. dev.	100.4	83.5	86.7	
Bank financing (%) – median	15.0	0.0	37.3	-31,862
Mean	19.2	7.0	40.4	***
St. dev	22.0	13.9	20.3	
ROA (%) - Median	1.0	0.8	0.9	-2,318
mean	0.9	0.8	1.0	*
st. dev.	6.8	4.5	3.8	
ROS (%) - Median	3.4	2.6	4.8	-7,885
Mean	5.3	-0.9	4.3	***
St. dev.	204.4	183.6	76.4	
ROE (%) - Median	2.0	1.5	2.0	-4,034
Mean	2.5	1.5	3.3	***
St. dev.	28.7	16.2	29.5	
CR –Median	1.4	1.5	1.4	-3,298
mean	2.3	2.7	1.8	***
st. dev.	5.8	6.1	1.7	

Variables	Total sample	Low bank dependent companies	High bank dependent companies	U Mann-Whitney Z statistics tests
QR - Median	1.0	1.1	0.8	-8,973
Mean	1.7	2.2	1.0	***
St. dev.	5.7	6.2	0.7	
CASH (%) - Median	4.7	2.9	4.6	-7,442
Mean	7.6	6.4	7.2	***
St. dev.	8.8	8.9	8.5	
NWCR (%) - Median	10.5	8.4	13.2	-8,277
Mean	10.7	8.3	16.6	***
St. dev.	23.2	16.8	20.8	
CCC (days) - Median	35	26	68	-9,999
Mean	54	8	157	***
St. dev.	371	336	616	
DIO (days) – median	39	38	47	-3,923
Mean	57	59	91	***
St. dev	78	66	130	
DSO (days) – median	62	77	59	-4,721
Mean	74	86	72	***
St. dev	63	69	53	
DPO (days) – median	71	86	74	-4,380
Mean	93	103	95	***
St. dev	78	67	84	

Note: *p<0,1; ** p<0,01; *** p<0,001; *Source*: author's own calculation.

The average level of bank financing for the whole sample is app. 20% (while the average for all the companies in Polish economy is 12%). This means that listed companies are more willing to use bank financing than the average Polish company. Low bank dependent companies show that on average only 7% of their total assets is financed by the bank, while high bank dependent companies show the average 37% (three times higher than the average for companies in Poland).

Low and high bank dependent companies differ significantly. The U Mann-Whitney Z statistics and p-value are the evidence of differences with statistical significance. In almost each proxy they present statistically significant diversity. Generally, low bank dependent companies are smaller, have lower tangibility, have lower profitability, but higher financial liquidity (both current and quick), lower cash holdings and lower net working capital ratio. Low bank dependent companies have shorter cash conversion cycle and this is the result of shorter DIO, longer DSO and longer DPO. Because low bank dependent companies are smaller they have also smaller negotiating power and that is why to sell their product they should offer longer deferred payment and try to pay their payables later.

Both group of companies do not differ as for the growth rate of sales revenue (GROWTH) and assets (INVEST). As we assume to find a relation between variables, we first calculated the correlation coefficients. The Pearson's pairwise correlation matrix of the variables used in our study is depicted in Table 2 from Annex 1.

Generally, profitability (ROS, ROA, ROE) is positively correlated with CASH, NWCR, GROWTH, SIZE, but negatively with INVEST, TANG. This means that that bigger companies are more profitable. But companies having more fixed assets are less profitable. Only ROS is correlated with financial liquidity (CR, QR, CCC) and turnover ratios and this relation is negative. Other measures of profitability are weakly correlated with financial liquidity. This means that higher profitability is connected with lower turnover ratios.

Financial liquidity (CR and QR) is positively correlated with CASH, GROWTH, and turnover ratios, but negatively SIZE, TANG, and Bank Financing. This means that bigger companies and companies having more fixed assets have lower financial liquidity. Companies with low use of bank financing have higher financial liquidity. This is quite understandable as companies with high financial liquidity do not need external financing.

CASH is positively related to all measures of profitability (ROS, ROA, ROE), but negatively with SIZE, TANG, Bank Financing and turnover ratios. The more profitable company the more cash pool. This might mean that the main source of cash is net profit. The bigger company is and the more fixed assets possesses the lower cash pool. And the more cash pool the lower use of bank financing.

NWCR is positively related to SIZE, DIO and DSO and negatively to CASH, GROWTH, TANG, Bank Financing and DPO. CCC is positively related with NWCR, GROWTH, turnover ratios. Turnover ratios (DIO, DSO, DPO) are positively related to the financial liquidity (CR and QR, CCC and NWCR) but negatively related to profitability (ROS, ROA, ROE) and SIZE and TANG.

SIZE has positive impact on profitability but negative on the financial liquidity (CR, QR, CASH). SIZE is negatively correlated with GROWTH and INVEST but positively with TANG. SIZE of the company is positively related to the profitability but not to financial liquidity. This means that the bigger company is the more profitable it is and the lower financial liquidity it has.

TANG is negatively related to profitability and financial liquidity, GROWTH and INVEST. This means that companies having more fixed assets are less profitable and have lower financial liquidity, grow slower and invest less. GROWTH depends on profitability and financial liquidity (positive sign). INVEST depends on GROWTH (positive sign) and profitability and SIZE (negative sign).

Bank financing depends on size and tangibility with positive signs – the bigger company and the more has fixed assets the more bank financing use. Bank financing depends also on financial liquidity but negative sign – the higher financial liquidity the less bank financing. This is justified as the companies that have access to liquid assets (have higher financial liquidity) do not need additional funds. But the bank financing is negatively related to ROA and ROS, and positively to ROE. The higher ROE and lower ROA the more bank financing is used by companies. This relation is justified by the positive effects of financial leverage that comes from the positive difference between ROE and ROA. The positive difference between ROE and ROA shows that the companies might use debt safely. To achieve positive difference between ROE and ROA company should have high ROE and low ROA.

3.2. Regression analysis results

To detect what impact had the financial crisis on profitability and financial liquidity we employed regression analysis. Dependent variable was profitability, financial liquidity and turnover ratios, independent variables was dummy variables for analyzed sub-periods (PRECRIS, CRIS, SACRIS, LACRIS). Because all our control variables are correlated with each other we decided on not including these variables into our models.

We assumed to find negative changes in profitability (decrease) during financial crisis and positive (increase) before and after financial crisis). We also assumed to find that high bank dependence companies react more radically to financial crisis. The results of regression analysis are presented in the Table 3 (for profitability ratios), 4 (for financial liquidity ratios) and 5 (for cash conversion cycle and turnover ratios).

Table 3. Regression analysis results for profitability

Sample	Total sample			Low bank dependent companies			High bank dependent companies		
Dependent variable	ROA	ROS	ROE	ROA	ROS	ROE	ROA	ROS	ROE
PRECRIS	0.100 ***	0.024 *	0.056 ***	0.088 *	0.031	0.069 *	0.174 ***	0.139 ***	0.190 ***
CRIS	-0.031 **	0.008	-0.012	-0.044	0.010	-0.039	-0.111 **	-0.092 *	-0.169 ***
SACRIS	0.004	-0.029 *	-0.004	-0.099 *	-0.063	0.002	-0.201 ***	-0.185 ***	-0.207 ***
LACRIS	-0.010	-0.018	-0.016	-0.120 **	-0.041	-0.169 ***	-0.210 ***	-0.140 ***	-0.194 ***
R square	0.011	0.002	0.004	0.012	0.005	0.026	0.038	0.025	0.037
F, p-value	31,675 ***	6,424 ***	12,206 ***	3,434 *	1,367	7,626 ***	11,407 ***	7,365 ***	11,058 ***

Note: *p<0,1; ** p<0,01; *** p<0,001; *Source*: author's own calculation.

The pre-crises period had positive impact on the profitability. In the crisis period there are significant changes in profitability (ROS and ROA) with negative signs. This is the evidence proving that Polish companies do not react dramatically to the financial crisis. After the crisis (both in short and long term) there are no statistically changes although the beta is negative which means negative impact on profitability. This might indicate delayed effects of the financial crisis on the Polish companies.

There are more statistically significant betas in all regression models for high bank dependent companies. This means that the changes in economic conditions have bigger impact on these group of companies. Their profitability reacts dramatically to changes stemming from different economic conditions (pre-crisis, crisis, post-crisis).

In the pre-crisis period the profitability of both low and high bank dependent companies increased (positive sign), while during crisis and after the financial crisis the profitability of high bank dependent companies decreased dramatically. At the same time the profitability of low bank dependent companies did not change significantly. This discrepancy proves that high bank dependent companies observed bigger negative reaction in profitability during financial crisis comparing to low bank dependent companies.

As for the time after crisis, there are negative reactions in profitability for both subsamples and again they are bigger (and with stronger statistical significance) for high bank dependent companies. Negative reaction in profitability both in short and long term after crisis is the evidence for delayed effects of financial crisis on Polish companies.

In the pre-crisis period the CR and QR declined. This means that the financial liquidity (CR and QR) decreased in good times. The company in good economic environment might decrease their safety as the economic conditions are relatively safe. What is important, financial liquidity did not change dramatically during financial crisis and after financial crisis. But during the financial crisis the financial liquidity still decreased slightly while in the after financial crisis increased slightly. Increase in financial liquidity means that companies try to increase their safety buffer. And these changes took place after the financial crisis which indicate delayed effects of financial crisis.

CASH increased in the pre-crisis period, and it was the result of good economic situations. During financial crisis it decreased slightly but after financial crisis the cash tended to decrease. Increase in CASH before crisis means that companies were cash rich due to good economic time. While during and after financial crisis the worsening economic conditions made the companies

Table 4. Regression analysis results for financial liquidity

Sample	Total sample				Low bank dependent companies				High bank dependent companies			
Dependent variable	CR	QR	CASH	NWCR	CR	QR	CASH	NWCR	CR	QR	CASH	NWCR
PRECRIS	-0.022 *	-0.012	0.114 ***	-0.038 **	-0.038	-0.041	0.196 ***	0.106 **	-0.051	0.052	0.270 ***	-0.017
CRIS	-0.007	-0.001	-0.012	0.038 ***	0.051	0.042	0.130 **	0.058	0.050	-0.070 *	-0.275 ***	0.052
SACRIS	0.011	0.005	-0.058 ***	-0.007	-0.007	-0.006	-0.138 ***	0.002	0.090 *	-0.040	-0.279 ***	0.040
LACRIS	-0.002	0.009	-0.020	-0.069 ***	0.006	0.015	0.088 *	0.106 **	0.013	-0.046	-0.256 ***	-0.041
R square	0.000	0.000	0.022	0.004	0.005	0.005	0.027	0.058	0.007	0.003	0.073	0.007
F, p-value	1,175	0,971	65,632 ***	11,781 ***	1,507	1,396	7,904 ***	17,694 ***	1,904	0,976	22,650 ***	2,056

Note: *p<0,1; ** p<0,01; *** p<0,001 *Source*: author's own calculation.

NWCR decreased in the pre-crisis period, increased during financial crisis and decreased after which again means the companies reacted to changes in economic conditions. This might mean that good economic conditions result in decreasing net working capital but worsening economic condition in the long term (after financial crisis) forced the companies to use the liquidity reserves.

As for financial liquidity (CR and QR) there are no specific differences in changes for both groups of the companies (low and high dependent). This means that both group of companies did not react dramatically due to financial crisis. But high bank dependent companies changed their cash pool level radically. It decreased significantly during and after financial crisis not changing the overall level of financial liquidity and net working capital. This means that both group of companies changed their financial liquidity in similar way with high bank dependent companies changing their cash pool more radically. The data again shows delayed effect of financial crisis (negative changes with statistical significance long after financial crisis).

Table 5. Regression analysis results for net working capital elements

Sample	Total sample				Low bank dependent companies				High bank dependent companies			
Dependent variable	CCC	DIO	DSO	DPO	CCC	DIO	DSO	DPO	CCC	DIO	DSO	DPO
PRECRIS	-0.003	-0.052 ***	0.015	-0.045 ***	0.015	-0.010	-0.002	-0.060 *	-0.044	0.043	0.043	-0.050
CRIS	-0.003	0.052 ***	-0.008	0.034 *	0.054	0.014	-0.015	0.006	0.038	0.054	0.001	0.042
SACRIS	0.018	0.046 ***	0.020	0.046 ***	-0.071 *	0.026	0.028	0.083 *	0.046	0.063	0.005	0.005
LACRIS	-0.006	0.056 ***	-0.011	0.056 ***	-0.108 **	-0.081 *	-0.007	0.092 *	-0.132 **	-0.054	-0.052	-0.082 *
R square	0.000	0.003	0.001	0.002	0.014	0.007	0.001	0.010	0.021	0.003	0.006	0.007
F, p-value	1,328	7,829 ***	2,383 *	6,831 ***	3,895 **	20,86 *	0,389	2,751 *	6,141 ***	0,822	1,731	1,966

Note: *p<0,1; ** p<0,01; *** p<0,001; *Source*: author's own calculation.

Cash conversion cycle do not show any statistically significant changes. This might mean that the changes in its elements (inventory, receivables, payables) neutralize the changes in CCC. The biggest changes are present in inventory and payable turnover ratios. DIO decreased before crisis and increased during and after financial crisis.

Increase in inventory turnover ratios means that the companies had problems with selling their goods and services. Similar changes are present as the payable turnover ratio is concerned. DPO decreased before crisis and increased during and after financial crisis. Increasing payable turnover ratio means that the companies have problems with repaying the liabilities. The receivables turnover ratio did not change significantly.

The changes in turnover ratios are more significant for low bank dependent companies with decrease in cash conversion cycle after the crisis, decrease in DIO after the crisis and increase in DPO after the crisis. Increase in payable turnover ratios means that these companies had problems with repaying their liabilities. As for the high bank dependent companies there are changes in CCC – decrease long after financial crisis and in DPO – again decrease long after financial crisis.

3.3. Profitability-financial liquidity correlation coefficient

To detect the relation between profitability and financial liquidity we calculated the correlation coefficient between all measures of profitability (ROS, ROA, ROE) and financial liquidity (CR, QR, NWCR, CASH, CCC) and between profitability (ROS, ROA, ROE) and net working capital elements (DIO, DSO and DPO). The correlation coefficient is calculated for each sub-period (PRECRIS, CRIS, SACRIS, LACRIS). We did all the calculations both for the sample and for two subsamples (with low and high bank dependence).

We assumed to find negative relation between profitability and liquidity – increase in financial liquidity is accompanied by decrease in profitability during financial crisis and decrease in financial liquidity with increase in profitability before and after financial crisis.

In the Table 6 we present only the results showing statistically significant correlation coefficient. We give up presenting correlation coefficient that are not statistically significant.

Table 6. The results of correlations analysis between profitability and financial liquidity

Period	Total sample	Low bank dependent companies	High bank dependent companies
PRECRIS	ROS-CASH: 0.108*** ROS-NWCR: 0.072*** ROS-CCC: 0.181*** ROA-CR: 0.045** ROA-CASH: 0.082*** ROA-NWCR: 0.146*** ROE-CASH: 0.053**	**ROS-CCC: -0.141*** **ROA-CCC: -0.153***	ROS-CR: 0.410*** ROS-QR: 0.*** ROS-CASH: 0.244*** ROA-CR: 0.202** ROA-CASH: 0.152*
CRIS	**ROS-CR: -0.057*** **ROS-QR: -0.061*** ROS-CCC: 0.139*** ROA-CASH: 0.088*** ROA-NWCR: 0.108*** ROA-CCC: 0.078*** **ROE-CCC: -0.073****	ROS-CR: 0.294*** ROS-QR: 0.297*** **ROS-CCC: -0.373**** ROA-CR: 0.151* ROA-QR: 0.147* ROA-NWCR: 0.140* ROE-NWCR: 0.137*	ROS-QR: 0.168* ROS-CASH: 0.193** ROE-CASH: 0.240***
SACRIS	**ROS-CR: -0.086**** **ROS-QR: -0.093**** ROS-NWCR: 0.104*** ROS-CCC: 0.177*** ROA-CASH: 0.113*** ROA-NWCR: 0.117*** ROA-CCC: 0.089*** **ROE-NWCR: -0.054*** **ROE-CCC: -0.145****	ROS-NWCR: 0.328*** ROS-CCC: 0.388*** ROA-NWCR: 0.292*** ROA-CCC: 0.289*** **ROE-NWCR: -0.371**** **ROE-CCC: -0.728****	ROS-CR: 0.150* ROS-NWCRA: 0.226*** ROS-CCC: 0.185** ROA-NWCR: 0.241*** ROE-NWCR: 0.246***
LACRIS	ROS-CASH: 0.067** ROS-NWCR: 0.126*** ROS-CCC: 0.053* ROA-CASH: 0.138*** ROA-NWCR: 0.171*** ROA-CCC: 0.102*** ROE-NWCR: 0.062** ROE-CCC: 0.046*	ROA-CR: 0.148* ROA-QR: 0.142* ROA-CASH: 0.146* ROE-CASH: 0.167* ROE-NWCR: 0.421***	ROS-NWCR: 0.191** ROS-CCC: 0.281*** ROA-NWCR: 0.282*** RA-CCC: 0.313*** **ROE-CASH: -0.139***

Note: *p<0,1; **p<0,01; ***p<0,001; *Source*: author's own calculation.

We found that the relation between profitability and financial liquidity is mostly positive. For the whole sample the positive relation is present in the pre-crisis period and long after crisis. For high bank dependence companies, the positive relation is present in pre-crisis, crisis and short after crisis period. For low bank dependent companies, the positive relation is present long after financial crisis.

The positive relation between profitability and financial liquidity during and after financial crisis represent the situation when decrease in profitability is accompanied by decrease in financial liquidity. The positive relation between profitability and financial liquidity present after financial crisis might indicate that the negative effects of the financial crisis are more severe not only during the financial crisis but also after. The negative relation between profitability and financial liquidity is present when ROE or ROS is taken into account before crisis.

Next step of our analysis is to find any relation between profitability and net working capital elements. We assumed to find negative relation between profitability and net working capital elements – increase in financial net working capital elements is accompanied by decrease in profitability during financial crisis and decrease in net working capital elements with increase in profitability before and after financial crisis.

In Table 7 we present only the results showing statistically significant correlation coefficient. We give up presenting correlation coefficient that are not statistically significant.

Table 7. The relations between net working capital elements and profitability

Period	Total sample	Low bank dependent companies	High bank dependent companies
PRECRIS	DIO-ROS: 0.073*** DIO-ROE: 0.144*** DSO-ROS: 0.124*** DPO-ROS: -0.053*	DIO-ROA: -0.148* DSO-ROA: -0.157*	DIO-ROS: 0.290*** DIO-ROA: 0.357*** DIO-ROE: 0.357*** DPO-ROS: 0.222*** DPO-ROA: 0.168* DPO-ROE: 0.156*
CRIS	DIO-ROA: -0.043* DPO-ROS: -0.094*** DPO-ROA: -0.137*** DPO-ROE: -0.056*	x	DSO-ROA: -0.229** DSO-ROE: -0.195** DPO-ROS: 0.210**
SACRIS	DSO-ROS: -0.135*** DSO-ROA: -0.141*** DSO-ROE: -0.061** DPO-ROS: -0.101*** DPO-ROA: -0.201*** DPO-ROE: -0.093***	DSO-ROE: -0.259*** DPO-ROS: 0.271***	DSO-ROA: -0.186** DPO-ROS: -0.285*** DPO-ROA: -0.368*** DPO-ROE: -0.321***
LACRIS	DIO-ROA: -0.046* DSO-ROS: -0.117*** DSO-ROA: -0.135*** DSO-ROE: -0.064** DPO-ROS; -0.150*** DPO-ROA: -0.193***	DSO-ROS: -0.524*** DSO-ROA: -0.156* DSO-ROE: -0.146* DPO-ROS: -0.542*** DPO-ROE: -0.160*	DIO-ROS: 0.192** DPO-ROS: 0.225**

*Note: *p<0,1; **p<0,01; ***p<0,001; Source: author's own calculation.*

As for the relation between profitability and turnover ratios there are more negative signs especially for the total sample during and after financial crisis, low bank dependent companies before and long after financial crisis and high bank dependent companies short after financial crisis. This means that the negative relation between profitability and financial liquidity is more noticeable when financial liquidity is defined on the basis of turnover ratios.

Conclusions and discussion

The aim of the paper was to find the impact of financial crisis on profitability, financial liquidity, net working capital elements and the relation between profitability and financial liquidity. We did it by including two additional dimensions: time dimension (that refers to the time before, during and after financial crisis) and companies' dependence on bank financing (companies that rely and do not rely on the bank financing).

Our analysis covers the country that was perceived as one resistant to financial crisis – Poland. The analysis was conducted for panel listed companies sample of 183 companies present on Warsaw Stock Exchange for the whole period of 2005-2016. We based our analysis on quarterly financial data which give us 8784 observations (quarter-company observation for the panel data of 183 listed companies over 12 years).

Before financial crisis the profitability increased, financial liquidity and net working capital elements decreased. This proves that companies felt quite safe and could decrease financial liquidity in order to prioritize

profitability. But as for the impact of financial crisis on profitability and financial liquidity we found ambiguous results. We found that Polish companies seem to be quite resistant to the financial crisis impact in general. Their reaction to financial crisis in terms of profitability and financial liquidity (CR, QR) is quite weak. The proxy of financial crisis had no or weak impact on the dependent variables describing profitability and financial liquidity. Cash holdings decreased during and after financial crisis which is consistent with Kahle and Stulz (2013) findings. This is consistent with the research results of Duszczyk 2014, Dogaru 2016, Terazi and Senel 2011, Kozub-Idźkowska and Proniewski 2011 that present the notion of weak Polish companies reaction to financial crisis. This is at the same contradictory to the notion that countries that have low bank concentration should expose economy to a bigger negative reaction to financial crisis (Gonzales 2015, Berlin and Mester 1999, Petersen and Rajan 1995). The financial crisis had no impact on cash conversion cycle which contradicts the previous research of Ramiah *et al.* (2014). The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis. These findings confirm partially findings of Daisuke (2017) and Vu and Phan (2016).

What is important, if the financial crisis had an impact on profitability, financial liquidity and net working capital elements it was long term impact on Polish companies. There is stronger negative effect of the financial crisis on profitability and financial liquidity long after the financial crisis. This is consistent with the finding that financial crisis had long-lasting effects (Prasad *et al.* 2015). To sum up, we can only partially confirm hypothesis 1, hypothesis 2 and hypothesis 3 assuming radical impact of financial crisis on profitability, financial liquidity and net working capital elements.

We found both positive and negative relation between profitability and financial liquidity for the whole sample and whole period. Negative relation is present as the ROS is a measure of profitability and CR, QR, CCC is a measure of financial liquidity. Positive relation is present when ROS and ROE are the measures of profitability and CASH is a measure of financial liquidity and when ROA is a measure of profitability and NWCR and CASH are the measures of financial liquidity. So we can both support and contradict at the same time all the research findings referring to the relation between profitability and financial liquidity (Jose *et al.* 1996, Eljelly 2004, Raykov 2017). What is important, we can see clearly that profitability (ROS, ROA and ROE) is negatively related with turnover ratios (DIO, DSO and DPO).

Looking deeper into the relation between profitability and financial liquidity we found that in the pre-crisis period the relation was positive. There is present negative relation during and short after financial crisis especially when ROS is a measure of profitability. This means that decrease in profitability (mostly ROS and ROE) is accompanied with the increase in financial liquidity (mostly CR and QR). But when turnover ratios are concerned there is noticeable only negative relation between profitability and turnover ratios during and after financial crisis. This is evidence that the decrease in profitability was accompanied by increase in turnover ratios. Again this changes in the relation between profitability and financial liquidity are noticeable in the long term which confirms although weak but long lasting effects of financial crisis on Polish companies. To sum up, we can partially confirm the hypothesis 4.

As for companies with low and high bank dependence we found different reaction to the financial crisis. Low bank dependent companies are smaller, have lower tangibility, have lower profitability, but higher financial liquidity (both current and quick), lower cash holdings and lower net working capital ratio. Low bank dependent companies have shorter cash conversion cycle and this is the result of shorter DIO, longer DSO and longer DPO. Because low bank dependent companies are smaller they have also smaller negotiating power and that is why to sell their product they should offer longer deferred payment and try to pay their payables later.

But it was high bank dependent companies that underwent the financial crisis more heavily – their profitability decreased radically during financial crisis time but also after financial crisis (in the short and long-term). As for financial liquidity the cash holdings decreased to a more extent during and after financial crisis. But there were almost no changes in cash conversion cycle and net working capital elements. Our findings are consistent with previous research showing that high dependence on bank financing make the companies more vulnerable to changes in economic conditions (Chava, Purnanandam 2011). To sum up, we could fully confirm the hypothesis 5.

To sum up, we found that Polish companies seem to be quite robust. Their reaction to financial crisis weak. The proxy of financial crisis had no or weak impact on the dependent variables describing profitability and financial liquidity. Cash holdings decreased during and after financial crisis. The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis.

What is important, if the financial crisis had an impact on profitability, financial liquidity and net working capital elements it was long lasting impact on Polish companies. There is stronger negative effect of the financial crisis on profitability and financial liquidity long after the financial crisis.

We found both positive and negative relation between profitability and financial liquidity for the whole sample and whole period. But we can see clearly that profitability is negatively related with turnover ratios. This is evidence that the decrease in profitability was accompanied by increase in turnover ratios. As for companies with low and high bank dependence we found that high bank dependent companies that underwent the financial crisis more heavily – their profitability and financial liquidity decreased radically during financial crisis time but also after financial crisis (in the short and long-term).

Our study is not free of limitations. We focused on the financial crisis as the only reason of changes in the financial ratios. But we found that control variables are strongly correlated with each other. The limitations give ground for future research as we can extend our future research. It seems reasonable to consider *e.g.* tangibility or size or industry belongings as other factors affecting financial ratios. Another limitation is concentration on one country only. It seems reasonable to consider comparative analysis including several countries with different specificity (*e.g.* different bank concentration rate).

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Table 2. Correlation matrix

Variables	ROA	ROS	ROE	CR	QR	CCC	NWCR	CASH	GROWTH	INVEST	SIZE	TANG	BankFin	DIO	DSO
ROS	0.195***	1													
ROE	0.233***	-0.073***	1												
CR	0.014	-0.043***	-0.004	1											
QR	0.012	-0.048***	-0.004	0.981***	1										
CCC	0.005	-0.317***	-0.005	0.008	0.002	1									
NWCR	0.108***	0.069***	-0.002	0.049***	-0.019*	0.039***	1								
CASH	0.108***	0.055***	0.039***	0.128***	0.134***	-0.004	-0.072***	1							
GROWTH	0.067***	0.021**	0.008	0.066***	0.063***	0.019*	-0.025*	0.016	1						
INVEST	-0.097***	0.009	-0.112***	-0.001	0.000	0.000	0.004	0.013	0.190***	1					
SIZE	0.026**	0.035***	0.000	-0.108***	-0.11***	0.005	0.044***	-0.082***	-0.045***	-0.029**	1				
TANG	-0.037***	0.012	-0.027**	-0.131***	-0.096***	-0.011	-0.227***	-0.309***	-0.024*	-0.022**	0.241***	1			
BankFin	-0.031**	-0.106***	0.045***	-0.107***	-0.106***	-0.008	-0.015*	-0.139***	-0.002	-0.021**	0.087***	0.137***	1		
DIO	-0.029**	0.004	0.010	0.025*	-0.025**	0.229***	0.248***	-0.045***	-0.006	-0.007	-0.020	-0.118***	0.098***	1	
DSO	-0.081***	-0.076***	-0.039***	0.044***	0.055***	0.037***	0.034**	-0.019	-0.030**	0.017	-0.099***	-0.111***	-0.008	0.010	1
DPO	-0.120***	-0.101***	-0.022*	0.022*	0.018	0.216***	-0.199***	-0.001	0.027*	0.025*	-0.028**	-0.050***	0.095***	0.219***	0.427***

Note: *$p<0,1$; ** $p<0,01$; *** $p<0,001$
Source: author's own calculation.

Causative Factors of Consumer Engagement in National Commercial Banks in Padang, Indonesia

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Abstract:

This study investigated the causative factors of customer engagement in national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang, Indonesia. Data source were primary data obtained from questionnaire of the respondent customers. Results of Structural Equation Modeling (SEM) showed that customer engagement in national commercial banks in Padang were influenced by the service performance and customer relationship management through customer satisfaction in Padang as the mediating variable.

Keywords: customer relationship management; service performance; customer satisfaction; customer engagement.

JEL Classification: G21; G23.

Introduction

After the financial crisis of 1997-1998 there were a lot of government banks and private banks in Indonesia which had to be closed because of the deteriorating financial condition caused by a violation of the rules and regulations made by the management. However, various efforts and attempts have been made by the government to public confidence in the Bank to be good, people are willing to re-use the services of the Bank. The efforts taken by the government include improvement efforts and restructuring of the banking industry by changing the structure of ownership and deregulation in the banking sector. This situation resulted in the change of competition, so that industry performance has endeavored to increase, the level of profitability has improved as indicated by increasing return on assets (ROA). But it does not indicate the true performance because approximately 40% of revenues are still derived from securities that zero risk assets (SBI and government bonds), although the ratio of operating expenses to operating income which reflects the level of efficiency is also increased. The capital adequacy ratio of ten large banks average has been above 8% and non-performing loans below 5%.

This indicates that the big banks do not have the ability to better appeal in the profit of small banks or foreign banks owned by the same as a bank owned by the State. This means that large banks in Indonesia do not have market power that caused them to get excess profit (Sucianti and Naomi 2009). With the attention of Indonesian

Bank and the government to the banking industry, banking performance should continue to rise with several countries in the ASEAN banking, but in reality the performance of banks remains relatively stagnant.

The growth in credit transactions of third party fund in national commercial bank (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang tends to decrease. Indonesian Bank of Padang showed the growth of third party funds in 2016 only amounted to Rp.34,1 trillion or slowed by 7.87% compared to 2015 which reached 11.3%.

On the other hand, then the transaction volume of bank credit and the addition of debit transaction banking in national commercial banks in Padang tends to decrease, this is caused by incapacity of bank in building customer engagement, where 65.9% of customers feel less bound by the bank, because of their activities with banks only in the savings or deposits and demand deposits. While 22.2% of customers feel bound by the bank because it has no credit loans collateral in the bank, in which to refund the monthly use of savings bank account number/deposit/current accounts with customers in the bank, so the savings credit transactions continue to be made each month. Similarly, 1.9% of customers feel very attached, because they have a home or car ownership loan, so that their bank account is only for the loan repayment.

This phenomenon indicates that customers have less engagement characterized by having several savings accounts in several banks, so there is a decision process (discharge) at the bank, but saving money (credit) on the other bank by the same customer. These conditions encourage customers tend to be rational loyalist. Customers who do not have a loan at a bank, is less tied to the commercial bank, making it less profitable for the bank. On the other hand, this phenomenon also shows the lack of success in establishing a common banking customer engagement through retention efforts as well as the creation of programs migration barrier on both products.

1. Literature review

The phenomenon of the lack of engagement to customers and banks can also be derived from the presence of some elements such as the lack of confidence of customers related to the bank (confident), customers are less credible associated with the bank (integrity), customers are less felt served with passion or enthusiasm (passion) and customers are less proud associated with the bank (pride). Some researches related to bank have been conducted (Boedi 2019, Wati 2019).

Patterson (2016) explained that customer satisfaction affects customer engagement. Companies which are able to maintain the satisfaction of their customers will be able to increase the number of customers, in addition to the performance of services and relationship. This means that the banking industry's perception of service performance is very close to the customer, so the perception of service performance tends to directly influence the engagement of customer.

Then Kumar and Gangal (2012) explained that there is a positive effect of customer satisfaction on customer engagement, low engagement of national commercial banks customers tends to be caused by lower customer satisfaction. It refers to the results of a survey conducted by Marketing Research Indonesia 2014 in four cities, Jakarta, Bandung, Pekanbaru and Banjarmasin. Customers are less satisfied, indicated by dissatisfaction with aspects of service personnel front liner, such as officer security guards over the service so that it does not make the customer comfortable. As well as customer service representative, teller and a telephone receiver that their skills could not keep abreast of ever-increasing customer expectations.

Chen (2011) stated that customer relationship management is a comprehensive approach to create, maintain and enhance relationships with consumers where customer retention is much cheaper for companies than to find new customers. Companies should always strive to offer new opportunities to create more individualized relationship between the seller and the customer (Hunt 2011). This was confirmed by the results of research Mohagar and Gashemi (2011). Thus, it costs five times to get a new customer than to retain someone who is already a customer.

Furthermore, Bena (2010) explained that the customer satisfaction of a bank has several dimensions, namely satisfaction at the time of transaction, ease of access to the bank, the satisfaction on the quality of relationships, bank reactions on complaints of customers, satisfaction in service promotions bank, satisfaction at the communication, satisfaction of operational hour. Besides, the dimensions of the bank's customer satisfaction are the satisfaction of the branch of service, satisfaction in product and service quality, satisfaction on the availability of branches in a particular location, the satisfaction in e-banking, branch personnel satisfaction in hospitality, satisfaction at the development of the ATM network. Kumar and Ganggal (2012) found that the dimensions of the bank's customer satisfaction are the bank branch, account number management, handling of inquiry.

Navaratnase and Elangkumaran (2014) conducted a study on the customers of commercial banks that service performance is a significant positive impact on customer satisfaction, therefore maintaining high quality

services in commercial banks will have customer satisfaction very well where low quality service will cause a decrease in satisfaction customers, and also can lead to loss of customers.

Teimuori (2013) analyzed the impact of service quality dimensions on customer satisfaction in the banking industry in Iran. Results found that the dimensions' responsiveness have the greatest impact on customer satisfaction and loyalty. Among the dimensions of service performance, and the two dimensions of reliability and empathy do not have a significant impact on customer satisfaction. Taleghani (2011) conducted a study in Saudi showed that the intensity of the relationship and customer satisfaction is 90%. In other word, 81% of the change of customer satisfaction can be explained by the benefits of the relationship. Khandabi (2014) also conducted research on banks in India about the influence of relationship marketing on customer satisfaction which shows that the dimensions of the marketing relationship have positive and significant impact on the level of customer satisfaction. Dimension "trust" has the greatest influence and dimension "shared values" have the lowest effect on customer satisfaction. Puriwat and Tripopsalkul (2014) conducted research on the effect of service quality on customer engagement various industries in Thailand. Results found that the performance of services has a significant positive relationship towards customer engagement. The study by Goetz (2014) showed that the moderating had positive results and significant impact on customer engagement on brand image and relationships.

Furthermore, Malthouse (2013) found that the customer relationship management must evolve if it wants to survive in the market, by producing the contact point of engagement desired customer and deliver value for both companies and consumers. Soliman (2011) found that the relationship with customer relationship management performance affected positively and significantly on financial institutions. Bena (2010) also found that customer satisfaction in banking management services focus on service to the customer satisfaction evaluation approach in banks in Romania.

Yao (2011) used framework to analyze the data collected from a questionnaire survey and found that factors of assurance and tangibles had significant effect on customer satisfaction. Dharmayanti (2006) conducted a study on savings customers of Mandiri Bank in Surabaya branch. Result found that the interaction between service performance and customer satisfaction as mediating variables can better explain variations in customer loyalty than each variable.

Furthermore, Kumar (2010) provided a comprehensive framework that can eventually lead to more efficient marketing strategy to contribute better long term for the customer. Result found that it is very important for banks to obtain useful feedback about the response time and the perception of quality of service to customers. Retail bank, which in turn will help in taking positive steps to maintain a competitive advantage research is very helpful for new banks in India.

Hawari and Ward (2006) conduct research on the impact of service quality automatically on financial performance and the mediating role of customer satisfaction with the bank in Australia. Result showed that customer satisfaction was confirmed as a mediator in the relationship between the automated service quality and financial performance. Caruana (2002) also conducted research on the influence of the quality of service and a mediating role in customer satisfaction. The study found that customer satisfaction mediates the relationship in service quality significantly.

Muniz and O'Guinn (2001) argued that communities can strengthen customer loyalty and customer commitment. According to Reichheld (2000) and Zhang (2010) community of customers is the most excellent tool to bind and create customer loyalty. Hunt (2000) also stated that the commitment was instrumental in developing customer loyalty.

From the previous description, it was conducted a study on causative factors of consumer engagement in national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang and factors that act as a mediator variable on customer engagement.

2. Methodology

This research is descriptive which aims to describe and examine the relationship service performance and customer management as independent variable that affect the customer satisfaction and customer engagement as dependent variable with Structural Equation Modeling (SEM). The unit of analysis in this study are customers of the national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang. Based on the description of the theory, hypotheses and framework can be formulated as follows:

- H1: there is an effect of service performance on customer satisfaction in national commercial banks in Padang.

- H2: there is an effect of customer relationship management on customer satisfaction in national commercial banks in Padang.

- H3: there is an effect of customer service performance on attachment in national commercial banks in Padang.

- H4: there is an effect of customer relationship management on customer engagement in national commercial banks in Padang.

- H5: there is an effect of customer satisfaction on customer engagement in national commercial banks in Padang.

- H6: there is an effect of service performance on customer engagement and customer satisfaction as mediating in national commercial banks in Padang.

- H7: there is an effect of customer relationship management on customer engagement and customer satisfaction as mediating in national commercial banks in Padang.

Figure 1. Framework based on SEM model
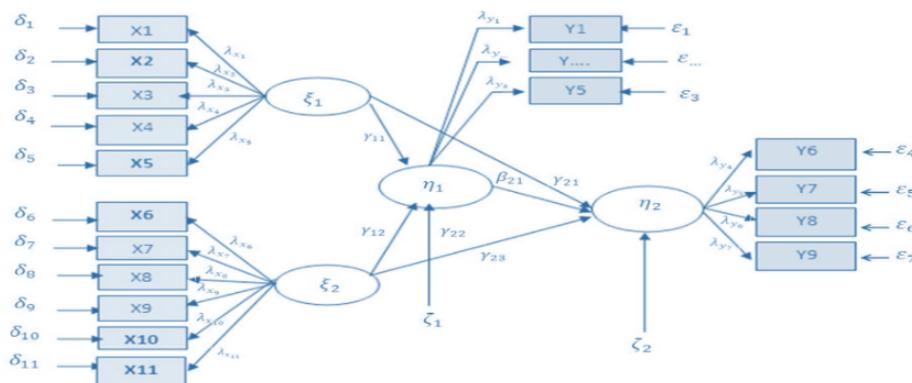
Where: ξ_1 = service performance; ξ_2 = customer relationship management; η_1= customer satisfaction; η_2= customer engagement; X1 - X5 = Manifest (Dimension) of service performance; X6 - X11 = Manifest (Dimension) of customer relationship management; Y1 - Y5 = Manifest (Dimension) of customer satisfaction; Y6 - Y9 = Manifest (Dimension) of customer engagement.

3. Research findings and discussions

Table 1. R^2 Value

Servqual	R Square
Customer relationship management on customer satisfaction	0.628284
Customer satisfaction on customer engagement	0.541781

Source: SPSS 18.0 processing

Table 2. Summary of inter-variable decomposition effect

	Customer Satisfaction	Customer Engagement
Service Performance	-0.012260	-0.051563
Customer Relationship Management	0.794272	0.574431
Customer Satisfaction		0.799777

Source: SPSS 18.0 processing

The reliability value of each variable research was very greater than 0.7 and met the criteria of composite reliability. The result of discriminant validity test using the output test of average variance extracted (AVE) was greater than 0.5, thus all latent variables in this study had a very good discriminant validity. Cross loading value obtained (0.880051) also showed a good level of discriminant validity with X1 dimension on variable service

performance, which was greater than cross loading value X1 with customer relationship management of 0.536453, satisfaction variable of 0.441053, and customer engagement variable of 0.281430. The value of the cross loading dimension with its variable was greater than the cross loading with other variables. Based on discriminant validity test results, the square root value of AVE on latent variable was greater than 0.7 and the correlation value with all other latent variables that have good discriminant validity.

Table 3. Summary results of hypothesis test

Hypothesis	Variables	Standardize/ Determination coefficient	T/F-value	Statistical inference
H1	Service Performance -> Customer Satisfaction	0.006224	0.316189	Rejected
H2	Customer Relationship Management -> Customer Satisfaction	0.784808	28.510207	Accepted
H3	Service Performance -> Customer Engagement	-0.032170	4.389801	Accepted
H4	Relationship Management -> Customer Engagement	0.566707	21.471630	Accepted
H5	Customer Satisfaction -> Customer Engagement	0.019310	2.109292	Accepted
H6	Service Performance -> Customer Satisfaction -> Customer Engagement	0.767299	71.887576	Accepted
H7	Customer Relationship Management -> Customer Satisfaction -> Customer Engagement	-0.088217	3.250602	Accepted

Source: SPSS 18.0 processing

The square root value of AVE on service performance variable was 0,746, greater than the correlation value between service performance with other variables of 0,669. The square root value of AVE on customer relationship management variable was 0,796, greater than the correlation value between customer relationship management with other variables of 0,786. The square root value of AVE on customer satisfaction variable was 0,769, greater than the correlation value between customer satisfaction with other variables of 0,730. The square root value of AVE on customer engagement variable was 0,754, greater than the correlation value between customer engagement with other variables of 0,539. Thus, the square root value of AVE was greater than the correlation value of other variables. This means that all the latent variables in this study had good discriminant validity. The AVE values for all variables in the study were ranged from 0.55 to 0.63. This proved that the AVE values of the research variable were greater than 0.5. The results indicated that all the indicators and dimensions of the variables had a good convergent validity. Thus, indicators and valid dimensions' measure each of the latent variables.

Furthermore, the value of R2 indicated that the customer satisfaction variable can be explained by the service performance variable of 62.8%, the rest was explained by other variables. The customer engagement variable was explained by the customer satisfaction variable of 54,2%, the rest was explained by other variables.

T-statistics value of 0,3161 on first hypothesis (H1) was smaller than t-table of 1,645 at confidence interval of 95%, and df = 326, thus the first hypothesis was rejected. There was no influence of service performance on customer satisfaction. The second hypothesis (H2) stated that partially, there was an effect of customer relationship management on customer satisfaction, where t-statistics value of 28,51 was greater than t-table of 1,645 at confidence interval of 95% and df = 326. Partially, there was a positive and significant effect of customer relationship management on customer satisfaction. The third hypothesis (H3) stated that partially, there was an effect of service performance on customer engagement, where t-statistics value of 4,389 was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. There was a positive and significant effect of service performance on customer engagement.

T-statistics value of 21,47 on fourth hypothesis (H4) was greater than t-table of 1,645 at confidence interval of 95%, and df = 326. It indicated that there was a significant effect of customer relationship management on customer engagement. T-statistics value of 71,88 on fifth hypothesis (H5) was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was a positive and significant effect of customer satisfaction on customer engagement. T-statistics value of 3,25 on sixth hypothesis (H6) was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was an effect of service performance on customer satisfaction on customer engagement with customer satisfaction as mediating variable.

The beta value of -0.0122 on hypothesis 6 and 7 was greater than the effect of service performance on customer engagement total value of -0.05156. This proved that customer satisfaction variables mediate the effect of service performance on customer engagement negatively. It means that customer satisfaction decreased the effect of service performance on customer engagement. T-statistics value of 2,1 on seventh hypothesis (H7) was

greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was an effect of customer relationship management on customer engagement with customer satisfaction as mediating variable.

Conclusion

From the research, we can conclude several things as follows:
- There was no significant effect of service performance on customer satisfaction in national commercial banks in Padang;
- There was a positive and significant effect of customer relationship management on customer satisfaction in national commercial banks in Padang;
- There was a positive and significant effect of customer service performance on customer engagement in national commercial banks in Padang;
- There was a positive and significant effect of customer relationship management on customer attachment in national commercial banks in Padang;
- There was a positive and significant effect of customer satisfaction on customers attachment in national commercial banks in Padang;
- There was a significant indirect effect of customer service performance on customer engagement in national commercial banks in Padang with customer satisfaction as mediating variables;
- There was a significant indirect effect of customer relationship management on customer engagement in national commercial banks in Padang with customer satisfaction as mediating variables.

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