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Wyższa Szkoła Bankowa w Poznaniu

KNOWLEDGE OF CREDIT ANALYSTS
AND THE QUALITY OF CREDIT PORTFOLIO IN BANKS

1. Introduction

Credit risk in bank activities is still a key problem despite the changes in the banking sector. Despite better and better techniques in its recognition, estimation and management it still causes problems, which is exemplified by a significant share of bad debts in banks' credit portfolios.

A new situation of enterprises in Poland, as the result of transformation of the last several years, has created the demand for new management techniques. In new social-economic conditions finding properly qualified staff has become a significant issue. Banking sector encountered the same problem as well. Banks of similar sizes acting on the defined financial market, reach different results in the same time, among other things, in the quality of credit portfolio. In some cases it can be stated that it is the result of the available capital, organization, technique, analytical and reporting system, as well as the level of qualifications and motivation of employees.

Although the literature of the subject of both credit risk and human resource management is rich, the publications on the relationship between the qualifications of the employees and credit risk in banks are scarce. Most of the available studies concentrate on the relationship between qualifications of the managing personnel of banks and productivity [7, p. 5; 2, pp. 18-28]. The studies analyzing qualifications of ordinary workers of credit institutions and their influence on the results of those institutions are extraordinarily scarce [3, p. 319]. It is generally emphasized in literature that bank employees significantly influence the results achieved by the banks [9, p. 44], that they constitute one of the main factors of competence advantage.

The hypothesis of the present study is that the quality of bank credit portfolio in the segment of enterprise credits depends *ceteris paribus* on the knowledge of credit analysts. This assumption is based mainly on the human resource theory and has its empirical reference to banking practice, as the special sphere of the application of this resource in economic activities.

2. Knowledge as an element of professional qualifications

The notion *qualification* appears mainly in the literature concerning human resource management, organization and management, and sociology, but there is no uniformity in its definition either among theoreticians or among practitioners as well. Besides, the notion *competence* has gained popularity in the last years.

It is not seldom that both notions, qualifications and competence are treated as synonyms. The two notions are indeed tightly bound with each other but even then they should be treated as designata of separate categories.

At the beginning, while distinguishing the notion of competence from qualifications, competence was defined as constant and clear assignment of professional activities, authority and responsibilities. Qualifications, on the other hand, were understood as education and skills, completed by professional experience but without, for example, personal features [13, p. 111]. Gradually, the notion of qualifications has been broadened, which was reflected, among other things, in realizing that an employee adds to his work, beside these narrowly defined qualifications, also his own experience, individual understanding of reality and interpersonal distinction.

Among numerous attempts to separate competence from qualifications there are also ones which indicate superiority of competence over qualifications as well as such which connect qualifications with the tasks resulting from the occupied position and competence with practicing a profession [11, pp. 64-120]. In many papers it can be noticed that the notion of qualifications is abandoned which is usually accompanied by the double meaning of competence. On one hand competence is then defined as formally defined range of tasks, duties and responsibilities. On the other hand, as collection of predisposition, skills and knowledge, which condition efficient performing of tasks and reaching desired results [1, p. 243; 15, p. 66]. Combining the two notions in one has become the most popular method, in most cases as competence which is then defined as scope of knowledge, skills, experience, attitude and behaviour and other psychophysical features important for the given work, but also formal assignment with the possibility of acting and making decisions concerning work [6, p. 17]. Other authors, however, separate competence from qualifications, indicating clear differences between them. For example, competence can be considered with reference to efficiency in work while qualifications are identified with professionalism of a given person, expressed by a number of certificates and diplomas as well as the position in the organizational structure [16, p. 388].

The authors using the notion qualifications to describe professional attributes of employees make the division between the qualifications shown while practicing a profession – usually called real qualifications, from qualifications evidenced by diplomas or certificates which are usually called formal or paper qualifications [19, p. 13].

Within the scope of this study professional qualifications will be understood as prerequisite to practicing a profession, comprising professional knowledge, professional skills and personal features (organizational and interpersonal skills, talents and interests).

The researchers generally agree that the components of qualifications can be divided, regarding the formal aspect, into three groups [12, p. 1109; 10, pp. 15-24]:
- psychological features,
- knowledge,
- skills.

The main subject of interest in the present thesis, in the empirical sense and in the context of its research objectives, is the qualifications which belong to the group *knowledge*.

Professional knowledge, concerning its source, can be divided into two kinds[1]:
- cold knowledge,
- hot knowledge.

Cold knowledge is acquired in the course of formal education, both general and professional, and can be characterized by objectivism and universality. Diplomas and certificates constitute the evidence of acquired cold knowledge.

Hot knowledge is directly connected with the individual experience of the person and therefore highly subjective. As a measurement tool of hot knowledge the category of seniority is used, assuming that the longer seniority the bigger professional experience and therefore better knowledge of the performed work.

3. Relationship analysis between the knowledge of credit analysts and the quality of credit portfolio

Among numerous methods of measurement of credit risk level in banks, the share of bad debts in the volume of credit limited to enterprise credit portfolio has been used in the present paper. The choice of method was determined mainly by the possibility to collect proper empirical material and relatively high degree of

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[1] The above suggested criterion is obviously not the only one which can be applied to the division of knowledge. Equally popular are e.g. [5, pp. 170-171 and 158]:

a) operational criterion – in that case knowledge is divided into declarative (I know that ...) and procedural (I know how ...);

b) criterion of accessibility – according to which knowledge is divided into accessible knowledge (it can expressed and reasonably easily communicated) and hidden knowledge (which is so subjective that it is difficult to share with other people).

data homogeneity as the Finance Minister's directions concerning rules of qualifying credit to the category of bad debts are the same for all banks operating in Poland[2]. Limiting the research to the segment of enterprise credit results also from the fact that banks apply automatic systems for credit risk estimation in the group of individual clients more and more often.

Remembering the above accepted notion of professional qualifications of credit analysts and its structure, the research is concentrated on only one group of features counted to qualifications, that is knowledge.

In the present work the following has been taken into account:

a) cold knowledge including:

– general knowledge, understood as level of education, with the following levels distinguished – primary, vocational, secondary, tertiary vocational and master's,

– specialist knowledge, understood as major in education, with the following majors distinguished – economy, technical studies, agriculture, mathematics, law, nature, liberal and others,

– updating cold knowledge, understood as completing and improving knowledge through participation in specialist in-service training courses measured by the number of training days;

b) hot knowledge including:

– general professional experience, understood as general seniority measured by the number of years,

– experience in banking, understood as seniority in the field of banking, measured by the number of years as well,

– specialist experience, understood as seniority in the field of credit analysis and estimating credit risk, again measured by the number of years,

– special experience, understood as seniority with the last employer, measured by the number of years.

In the operational sense the describing variable were divided into two groups:

• quantitative features which include general seniority, seniority in banking and in the field of the credit analysis, seniority with the last employer and the number of training days in the last three years,

• qualitative features which include the level of education[3] and major.

Statistical material for the analysis was made of data based on information collected from credit analysts selected at random and working in banks operating in Poland. Empirical research was carried out in two stages in the years 2002 to 2005 and comprised:

a) credit analysts – the empirical material comes from 146 credit analysts employed in twelve banks operating in Poland, differentiated both in size and in ownership structure;

b) bank centrals – the empirical material comes from 47 commercial banks and 77 co-operative banks operating in Poland – the aim of this stage was to establish the role of credit analysts in the process of credit risk management in banks.

Information on how far the sample was representative was obtained from the evaluation of conformity of the distribution of the sample with the distribution of general population as to the structure of employment and the structure of the average credit portfolio tested by conformity test chi-square. The results of the test indicate that the differences between the structures in the sample and in the general population have a random character and are irrelevant. The sample can therefore be considered representative as regards the chosen feature.

For the needs of the subject dependence analysis the method of correlation analysis, regression analysis and classification tree method were applied.

4. Interdependence analysis

Interdependence analysis was used to state whether there are any dependences between variables, what is their strength and direction. The measure used for this purpose has been r-Pearson's linear correlation factor (for quantitative variables) and C-Pearson's factor (for qualitative variables). The reference point for the analysis – in case of qualitative variables – was the average share of bad debts for the examined population.

Table 1. Interdependence between features describing knowledge and the quality of credit portfolio of credit analysts

Specification	General profes- sional experience	Profes- sional experience in banking	Profes- sional experience in analyses	Seniority with the last employer	The number of training days (specia- list training)	Level of educa- tion	Major in education
Value of r-Pearson's correlation factor	-0,21	-0,45	-0,70	-0,09	-0,42		
Value of C-Pearson's factor	-					0,37	0,78

Source: own study.

Analyzing the results of testing the interdependence between particular features (of quantitative character) describing knowledge of credit analysts and the quality

of enterprise credit portfolio it can be stated that all variables maintain identical correlation direction – negative. This means that together with growing professional experience and bigger training activity of credit analysts (with the assumption that no other factors influence the described variable at this time) the portfolio of credit analysts improves, i.e. the share of bad debts in the whole credit portfolio diminishes.

Definitely, regarding the strength of correlation with the quality of credit portfolio, the variable described as professional experience in credit analyses predominates. Only in case of this variable the strength of correlation is distinctive. For other two variables, i.e.: number of training days of specialist training and professional experience of credit analysts in banking, the strength of correlation with the credit portfolio quality is average. Whereas in case of general professional experience of credit analysts and their seniority with the last employer the correlation with the share of bad debts in credit portfolio is indistinct.

Interpreting the above shown values of C-Pearson's factor, it can be noted that the variable significantly interdependent with the quality of credit portfolio of credit analysts is the major in education. However, the interdependence between the level of education and the quality of credit portfolio of credit analysts is average.

5. Regression analysis

The dependence between all quantitative and qualitative variables and the quality of credit portfolio of credit analysts has also been analyzed, taking into account simultaneous influence of describing variables on the described variable, which leads to the attempt to find the causative-effective dependence and, at the same time, the qualitative variables have been ranked[4].

After ranking qualitative variables describing the qualifications of analysts, the influence of all describing variables on the quality of credit portfolio was estimated on the basis of diverse regression with 5% significance level. The aim of regression analysis was not making a universal econometric model showing the total influence of describing variables on the quality of credit portfolio but finding the strength and direction of interdependences and statistical significance of those dependences.

The analysis of the created model of regression function for the whole group of credit analysts shows that, beside general professional experience, the dependence between the describing variables and the quality of credit portfolio has a negative direction. A positive direction of dependences between general professional experience and the quality of credit portfolio of credit analysts can suggest that banking, and specially credit risk analysis, is such a specific field that all experience gained beyond this field makes it more difficult to understand the mechanisms functioning in banks. This could undoubtedly be an indication for personnel de-

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[4] According to the rules applied to calculating Spearman's factor [17, pp. 229-231].

partments in banks that in the recruitment process for credit analyses, professional experience gained in other field than banking should not be treated as an asset of candidates, just the opposite, as a barrier for efficient work in a new field.

Adapting the econometric model, measured with determination factor explains the causes of variability of described variable quite well. For the examined population of credit analysts the adoption of the model to the empirical data equals 55,1%. So, the quality of credit portfolio is, to the significant degree, determined by the describing variables taken into account in the regression function.

However, it should be noticed that only one from the analyzed variables, i.e. professional experience in credit analyses, influences the credit portfolio of analysts significantly.

Eliminating one by one the least significant variables, finally two variables fulfill the expected level of statistical significance. These are: professional experience in credit analysis and professional experience in banking.

The econometric model built for these variables[5] suggests that the key elements in the knowledge of credit analysts which should be emphasized in the process of selection are experience in banking and experience in the field of credit analysis. Moreover, according to the results of the study, growing experience in both fields leads to the improvement of the quality of credit portfolio. Growth in professional experience in banking by one year brings the improvement in the quality of credit portfolio of analysts, which means with unchanged other describing variables, diminishing share of bad debts in the credit portfolio by 0,3 per cent. Whereas if the professional experience in credit analysis grows by one year, the quality of credit portfolio improves even more significantly as it means, with unchanged other describing variables, diminishing share of bad debts in the credit portfolio by almost 1,6 per cent.

Adopting of the econometric model calculated on the basis of regression analysis for those variables which are statistically significant measured with determination factor, explains the causes of variability of the described variable satisfactorily. For the examined population of the credit analysts the adjustment of the model to the empirical data equals 53,4%. So, the quality of the credit portfolio is therefore determined significantly by the factors taken into account in the model.

6. Classification tree

The application of the method of classification tree in general copies the conclusions from previous analyses. The classification tree for the analyzed variables

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[5] For these variables the following model of regression function has been constructed/built:
$$y = -0,0030x1 - 0,0156x2 + 0,2554,$$
where: y – share of bad debts in the credit portfolio of credit analysts,
$x1$ – professional experience in banking in years,
$x2$ – professional experience in the field of credit risk analysis in years.

is not developed as there is only one decisive rule connected with the experience of credit analysts in the field of credit risk analysis. And thus, the strongest predicator influencing the quality of credit portfolio of credit analysts is professional experience in the field of credit risk estimation and in credit rating. The critical value of the predicator is four and a half years. It shows that the credit portfolio of analysts whose experience in credit analyses is longer than four and a half years is better from the average for the examined population. In the opposite situation the credit portfolio of analysts is worse from the average for the examined population.
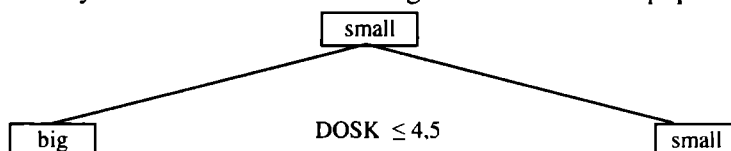
small – less than average share of bad debts (desired decisive feature),
big   – bigger than average share of bad debts (not desired decisive feature),
DOSK   – experience of credit analysts in the field of credit analysis in years.

Fig. 1. Classification tree for the whole population of credit analysts
Source: own study.

Table 2. Predicator importance ranking

Predicator	Importance ranking
Seniority in the field of credit analysis	100
Number of training days	45
Seniority in banking	27
Major of education	14
General seniority	10
Level of education	7
Seniority with the last employer	7

Source: own study.

Using the method of classification tree a ranking of predicator importance can be made. Its analysis confirms conclusions which come straight from classification tree. The most significant predicator is absolutely professional experience in credit risk analysis. The significance of all other predictive variables is marginal.

7. Conclusions

On the basis of the conducted studies it has been stated that there is a strong tendency in the Polish banking sector to separate – in the process of crediting – the function of selling from the function of analyzing. More and more often the tasks of credit analysts concentrate exclusively on estimation of the level of credit risk and on credit rating. Despite the fact that credit analysts are not decisive, the major-

ity of credit decisions are convergent with their recommendations. The conducted study shows that the degree of convergence is close to 97,5%. This result lends credence to the thesis that the quality of bank credit portfolio, in the segment of enterprise credits, is determined by the quality of work of credit analysts in the significant degree.

The hypothesis that the quality of bank credit portfolio in the segment of enterprise credits, measured by the share of bad debts in the credit portfolio depends, ceteris paribus, on the knowledge of credit analysts has not been positively verified in the result of the application of the analytical methods: correlation, regression and classification tree. Taken strong simplifications connected with the measurement of the hypothesis have limited research intention in a significant way. And thus, the statement indicating the influence of the knowledge on the quality of banks' credit portfolio cannot be rejected with the scientific accuracy but it can be stated that this component of qualifications alone does not make the main factor.

However, in future further search for factors determining credit risk for banks, the professional experience of credit analysts in the field of estimating the level of credit risk should not be omitted, which is the result of the present study. For this variable, as the only one considered in the examination of features describing knowledge of credit analysts, is strongly connected with the quality of credit portfolio in the segment of enterprise credit.

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WIEDZA ANALITYKÓW KREDYTOWYCH
A JAKOŚĆ PORTFELA KREDYTOWEGO BANKÓW

Streszczenie

Celem opracowania jest analiza zależności między wiedzą analityków kredytowych a jakością portfela kredytowego poszczególnych analityków.

Na potrzeby analizy przeprowadzono badanie, w którym wzięło udział 146 analityków kredytowych zatrudnionych w 12 bankach działających na terenie Polski.

Zależność między wiedzą analityków a jakością portfela kredytowego mierzono, posługując się analizą korelacyjną, regresją oraz drzewem klasyfikacyjnym.

Wyniki analizy wskazują, że jakość indywidualnego portfela kredytowego analityków kredytowych w znacznym stopniu zależy od ich doświadczenia w dziedzinie analiz kredytowych. Ten czynnik powinien być brany pod uwagę przy konstrukcji wymagań kwalifikacyjnych na stanowisko analityka kredytowego w bankach.