Determinants of winning and losing persistence in the Polish banking sector

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Abstract

The article explores the reasons for winning and losing persistence in the Polish banking sector in the 1994–2005 period. It empirically verifies four hypotheses. They associate the performance persistence with market power, informational opacity, ownership structure, as well as with different operational and risk profiles of banks. Estimation of probit models led to the conclusion that in Poland market power related to the developed distribution channels and informational opacity make winning persistence more likely while preventing losing persistence from occurring. Furthermore, foreign-controlled banks have more chances to succeed repeatedly and avert subsequent failures. The picture of performance persistence in the Polish banking sector is biased by banks' earnings management, especially by the avoidance of reporting small losses.

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1. Introduction

Performance persistence means an organization's tendency to achieve similar results over consecutive periods. It is winning persistence when good results are recorded on a constant basis, and losing persistence when performance remains consistently poor. There are several reasons that make the phenomenon of performance persistence and research on it so important. For investors, the likely persistence of financial performance is the factor they should take into account when making their decisions. Persistence, which reflects some imperfections in the mechanisms of competition, also provides valuable information to institutions dealing with the evaluation of competitiveness and the protection of consumer interests. On the other hand, identification of the reasons for winning and losing persistence in various industries is of vital importance to managerial staff, e.g. as they work toward the goal of maximizing value for shareholders.

In the case of the banking sector the amount of relevant research does not match the potential significance of performance persistence phenomenon. Compared to purely cognitive and practical benefits of in-depth research into persistence, we believe this amount is disproportionately low. This article is, therefore, meant to supplement previous findings with regard to the economic sources of the persistence phenomenon. We think that three factors make this article original. Firstly, it accounts explicitly for the fact that banks' earnings management may disturb research results. Secondly, it analyzes the sensitivity of research results to changes in the definitions of success and failure. Thirdly, it constitutes, the first, to our knowledge, attempt to examine the hypotheses explaining the performance persistence in the banking sector, which was made using data from emerging markets.

The remainder of the article is composed of six sections. Section 2 presents theoretical determinants of the winning and losing persistence in the banking system. Section 3 provides an overview of the empirical findings that have been made in this respect so far. Then, Section 4 describes the general characteristics of the research project dealing with the performance persistence phenomenon in Poland, which was initiated and conducted by the author of this article. In addition, it puts the findings of research on the reasons for performance persistence (presented for the first time in this article) into the context of the previously published (in Polish and English) results of the verification of the hypothesis behind very existence of winning and losing persistence phenomenon in the Polish banking system. The research methodology which was used to identify the factors determining the performance persistence is described at length in Section 5, whereas the research findings and their interpretation are presented in Section 6. The article is closed with the overview of major findings.

2. Theoretical determinants of winning and losing persistence in banking

As indicated by A.N. Berger et al. (2000), causes of performance persistence should be sought among factors which are sufficiently heterogeneous within the study population, yet they remain quite stable in time for its constituent subjects. Such factors include: market power, informational opacity, management skills, ownership structure, as well as banks' operational and risk profiles.

The market power of some banks obviously impairs competition. Disruptions to competition may affect the market, on both a local and national level. In banking, market power is strictly associated with scale of operations. It is easy to notice that large scale creates reputation capital, leads to the fact that banks are seen as too big or too important to let them fail, and usually adds to informational opacity. Theoretically, regulations of banking activities have an ambiguous impact on the market power and its stability and, in consequence, on the likelihood of the occurrence of persistence phenomenon. On the one hand, licensing of banking activities, the use of an array of operations reserved specifically for banks, or restrictions curbing geographical expansion (currently very rare) thwart competition. On the other hand, control of takeovers and mergers can, for example, protect competition, in both local and national markets.

Substantial degree of informational opacity deepens information asymmetry between banking insiders and outsiders. Thus it makes it easier to sign contracts with terms beneficial to insiders. Bank's informational opacity depends not only on the size of operations, but also on the complexity of its organisational and ownership structure, as well as its specialization in operational areas where the role of private information is particularly significant, e.g. in lending to small and medium-sized enterprises. Of substantial importance to the interpretation of the findings of research into the determinants of winning and losing persistence in the banking sector may be the fact that with increases in the informational opacity of a bank more opportunities arise to manage its financial result – opportunities that are seized by banks stemming from various markets (Beatty et al. 2002; Shrieves, Dahl 2003; Jackowicz, Kuryłek 2005).

The role of management skills in the shaping of financial results is particularly vividly discussed with reference to mutual funds. However, it remains unexplained even in the case of this type of financial intermediaries (Chevalier, Ellison 1996; Carhart 1997; Huij, Verbeek 2007). From a theoretical point of view, the factor in question should be of more importance in banking than in the mutual fund industry. In our opinion, it infers from two reasons. Firstly, bank managers operate partially in markets with a lower informational efficiency. Secondly, banking organizations are more complex, so they have more fields in which high or missing management skills co-determine performance. It is worth noting that in case of a relationship between management skills and winning and losing persistence a snowball effect may occur. Prosperous banks find it easier to retain or attract the best specialists, and thus to enhance chances to succeed in subsequent periods. However, for the banks that have fallen into financial troubles and need to keep wages at a reasonable level, it is difficult to compete for the best professionals on the labour market.

Agostino et al. (2005) were the first to propose that the array of factors determining winning and losing persistence in the banking sector should include the ownership structure of banks. They formulated a hypothesis that stronger concentration of ownership and bigger role of institutional investors in the ownership structure should reinforce the performance persistence phenomenon. They did not present, however, any economic mechanism that would explain the existence of this relationship. They presumably meant a mechanism associated with the efficiency of corporate governance exercised by institutional investors and the non-existence in their case of the free rider problem as regards monitoring of managers' actions and influencing their decisions. The free rider problem may occur on a large scale, however, if the ownership structure is dispersed.

The described mechanism of ownership structure's impact upon performance persistence is not the only one that may function in emerging economies. State-owned and foreign-controlled

banks in transition economies are generally more trusted by customers than those under the control of domestic private investors. This unique reputation effect is a result of wide-ranging implicit guarantees for liabilities of state-owned banks, as well as of financial power of foreign shareholders and their knowledge of how to manage banking risks.

Banks' risk and operational profiles may show significant differences in respect of performance persistence phenomenon occurrence. For example, they concern banks' investment structure and financing sources, a prevailing (wholesale or retail) component of their operations, or geographical scope of activities. The impact of differences in banks' risk and operational profiles may be augmented by macro-economic developments. Overall good economic condition should promote winning persistence in banks taking increased risks, whereas an economic downturn poses a threat of their losing persistence over a number of periods.

3. Review of previous empirical findings

In the literature on the subject, we have managed to identify only four publications aimed at empirical identification of the reasons for banks' winning and losing persistence. Three of them apply to the US market, and one to that of Italy. The studies are based on data from different periods, and they also use various methodologies. This makes any comparisons and generalizations of the reported findings very difficult.

The first to be published was a study by Roland (1997), which used data compiled for 1986–1992 regarding 237 US bank holding companies. Roland's study stands out against the research described further below because it does not focus on the features of a bank and its relations with stakeholders, which are so critical to persistence, but on the constituents of a bank's profit and loss account, which are responsible for the persistence of the return on assets. Calculations showed that the long-term persistence of return ratios in the sample under review was determined by interest income, commission fees, and proceeds from investment in securities, whereas the short-term persistence was related to the interest expense of deposits.

The findings of the most extensive study ever conducted on the reasons for the persistence of banking performance were presented by Berger et al. (2000). They used data regarding all US banks in 1969–1997. They concluded that the impact of persistence drivers upon success or failure persistence is not identical. Reduced competition in the local market influenced stronger losing persistence. The situation was quite different for informational opacity which had a greater effect upon winning persistence. Local and macro-economic disruptions remained a very important determinant for both types of persistence. The latter observation corresponds well to the results of research conducted by Neely and Wheellock (1997), who, *inter alia*, positively verified the hypothesis that the financial performance of U.S. banks in 1946–1995 depended on regional and macro-economic disturbances.

The reasons for performance persistence among U.S. savings institutions were analyzed by Cebenoyan et al. (2004). They examined a sample of 81 organizations, and compiled data for 1989–1994. The estimation of a probit model revealed that companies that experienced losing persistence usually shared low charter values (approximated by the quotient of the market and book values of their equity) and a higher tendency to incur risks. The probability of repeatedly joining the

group of winners was increased, by contrast, by high charter value and reduced credit risk. Unlike in research conducted by Berger et al. (2000), regional economic conditions were a statistically significant driver of losing persistence only.

Of particular interest to Agostino et al. (2005) was their hypothesis, presented in the previous section, regarding the relationship between the ownership structure of banks and the performance persistence phenomenon. Based on data regarding 331 Italian banks in 1997–2000, Agostino et al. found out that higher overall concentration (measured by the Herfinadahl-Hirschman index) and concentration of ownership in the hands of institutional investors such as banks made performance persistence more probable. The performance persistence was diminished by an ownership dispersion, however.

4. Research on performance persistence in the Polish banking sector – general characteristics

The research project on the performance persistence of banks in Poland was carried out in two stages. In the first stage, we aimed to examine the hypothesis concerning occurrence of winning and losing persistence, and find out how powerful this phenomenon was. Positive verification of the said hypothesis constituted a prerequisite to the second stage of research, i.e. an attempt at empirically identifying the determinants of the performance persistence phenomenon. As mentioned in the Introduction, the results of the first step have already been published, whereas those of the second one are disclosed for the first time in this article. This is why we will limit to presenting only those findings of the first stage of research which substantiate the methodological choices in the second stage and help to interpret the results of research on the reasons for persistence performance. Before we do so, however, we will describe some important features shared by both stages of research into the persistence phenomenon.

The subjects of the research were commercial banks that were active in Poland. According to the nomenclature adopted by Polish regulatory authorities, this term is understood to include banks licensed in Poland which are organized as public limited companies or state enterprises. Over the entire time horizon under review, which spanned the period from 1994 to 2005, commercial banks constituted the most important element of the banking sector and played a pivotal role in the financial intermediation processes in Polish economy, since they controlled more than 90% of the banking system's assets and more than 70% of the financial system's assets.

Data used in the performance persistence research was collected exclusively from publicly available sources, mostly from annual reports of banks and from financial statements contained in an official gazette called *Monitor Polski B*. Some financial statements could not be included in the author's database, as in 1994–2005 banks that had been put into liquidation or taken over by financially stronger organizations did not publish their reports for their last full financial year. However, this occurred relatively rarely, so there is no reason to suppose that the lack of those reports has substantially distorted the picture of the performance persistence phenomenon.

We measured the performance using two profitability indicators. The first one was operating return on assets (OROA) (profitability of main banking and financial operations), and calculated as the quotient of operating income (*wynik działalności bankowej* in Polish) and the value of assets.

The second one was return on assets (ROA) and calculated as the quotient of gross financial income and the value of banking assets. The two profitability measures were used because operating income is empirically proven to be less vulnerable to earnings management activities of Polish banks than gross financial income (Jackowicz, Kuryłek 2005).

The analysis of dynamics in profitability distributions, including the verification of the hypothesis about performance persistence, can be performed in two ways: either by means of the discretization of continuous variables or without converting continuous into discrete variables. We applied both methods in our research.

The first thing to be done before the discretization-based method can be used is to find whether the organization has been a winner or a loser over a financial period. The classification criterion in our research was whether a year's profitability median has been reached or not. Using classification results for subsequent periods, the so-called contingency tables can be compiled to show the number of organizations which: (i) were winning over two consecutive periods; (ii) were losing over both periods in question; (iii) were winning during the first and losing during the second period; (iv) after losing during the first period managed to bounce during the second period. Contingency tables make it possible to conduct simple, non-parametric tests of the null hypothesis about no correlation between performance of the current period and the results achieved in the previous period, i.e., about the non-existence of performance persistence phenomenon (Jackowicz 2006; Jackowicz 2008a).

Calculated test statistics allowed rejection of the null hypothesis (at the significance level of 1%) for all the biannual sub-periods under review. This was a strong argument in favour of the thesis that there is short-term performance persistence in the Polish banking system. In addition, changes over time in the test statistics values suggested that the persistence phenomenon was stronger in the initial and final years of the time horizon adopted for analysis. A relatively weaker performance persistence in the middle years of the analyzed time span seemed to be caused by the deterioration in the banking sector financial condition and the intensification of ownership and organizational transformations in the late 1990s and the early 2000s.

Although they provide important information, all methods involving the discretization of a continuous variable share two weaknesses. Firstly, their results depend on arbitrary decisions about the number and definitions of the discrete states considered. Secondly, information contained in a compiled data set is inevitably lost while converting a continuous into a discrete variable. This is why we decided to additionally verify the hypothesis about the performance persistence in the Polish banking sector using a tool that is free from the mentioned deficiencies, i.e. stochastic kernel estimation (Jackowicz, Kozłowski 2008b). The stochastic kernel estimation technique was developed by D. Quah (1997) to study economic growth processes. Nowadays, the scope of applications of stochastic kernel to economic research is very broad, encompassing, for example, the analysis of healthcare financing systems (Dharma 2007), local labour markets (Pellegrini 2002), technical efficiency of companies (Jorge Moreno 2006), and urban development (Ioannides, Ogerman 2003).

The stochastic kernel estimation for OROA provided no surprises. The layers of the stochastic kernel mapping in this case were clearly arranged along a straight line inclined at an angle of 45 degrees to the X-axis. Therefore, regardless of OROA during period t, profitability similar to the original one was most likely to be recorded in year $t + 1$. This proves the lack of mobility within the

distribution, and, above all, confirms the occurrence of short-term winning or losing persistence in the area of main banking and financial operations of the Polish commercial banks.

As shown in Figure 1, the dynamics of ROA distribution wasn't so straightforward, though. There is no doubt that short-term persistence is observed in the case of positive ROAs. For negative values of ROA in period *t*, the ridge of the stochastic kernel is rotated counter-clockwise, and generally runs along a half-line parallel to the Y-axis that is drawn from the point on the X-axis indicating zero gross income during period *t+1*. This proves that a large number of banks which incurred gross losses in the first year were able to report small gross profit in the next financial year. The analysis of OROA dynamics makes it clear that this improvement was not caused by enhanced profitability in the area of main banking and financial operations. It could only be a result of reduced overhead costs or some accounting practices concerning amounts of created or released provisions. Given that the degree of managerial control over the provisions amount is in a short term higher than that over overhead costs and that research conducted by Jackowicz and Kuryłek (2005) has confirmed provisions to specific loan loss reserves being regularly manipulated in the Polish banking sector to avoid reporting losses, we incline toward the hypothesis that sees the cause of change in the position of the stochastic kernel ridge in the so-called earnings management activities.

Figure 1
Layered mapping of the stochastic kernel for ROA
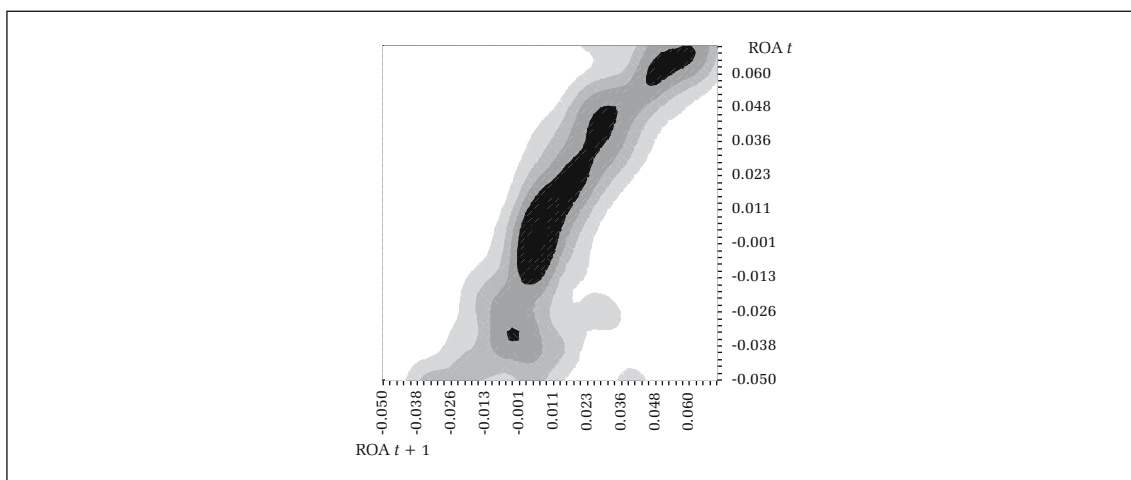
Note: Stochastic kernel estimation was besed on data for the Polish banking sector in 1994–2005. The X-axis shows ROAs for period *t* + 1, and the Y-axis for period *t*. The isolines in the figure connect points with the identical values of the stochastic kernel. The stochastic kernel was plotted using software developed by Kozłowski (Jackowicz, Kozłowski 2008b).

To sum up, the first stage of research on the performance persistence in the banking sector enabled us to draw the following conclusions. Firstly, short-term performance persistence is an important and permanent feature of the Polish banking system. It is reasonable, therefore, to make an attempt at finding out empirically what causes this phenomenon to happen. Secondly, for those banks that incur gross losses, it can be assumed with a high degree of probability that the short-term dynamics of their profitability, which is driven by market mechanisms, may be disturbed by accounting practices connected to earnings management. Hence, the causes of winning and losing persistence should be more readily identifiable if profitability is measured by operating

income (OROA) rather than by gross income (ROA). Thirdly, there are two factors contributing to the strength of performance persistence phenomenon: general economic trends and intensity of structural transformations in the banking sector.

5. Methodology of research on the determinants of performance persistence

The reasons for winning and losing persistence will be reviewed separately, as factors increasing the chances of winning do not necessarily have to reduce, at the same time, the risk of losing once again. To control how the decision regarding the definitions of winning and losing affects output results and draw conclusions, we are going to use alternative definitions. According to the first, restrictive definition, we consider those organizations to be winners (W) or losers (L) whose profitability was, respectively, among 25% of the best or 25% of the worst performances in a specific year. According to the liberal definition, we consider those banks to be winners whose profitability exceeded the median of profitability distribution in a given year, and losers – those organizations which failed to reach this profitability threshold. Throughout the entire research project regarding persistence, we use OROA and ROA, defined in section four, as measures of banking performance.

   The determinants of winning and losing persistence will be identified based on an estimation of probit regression models. Dependent variable: winning persistence (WP) or losing persistence (LP) will have value 1 if a bank respectively wins or loses twice during two consecutive annual financial periods, and value 0 in the remaining cases. Since alternative definitions of winning and losing are employed, it is necessary to provide the symbols of dependent variables with the additional quantifiers: 25 and 50, in order to indicate that the quartiles and the median of the profitability distribution, respectively, are used for the assessment of financial performance.

   Because of the special way in which the banking sector operates in a transition economy, focus is placed on short-term winning and losing persistence (observed in two-year periods). Over the time period studied (1994–2005), the number of commercial banks substantially diminished, numerous consolidation processes took place due to factors of both market-related and administrative nature, ownership structure of banks was profoundly transformed. These changes were far more intense than in developed and stable economies. For example, in 2001, which was the record-breaking year in this respect, as many as 15 out of 73 commercial banks that were operating in 2000 were involved in consolidation processes. On the other hand, in 1999, deep changes regarding ownership structure affected 11 out of 77 banks that were operating until the end of that accounting period. In this setting, the determinants of medium- and long-term persistence would be, in our opinion, disturbed, and the number of observations that could be used for model estimation largely limited. Relative stabilization of ownership structures and organizational forms occurred in the Polish banking sector only after 2004. This makes econometric analysis of medium- and long-term winning and losing persistence phenomenon in Polish conditions actually possible only in several years from now.

   The set of explanatory variables originates, above all, from the desire to perform an empirical assessment of theoretical conjectures about the reasons for performance persistence. What limited the capability to test precisely some of the hypotheses described in section two, however, was the data scarcity associated with the strong diversity of the reporting standards applied by Polish

commercial banks. As demonstrated below, we finally managed to verify four out of five potential explanations for the persistence phenomenon.

We tried to describe the market power of banks by means of three variables. The first two ones are associated directly with the scale of operations. These are the natural logarithm of balance sheet assets (Ln A) and the square of a bank's share in the system's assets (SA 2). Two variables instead of one were used to reflect the size of operations owing to the fact that large differences in the size of banks, the importance of which is emphasized by SA 2, may have a different impact on the persistence phenomenon than small or moderate ones. The third variable from this group reflects the market power seen from the angle of having well developed distribution channels. It is constructed as a difference between a bank's share in tangible sector assets and its share in total sector assets (SFA-SA). All three variables should increase the probability of winning persistence and prevent losing persistence. The greater the size of operations, the stronger the bank's reputation and the broader the implicit default government guarantees for its liabilities. Well developed distribution channels, in turn, ensure access to inexpensive and reliable funding sources, and make it easier to launch new products and boost the sale of those that are already on offer. The expected direction of the size-related variables influence can be distorted by a less efficient decision-making process in large banking organizations, which exacerbates difficulties in responding to changing market conditions.

The informational opacity of banks is illustrated by two variables: share of loans granted to non-financial institutions in balance sheet assets (Lnfn/A) and a binary variable that equals 1 when bank's shares are listed on a stock exchange (EXCH). Lending to non-financial institutions is the type of investment activity in which private information remaining at a bank's disposal is of vital importance, i.e. information asymmetry between banking insiders and external stakeholders is particularly noticeable. One should expect, therefore, that variable Lnfn/A will have a generally positive effect on the probability of winning persistence and a negative effect on the likelihood of losing persistence. When predicting the direction of the impact of a bank's shares being listed on a stock exchange on the phenomenon in question, two factors should be taken into account. Firstly, far more reporting obligations are imposed on listed banks than on other entities in the sector. *Ceteris paribus* the informational opacity of their activities should be, therefore, lower. Secondly, despite reduced potential for earnings management such activities are extremely important for listed banks, especially as far as building an illusion of stable growth or demonstrating the uniqueness of poor performance is concerned. Therefore, we expect listed banks to sustain a sequence of severe failures less often than others but at the same time to be less ready to report extremely good performance that might be difficult to beat in the next period.

Based on the data available to us, it is impossible to provide an in-depth overview of the ownership structure of commercial banks, nor to determine the degree of its overall concentration. Hence, the set of explanatory variables contains two variables reflecting only the most general features of the ownership structure. These are binary variables encoding the fact that a bank is controlled either by the state treasury (STOWN) or foreign investors (FOROW). Compared with organizations owned by private domestic investors, both groups of banks should enjoy more confidence from their customers, and consequently be able to earn higher financial intermediation margins. As far as operating income is concerned, the variables in question should therefore increase the chances of winning persistence and reduce the probability of losing persistence. When profitability is measured on gross income basis, the power of the mentioned effect will depend on

how far the lack of a clearly defined owner in state-owned banks translates into the lack of proper control over their overhead costs. Taking into consideration the positive impact of foreign ownership upon cost effectiveness of banks in developing countries, which has been proven empirically, we can expect in the first place the FOROW variable to have a positive effect on the level and stability of performance measured by ROA.

The last group of variables is meant to verify how persistence is affected by the differences in banks' operational and risk profiles. This group consists of three variables. The first two show, respectively, the share of debt securities in balance sheet assets (DS/A) and the role of fee (non-interest) income in operating income creation (FI/OI). The third one is calculated by multiplying the ratio of liabilities to assets (measure of financial leverage) and the share of loans granted to non-financial sector in balance sheet (FL Lnfn). DS/A and FI/OI can be used as a measure of bank's activities diversification. A high share of debt securities in assets signify the existence of a counterbalance to the primary investment activity of banks, i.e. lending, whereas high values of FI/OI suggest that a sizeable part of banks' income does not come from traditional intermediation between savers and investors. Furthermore, given that in Polish conditions an overwhelming majority of debt securities in bank portfolios are instruments issued by the state treasury or the National Bank of Poland (central bank), and that fee (non-interest) income compared with net interest income generally exhibits less volatility, the variables in question are most likely, in our opinion, to decrease the probability of losing and that of recording losing persistence. For the DS/A variable, it may be quite important that in Poland its high values are usually observed in banks with dominant retail component of their activities, which can also increase a chance of winning persistence as such banks have access to cheap funding sources. The need to introduce the FL Lnfn variable into the estimated model results from the fact that extensive lending to non-financial institutions may have quite a different dimension in banks with good and poor capital base. In the latter case, it may be a sign of increased risk taken to reverse unfavourable trends in a bank's financial condition or to make up for previously sustained losses, i.e. a sign of moral hazard. Historical observations teach that in an overwhelming majority of cases such strategies are ineffective. Therefore, we expect the high values of FL Lnfn variable to increase the probability of losing persistence and decrease the likelihood of winning persistence.

The ten described explanatory variables appear in estimated models of winning and losing persistence when winners and losers are identified on the basis of reported OROA values. Where performance evaluation was based on ROA values, we additionally introduced a variable to reflect the degree of overhead costs control in relation to the size of operations measured by balance sheet assets (OC/A). The expected direction of its effect on the dependent variable is obvious. OC/A should be negatively related to the probability of winning persistence and positively related to that of losing persistence. The OC/A variable is sometimes considered to be a measure of managerial skills. We believe that such an interpretation would be abusive in the context of the presented study, as the variable in question is strongly influenced by dominant type of activities. Therefore, as we mentioned earlier, four out five hypotheses formulated in section two are verified in this article. The only exception is the hypothesis linked to the role of managerial staff skills.

Information on the structure of models, expected signs of estimated parameters, relationship between explanatory variables and verified hypothesis is summarized in Table 1. The "+" symbol indicates the expected positive correlation of explanatory variable with dependent variable, whereas

Table 1
Construction of the models and expected directions of the influence of explanatory variables

Explanatory variables	The explanatory variables	Dependent variable				Connection between the explanatory variables and the tested hypotheses[a]
		WP (winning persistence)		**LP (loosing persistence)**		
Ln A	natural logarithm of assets (in real terms)	+ ?		- ?		MP, IO
SA 2	square of the share in the system's assets	+ ?		- ?		MP, IO
SFA-SA	difference between a bank's share in the system's tangible assets and total assets	+		-		MP
Lnfn/A	share of lending to non-financial institutions in a bank's assets	+		-		IO, PR
EXCH	binary variable that equals 1 when bank's shares are listed on the stock exchange	- (restrictive definition of winning)	? (liberal definition of winning)	-		IO
STOWN	binary variable that equals 1 when a bank is controlled by the state treasury	+ (using OROA)	? (using ROA)	- (using OROA)	? (using ROA)	OS
FOROW	binary variable that equals 1 when a bank is controlled by foreign investors	+		-		OS
DS/A	share of debt securities in assets	+ ?		-		PR
FI/OI	share of fee (non-interest) income in operating income	?		-		PR
FL Lnfn	product of multiplying the variable illustrating financial leverage and variable Lnfn/A	-		+		PR
OC/A only in ROA models	overhead costs divided by a bank's assets	-		+		PR

[a] The symbols used in the last column of the table refer to the type of the tested hypothesis explaining the reasons for the persistence phenomenon. MP stands for a hypothesis associated with market power, IO – informational opacity, OS – ownership structure, PR – bank's operational and risk profile. These hypotheses are described in detail in Section 2 of the article.

the "-" symbol – the negative one. The "?" symbol, which can be seen in certain cases, suggests that it is theoretically difficult to determine the direction of the effect for a variable or some factors may disturb the main expected direction of a variable influence.

Research integrity requires that we mention that the tests of individual hypotheses concerning the determinants of performance persistence phenomenon are not fully disjoint as it can be seen in Table 1. For example, the share in assets of loans granted to non-financial sector is indicative of a bank's informational opacity, but it also describes its risk profile. Variables associated with the size of operations also provide guidance on informational opacity, which, *ceteris paribus*, the situation usually is such that the larger the bank the higher the informational opacity. Although undesired for the sake of interpretation clarity of obtained results, it is a feature of the set of explanatory variables which is impossible to eliminate.

With separate analysis of winning and losing persistence, the use of two types of winning and losing definitions (restrictive and liberal), and the employment of two profitability measures (OROA and ROA) to identify winning and losing banks, there are as many as eight models to be estimated. The total number of observations used in estimation of probit regression models in all cases equals 720. Values of the explanatory variables are calculated as averages over two-year subperiods.

6. Research findings

6.1. Persistence on the level of operating income

Table 2 presents estimation results for probit regression models in which winners and losers are identified based on the OROA values. In addition to the estimated parameters, the table contains information that can be useful in evaluating the quality of the obtained models.

Before we proceed to discuss the economic significance of the research findings, we would like to draw attention to some general features of the estimated models that seem to be of vital importance, as they attest to their good quality and thus prove that models provide reliable grounds for statistical inference. Firstly, depending on the type of dependent variable, as many as seven to nine out of ten explanatory variables are individually statistically significant. Secondly, the whole set of explanatory variables in all four models is also statistically significant at a level considerably better than 1%. Thirdly, the orders of magnitudes of the estimated parameters remain stable. Fourthly, wherever expected (cf. Table 1), the signs of the parameters are reversed on passing from the models explaining winning persistence to models specifying the determinants of losing persistence.

An overwhelming majority of the conjectures regarding the determinants of winning and losing persistence which are formulated in section five have been proven empirically. The market power seen from the angle of well developed distribution channels (SFA-SA) increases statistically significantly the probability of winning persistence and prevents losing persistence notwithstanding the definition of winning and losing persistence applied. A higher share of loans granted to non-financial institutions in assets (Lnfn/A), which is indicative of the increased informational opacity of operations, makes statistically significantly winning persistence more and losing persistence less probable. As it can be expected, this effect doesn't occur in the case of organizations that use high financial leverage. Strong engagement in lending to non-financial institutions while

Table 2
Determinants of winning and losing persistence. Profitability measured by OROA

Explanatory variables:	Dependent variable:	WP 25	WP 50	LP 25	LP 50
Constant		-0.1063	-0.0748	-2.1280***	-1.7562***
Ln A		-0.2227***	-0.1643***	0.1885***	0.2274***
SA 2		-37.5203	16.6768	-31.2519*	-20.0524
SFA-SA		31.3952***	38.4859***	-36.7374***	-56.4126***
Lnfn/A		4.7450***	4.5155***	-7.0342***	-5.6763***
EXCH		-0.5990***	-0.0815	-0.6109***	-0.1692
STOWN		0.4680**	0.5368***	-0.4273	-0.4807**
FOROW		0.6089***	0.5211***	-0.2556	-0.4299***
DS/A		2.8338***	2.3080***	-1.9573***	-2.0037***
FI/OI		1.9071***	2.0521***	-0.4015	-1.2731***
FL Lnfn		-3.2918***	-2.9903***	5.6227***	4.5266***
Test of the overall statistical significance of the set of explanatory variables (χ^2)		134.1294***	158.5802***	142.3060***	197.3433***
Akaike's information criterion		0.7181	1.1468	0.6831	1.0930

Note: The table presents the results of estimation of probit regression models. The dependent variable is winning persistence (WP) or losing persistence (LP). These variables equal 1 when a bank is winning or losing, respectively, over two consecutive periods. Winning and losing are identified based on operating return on assets (OROA), i.e. a measure of profitability in the area of main banking and financial operations. Additional quantifiers 50 and 25 differentiate models in which winning and losing are defined restrictively (based on the first and third quartiles) from those in which they are defined liberally (based on the median). The definitions of explanatory variables and their connections with the tested hypotheses are summarized in Table 1.
Symbols ***, ** and * mean that there are grounds for rejecting the null hypothesis about the non-existence of the individual or overall statistical significance of explanatory variables at the levels of 1%, 5% and 10%, respectively.

having poor capital base (high values of FL Lnfn) statistically significantly reduces the chances of winning persistence and increases the probability of losing persistence. Listing of a bank's shares (EXCH) reduces *ceteris paribus* statistically significantly the probability of achieving restrictively defined success twice and diminishes the likelihood of repeating restrictively defined failure. The same variable, however, loses its statistical significance in models constructed using the liberal definitions of winning and losing. This means that the combined impact of comprehensive reporting obligations and strong incentives to create a positive image through earnings management

shifts listed banks toward the centre of the profitability distribution as far as main banking and financial operations are concerned. Foreign-owned banks (FOROW) and state-owned (STOWN) banks take advantage of reputation effects. The latter also benefited from the implicit guarantees of liabilities throughout the whole period studied and three big banks (PKO BP, Pekao SA i BGŻ) from preferential legal guarantees for savings deposits of individuals. The above-mentioned preferential guarantees were in place until 1999. We think that that the influence of the first factor (i.e. implicit guarantees) was stronger because the level of public awareness regarding deposit guarantee scheme was and still is rather low. Therefore, most probably the public perception of some banks as state entities helped them to achieve relatively high values of OROA and prevent losing persistence, but only when liberal definitions are used. As expected, greater diversification of activities, measured by variables DS/A and FI/OI, reduces statistically significantly the probability of losing persistence. Unexpectedly, however, it statistically significantly increases the probability of winning persistence. Thus it turns out that the development of commission-earning activities and the diversification of investment portfolio (perhaps also combined with the retail nature of a bank) have stabilized the good performance in the area of main banking and financial operations in the Polish banking sector.

The impact of the explanatory variables that illustrate the size of operations upon the dependent variables is quite different from expected. With the increase in the size of operations, which is measured by the natural logarithm of assets (Ln A), chances of winning persistence are shrinking, and those of losing persistence growing. When the models include variable controlling for the market power associated with well developed distribution channels and variable capturing sources of reputation capital other than the size of operations, the phenomenon observed can be explained by large banking organizations' losing their capability of quickly adapting to changing market conditions. The second variable that reflects the size of operations (SA 2) is statistically significant only in the model explaining the reasons for restrictively defined repeated failures. The negative sign of the estimated parameter in this case suggests that being among the largest commercial banks protects against a succession of severe failures.

The image of performance persistence determinants, when OROA measures profitability, is only very moderately sensitive to the adopted definitions of winning and losing. The transition from the restrictive to the liberal definition of winning produces only one change in the sign of a statistically insignificant variable and one loss of statistical significance by an explanatory variable without changing the direction of its influence. The sensitivity is slightly higher when losing persistence is reviewed, but in this case, too, it concerns only changes in the statistical significance of explanatory variables, but not in the signs of the estimated parameters.

6.2. Persistence on the level of gross income

Table 3 contains the results of probit models estimation which explain winning and losing persistence where ROA is used to measure the profitability of banks. Table 3 is built on the same lines as Table 2.

The econometric quality of the models is satisfactory, but not as good as is the quality when analysing the determinants of performance persistence on the level of operating income. The

Table 3
Determinants of winning and losing persistence. Profitability measured by ROA

Dependent variable:	WP 25	WP 50	LP 25	LP 50
Explanatory variables:				
Constant	-1.3050	-2.2405***	-1.6229*	0.0955
Ln A	-0.0047	0.0963**	0.0585	0.0131
SA 2	4.2144	-6.7370	-427.3645**	0.8831
SFA-SA	21.0057***	18.8975***	-27.1626**	-6.0511
Lnfn/A	5.4784***	3.9079***	-0.8964*	-1.2804***
EXCH	0.0291	0.0186	0.0028	-0.1922
STOWN	0.1316	0.2394	-0.2771	-0.3660**
FOROW	0.2216	0.3395**	-0.2909*	-0.5440***
DS/A	1.5544**	0.8804	-1.4872**	-1.1840**
FI/OI	-2.3102***	0.3060	0.3838	0.3910
FL Lnfn	-4.3388***	-3.8803***	0.8361**	0.9496**
OC/A	-16.1498***	-2.4634	6.3879***	2.3174
Test of the overall statistical significance of the set of explanatory variables (χ^2)	105.2150***	75.5219***	68.6530***	50.7516***
Akaike's information criterion	0.7702	1.2598	0.7882	1.2845

Note: The table presents the results of estimation of probit regression models. The dependent variable is winning persistence (WP) or losing persistence (LP). These variables equal 1 when a bank is winning or losing, respectively, over two consecutive periods. Winning and losing are identified based on return on assets (ROA), i.e. the quotient of gross income and assets. Additional quantifiers 50 and 25 differentiate models in which winning and losing are defined restrictively (based on the first and third quartiles) from those in which they are defined liberally (based on the median). The definitions of explanatory variables and their connections with the tested hypotheses are summarized in Table 1. Symbols ***, ** and * mean that there are grounds for rejecting the null hypothesis about the non-existence of the individual or overall statistical significance of explanatory variables at the levels of 1%, 5% and 10%, respectively.

number of explanatory variables that are individually statistically significant is definitely lower. Each model using the restrictive assessment of financial performance has six, and each of the remaining ones five such variables. In addition, the number of the explanatory variables with a statistical significance at 1% level is strongly reduced as well. In the models where variables WP

25 and WP 50 are explained, now they number five and three, respectively, with only one in the models of losing persistence. Previously, an overwhelming majority of the explanatory variables were statistically significant at 1% level. The values of Akaike's information criterion are now higher, which also suggests poorer quality of the models. The orders of magnitudes of the estimated parameters are slightly less stable than in Table 2. Where it should be expected, however, the statistically significant explanatory variables continue to reverse the directions of the impact when passing from the models explaining the reasons for winning persistence to those showing the determinants of losing persistence.

An interesting trend can be noticed when taking a closer look at Tables 2 and 3 together. Namely, as argued above, the models in Table 3 are of poorer quality than those in Table 2. On the other hand, among the models built to explain gross income persistence (Table 3), those associated with losing persistence seem to be definitely worse. Such a picture of growing difficulties in identifying the determinants of performance persistence is fully consistent with the conjectures about the potential disruptive effect of earnings management efforts (Jackowicz, Kozłowski 2008b), which are formulated in section four, based on the contour plot of stochastic kernels for OROA and ROA. As expected, identifying the determinants of losing persistence on the level of gross income turned out to be the most difficult task.

In the group of variables illustrating market power, the strongest effect in the expected directions is attributable to that measuring the development of traditional distribution channels (SFA-SA). As SFA-SA variable increases, the chances of winning persistence statistically significantly rise and the likelihood of consecutive severe failures diminishes. Both variables reflecting the size of operations are rarely statistically significant. An increase in assets (Ln A) contributes to repeating liberally defined wins, whereas being among the largest Polish commercial banks reduces, as in the case of measuring profitability by OROA, the risk of suffering subsequent restrictively defined failures. A major role of investment efforts which require banks to gather and use private information (Lnfn/A) statistically significantly increases the chances of winning persistence while reducing the probability of losing persistence at the same time. The competitive edge of foreign-owned (FOROW) and state-controlled (STOWN) banks, which was observed for operating income, virtually disappears in the case of the latter as far as gross income is concerned (except for the model with dependent variable LP 50). State-owned banks are therefore less efficient in translating the advantage associated with their reputation capital noticed in the area of main banking and financial operations into good and stable financial earnings before taxes. Having an extensive portfolio of debt securities (DS/A) proves to be a good protection against losing persistence, whereas lending to non-financial institution by banks with poor capital base (FL Lnfn), i.e. acting in conformity with the moral hazard hypothesis, statistically significantly reduces the chances of winning persistence and reinforces poor performance persistence. Quite unexpectedly, higher diversification of operating income creation, as measured by the FI/OI variable, statistically significantly reduces the probability of being among 25% banks with the highest ROA values. Previously, whenever the analyzed variable was individually statistically significant, its effect on financial performance and its stability was consistently positive. Regrettably, it is difficult, in our opinion, to find an economically convincing explanation why the direction of the influence on the dependent variable is changed. As expected, good control of overhead costs, i.e., low OC/A values, statistically significantly increases the likelihood of restrictively defined winning persistence and

diminishes the probability of getting twice into the lower quartile of the profitability distribution. Interestingly, this variable loses its statistical significance for the liberal definitions of winning and losing, which implies that the level of overhead costs determines the persistence phenomenon only in the tails of the profitability distribution.

As already mentioned, the type of definition used for winning and losing did not virtually affect the inference about the reasons for the performance persistence on the level of operating income. The sensitivity of research results to the adopted definitions of winning and losing is higher when measuring profitability by ROA, but in our opinion, it can still be ranked as moderate. An alteration of the definitions of winning and losing in Table 3 results in quite numerous changes in the individual statistical significance of explanatory variables, but, what is important, does not change the direction of the impact of statistically significant explanatory variables.

6.3. Sensitivity of research findings to changes in the structure of the models

The sensitivity of research findings to changes in the structure of the models was mostly analyzed in Subsections 6.1 and 6.2. The effect of changes in the definitions of winning and losing and that of the alteration of the ratio used to measure the profitability of banking operations was traced therein. As shown above, the results of this part of the analysis did not provide sufficient grounds to question the credibility of the conclusions drawn.

When conducting the research project we verified the sensitivity of research findings in other ways, too, two of which we would like to comment upon here. Firstly, we included in the estimated models explanatory variables that can be obtained by multiplying variables illustrating the risk of banking operations and binary variables encoding periods of boom and recession. This step was the result of the observation we made during the first stage of our research into persistence that the power of this phenomenon depends on the condition of the banking sector and the whole economy. Neither of the so structured explanatory variables was statistically significant and they did not change the signs of parameters estimated for the remaining explanatory variables. Therefore, they were not included in the final set of explanatory variables. Secondly, we estimated probit models for sub-samples encompassing periods: 1995–2000 and 2000–2005. When using OROA as the performance measure, results were remarkably stable in time. Neither of the estimated parameters changed the sign. Cases of lost or achieved statistical significance were very rare. Nevertheless, it was possible to draw one new conclusion. In the later period, in models constructed using liberal definitions of success and failure, a large scale of operations statistically significantly increased the probability of winning persistence and prevented losing persistence. The image of performance persistence, when profitability was measured with ROA, was more sensitive to the changes of sub-samples. There were 15 cases of modified statistical significance of explanatory variables. However, the pattern of changes was unclear probably due to the earnings management by banks. Variable SFA-SA which lost its statistical significance in shaping wining persistence phenomenon in the latter period constituted the only exception to this rule.

7. Summary

The study performed was aimed at empirically verifying four hypotheses explaining the occurrence of winning and losing persistence in the Polish banking system. The above-mentioned hypotheses see the reasons for the phenomenon in the differences of market power, informational opacity, ownership structure, and banks' operational and risk profiles. It turns out that a major role in increasing the chances of winning persistence and in diminishing the probability of losing persistence was played, in the Polish reality, by the market power resulting not from the sheer size of operations, but the developed distribution channels, especially in the first half of the studied period. As expected, informational opacity was positively correlated with winning persistence and negatively with losing persistence. Banks with poor capital base constituted a notable exception to this rule. In their case, lending to non-financial institutions was a manifestation of moral hazard, which ultimately leads to a reduced probability of winning persistence and an increased likelihood of losing persistence. In the area of main banking and financial operations, state-controlled and foreign-owned banks had a competitive edge related to the positive reputation effects. This competitive edge was translated into winning persistence and the prevention of losing persistence on the level of gross income mainly by banks controlled by foreign investors, though. It was the diversification of asset structure which had a relatively higher significance for performance persistence than diversification of operating income components. In the expected direction, winning and losing persistence was influenced by the control of overhead costs, although this effect was statistically significant only if restrictive definitions of winning and loosing were applied.

As anticipated, earnings management conducted mainly by loan loss reserves policy distorts the picture of the reasons for performance persistence, particularly of losing persistence on the level of gross income. However, earnings management does not make it impossible to identify the most important determinants of this phenomenon. The way in which winning and losing are defined does not affect the economic meaning of the obtained results when the profitability of banks is analyzed in the main area of their banking and financial operations. In addition, it has only a moderate effect on the conclusions that can be drawn when the profitability is measured on gross income basis.

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