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DETERMINING THE PRIORITIES OF CRITERIA IN ASSESSING THE BANKRUPTCY RISK OF THE BANKS VIA AHP[2]

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ABSTRACT

The prediction of bank failure is important for financial managers, analysts, investors and other users of financial statements. The purpose of our study is to determine the priorities of CAMELS's dimensions as criteria in assessing the bankruptcy risk of the banks. AHP technique is used via acquiring pairwise compared views of 108 experts who are academics, policy makers/managers of some banks, regulatory institutions of Turkey study especially on banks, to determine priorities of each criteria. According to AHP results, orderly liquidity, asset and capital dimensions of CAMELS have a total priority of 66.54%, which is about 2/3 of the importance in assessing the bankruptcy risk of the banks.

Keywords: *AHP, CAMELS, Bank's Bankruptcy Risk.*

BANKALARIN İFLAS RİSKLERİNİN ÖLÇÜMÜNDEKİ KRİTERLERİN ÖNEM DERECELERİNİN AHP İLE BELİRLENMESİ

ÖZET

Finans yöneticileri, analistler, yatırımcılar ve diğer finansal tablo kullanıcıları için banka başarısızlık tahmini önemlidir. Çalışmamızın amacı, bankaların iflas risklerinin ölçümünde kriter olarak CAMELS boyutlarının önem derecelerinin belirlenmesidir. Özellikle bankalar üzerinde çalışan Türkiye'deki akademisyenlerden, bazı düzenleyici kurumların, bankaların karar vericileri/ yöneticilerinden 108 uzmanın ikili karşılaştırma görüşleri üzerinden AHP tekniği kullanılarak her kriterin önem dereceleri belirlenmiştir. AHP sonuçlarına göre, CAMELS'e ait sırasıyla likidite durumu, aktif kalitesi ve sermaye yeterliliği boyutlarının, bankaların iflas riskini değerlendirme açısından toplam ağırlıkta yaklaşık 2/3 gibi olan %66,54 önem derecesine sahip olduğu sonucuna varılmıştır.

Anahtar Kelimeler: *AHP, CAMELS, Bankların İflas Riski.*

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1. Introduction

The prediction of business or bank failure is particularly important for financial managers, analysts, investors and other users of financial statements. The financial ratios can be accepted as the fragments of bankruptcy prediction. Since bankruptcy risk has always been a matter for bankers, stakeholders, investors etc., proper assessment of bankruptcy risk is required for investments, market stability and fortune (Kumar & Kavita, 2015). In the last decades, lots of countries have experienced severe banking crisis such as Sweden, 1990s; Thailand, Malaysia, Korea, Philippines, and Indonesia, 1997; Paraguay, 1995–98; Russia, 1998; Turkey, 1994, 2000, and 2001; Argentina, 2001 (Akhisar & Karpak, 2010). Mortgage crisis in USA can be accepted as a global financial bank crisis. Turkey have been experiencing a deep banking crisis in 2000-2001 which result in 22 banks as seized or banks' licenses were canceled by BDDK (Banking regulation and supervision agency of Turkey) between August 2000 and Mart 2005. That operations may result the loss of more than 50 billion USD which was about one third of the budget of Turkey (Akyazan, 2006). This experience shows us that assessing the bankruptcy risk of the banks is very important not only for banks and firms but also for the economy of the country.

Altman et al. (1977) can be accepted as produced first original academic studies on bankruptcy risk, developed ZETA model for assessing the bankruptcy risk of corporations using their financial ratios via discriminant analysis. Olmeda and Fernandez (1997) used 9 financial ratios of 66 bank to assess the bankruptcy risk of the banks. Vilen (2010), used 25 financial ratios of 124 bank to assess the bankruptcy risk of banks. Kumar and Kavita (2015), used Altman's Z score to assess the bankruptcy risk of 10 Indian banks. In academic literature, bankruptcy prediction or/and assessment, discriminant analysis, logit model, probit model, neural networks and multi-criteria decision making (MCDM) techniques are used. Bellovary et al. (2007:10) compared 14 academic studies, neural network models were best, and probit models were worst performers in order to bankruptcy prediction accuracy power and report.

Since lots of alternatives and criteria/factor exist in bank bankruptcy prediction, we can use MCDM techniques in order to improve the prediction. So many techniques are promoted for MCDM that have various advantages, namely AHP, ANP, ELECTRE, PROMETHEE, TOPSIS, GRA, etc. MCDM are used for firm performances, product design, product selection, facility location and facility layout planning, river basin planning, achievement order, financial applications, etc. (Hamzacebi & Pekkaya, 2011). Gaganis et al. (2006) assessed the soundness of the banks using UTADIS, one of the MCDM techniques, logistic regression and discriminant analysis. Akhisar and Karpak (2010) used AHP to assess performances of banks.

The objective of the study is to determine the priorities of CAMELS's dimensions in bankruptcy risk of the banks. AHP technique is used to determine priorities of the dimensions as criteria. To our knowledge, this study contributes to literature, since the priorities are produced from the each experts' opinions of consistency controlled pairwise comparisons, and the study uses quite a big sample in volume, generally consists of top manager-experts of the studied subject. Moreover, since some problems may be encountered in regression analysis, namely unit root for time/panel data regressions, multicollinearity especially among existence of similar properties of criteria as variable.

In sum, no such problem exists in AHP calculation process except consistency of replier's views. Accordingly, usage of AHP in this study is also one of the originality of such studies. To conduct the study, we applied pairwise comparison survey of the criteria. The survey is applied to experts who work at BDDK, TCMB (Central Bank of Turkey), and top managers of some banks, academics who study finance and banks in particular. After collecting data from pairwise comparison of survey, AHP technique is used to calculate priorities for each criteria.

2. Determining the priorities of CAMELS's Dimensions for the banks' bankruptcy risk

The objective of this study is determining the priorities of the criteria in assessing the bankruptcy risk of the banks. AHP method is used for calculation of pairwise compared survey results of experts who work at BDDK, TCMB, and top managers of some banks, academics who study finance and especially on banks.

CAMELS that is formed in 1997, for especially assessing the performances of banks, are commonly used not only by academicians but also by banking supervisors. We conducted this study in order to determine the priorities of CAMELS's dimensions for the bankruptcy prediction. CAMELS's dimensions are Capital (CAP), Asset (ASS), Management (MAN), Earnings (EAR), Liquidity (LIQ), and Sensitivity to market risk (SMR).

AHP is an eigenvalue approach to the pairwise comparisons and it supports a methodology to calibrate the numeric scale for the measurement of quantitative and qualitative performances (Hamzacebi & Pekkaya, 2011). The AHP method uses scale numbers which indicate how many times more important one criterion is over another one. The AHP method is a converter of the pairwise compared judgments to priorities, and AHP lets an easy calculation of consistency of all comparisons of an individual by generating an index (Pekkaya & Başaran, 2011; Pekkaya & Aktogan, 2014). AHP method can be thought as an inalienable mathematical technique for priority calculations. The method is described by Saaty (2008) who is the first developer of it in 1970s, as in the following steps: 1) Defining the problem. 2) Determining the frame of the decision hierarchy. 3) Constructing the pairwise comparison matrices. 4) Obtain the weights from the comparison matrices.

In related literature about AHP, ordinarily very little volume sample of experts are used for the calculations, mostly volume of expert as sample, is not reported or there may be no consistency calculation conducted for each unit, but only one consistency calculation conducted for common views. We think that, since inconsistent comparisons may diverge the whole views, and inconsistent comparisons of experts should not take into account for the common views. Saaty's consistency boundary which is 0.1000, is also too strict. Numerically for criteria pairwise comparisons, according to Saaty (1980), comparisons of 16 experts, among 108, can be accepted as consistent, but according to Dodd et al. (1993), 81 comparisons are not randomly scored comparisons which consistency boundary is 0.4113 for 6 criteria. In this study, the concept of Dodd et al. is accepted for considering much more opinions and used for priority calculations as in the studies of Pekkaya & Başaran (2011) and Pekkaya & Çolak (2013). Accordingly, consistency tolerated priorities are taken into account in our analyses.

Table 1. Priorities of Main Criteria

	n	**CAP**	**ASS**	**MAN**	**EAR**	**LIQ**	**SMR**	**Cont.**
Priorities-G	108	.1864	.2083	.1500	.0872	.2495	.1187	.0116
Priorities-SG	16	.2214	.1850	.1096	.0937	.2652	.1251	.0051
Priorities-DG	81	.1976	.2201	.1383	.0789	.2476	.1175	.0086
Ranks	81	3	2	4	6	1	5	

(Note 1) Priorities-G: AHP is conducted via geometric means of pairwise comparisons (without boundary)

(2) Priorities-SG: AHP is conducted via geometric means of pairwise comparisons (Saaty's boundary).

(3) Priorities-DG: AHP is conducted via geometric means of pairwise comparisons (Dodd's boundary)

(4) Ranks: Ranks of the priorities of the main criteria are determined with respect to Priorities-DG, since it contain much more views. Cont.: Consistency common views of sample.

Calculated priorities of CAMELS's dimensions for the banks' bankruptcy risk with respect to opinions of experts are presented in Table 1. The priority calculation is achieved by 3 different scenarios. Priorities-G, Priorities-SG, and Priorities-DG are calculated via only one pairwise comparisons matrix which is computed by getting geometric mean of pairwise comparison scores of experts. However samples are different, numerically 108 (without boundary), 16 (Saaty's boundary), and 81 (Dodd's boundary) sample volumes are used respectively. In academic literacy of AHP, Priorities-G procedure can be commonly used. However, Priorities-G is not take into account in our study, since it has inconsistent comparisons which may deteriorate the whole views. Because of representing higher volume of sample, Dodd's boundary is accepted and Priorities-DG results are analyzed in our study, the other results are reported only for comparisons of priorities. The priority results of the other scenarios mainly supports the priority results of Priorities-DG.

The priorities are obtained from the sample of the experts' consistency tolerated pairwise comparisons with respect to Dodd et al. (1993:21) with consistency boundary of .4113. The value .4113 is calculated by dividing 0.50996 which is for 6 criteria at the 95% confidence level of judgements of the decision maker rather than by chance declared by Dodd et al., to the value of 1.24 which is random index for 6 criteria declared by Saaty. So, according to this consistency boundary, pairwise comparisons of experts are not by chance, and they can be accepted as containing more information.

According to all scenarios, LIQ (24.76%) is determined as most important criteria, ASS (22.01%) and CAP (19.76%) are also quite important. These three criteria have the total priority of 66.54% which is about 2/3 of the prominence and the rest of the criteria have the total priority of 33.46% which is about 1/3 of the prominence.

3. Conclusion

The experiences of bank crises show that, assessing the banks' bankruptcy risk is very important not only for decision makers of banks and firms but also for the economy of the country. So, our objective of this study is to determine the priorities of CAMELS's dimensions in bankruptcy risk of the banks. The priorities are calculated via AHP by using pairwise compared views of experts who work at BDDK, TCMB, and are top managers of some banks, academicians who study especially on banks.

According to results, LIQ is determined as most important criteria (24.76%), followed by ASS (22.01%) and CAP (19.76%). These three criteria have the total priority of 66.54% which is about 2/3 of the importance in assessing the bankruptcy risk of the banks. Gaganis et al. (2006) evaluate CAP (19.76%), EAR as ROAA (10.21%) - EXPENCES (10.31%) and LIQ (%9.08%) in measuring Banks. Jin et al. (2011) determined statistical difference between failed and not-failed banks, in some financial ratios of profitability, CAP and ASS dimensions. Our results are not so differentiate among related literature in terms of priority values, but differentiate in terms of criteria that taken into consideration. For example, Jin et all. state that, they only evaluated some financial ratios of profitability, CAP and ASS dimensions, since these data are publicly available.

As a consequence, in assessing the bankruptcy risk of the banks, decision makers, namely financial managers, analysts, investors and other users of financial statements, must pay most regard to LIQ, ASS, and CAP criteria for measuring financial health of a bank not only for the sake of investments but also for business world and market stability.

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