CASH-BASED ACCOUNTING INFORMATION IN PREDICTING BANKRUPTCY RISK: EVIDENCE FROM LISTED TURKISH FIRMS[*]

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ABSTRACT

This paper aims to investigate the relationship between cash-based accounting information and bankruptcy risk with a sample of listed non-financial Turkish Firms. For this purpose, we used Altman Z, Springate, and Zmijewski models for estimation of bankruptcy risk. These model scores are given as dependent variables whereas cash flow information; operating, investing, financing cash flows, and cash flow patterns, and as control variables; firm size and firm age are utilized as independent variables to investigate this relationship. The empirical results showed that cash-based accounting information is unable to explain variation in bankruptcy risk of listed non-financial Turkish firms. On these results, it is thought that the reason for this situation may be that the bankruptcy risk measurement models used in the literature are based on accrual-based accounting information, so they may have lost their meaning from a contemporary accounting point of view.

Keywords: Cash-Based Accounting Information, Bankruptcy Risk, IAS-7, Statement of Cash Flows

JEL Classification: G33, M40, M41

NAKİT ESASLI MUHASEBE BİLGİLERİ İLE İFLAS RİSKİ İLİŞKİNİN İNCELENMESİ: HALKA AÇIK FİRMALAR ÜZERİNE ARAŞTIRMA

ÖZ

Bu araştırmada Borsa İstanbul'da pay senetleri işlem gören finans sektörü dışı firmalar üzerinde nakit esaslı muhasebe bilgilerinin iflas riskini ne derecede açıklayabildiği incelenmiştir. Araştırmada

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firmaların iflas riskini ölçmek için Altman Z, Springate ve Zmijewski modelleri kullanılmış olup bu modellerden elde edilen sonuçlar bağımlı değişken olarak kullanılmıştır. Bağımsız değişkenler olarak ise firmaların nakit akış bilgileri ve kontrol değişkenleri olarak firma boyutu ile yaşı kullanılmıştır. Araştırmanın sonucunda nakit esaslı muhasebe bilgilerinin firmaların iflas riski skorlarını açıklamada yetersiz sonuç verdiği görülmüştür. Bu durumun sebebinin yazında kullanılan iflas riski ölçme modellerinin tahakkuk esaslı muhasebe bilgilerini temel alması, dolayısıyla çağdaş muhasebe bakış açısıyla günümüzde anlamlılığını yitirmiş olabileceği düşünülmektedir.

Anahtar Kelimeler: Nakit Esaslı Muhasebe Bilgileri, İflas Riski, TMS-7, Nakit Akış Tablosu

JEL Sınıflandırması: G33, M40, M41

GENİŞLETİLMİŞ ÖZET

AMAÇ VE MOTİVASYON

Günümüzün iş ortamında, firmalar birçok zorluk ve riskle karşı karşıyadır. Küreselleşmenin ve ekonomik entegrasyonun önemli ölçüde arttığı ve rekabetin yerelden küresel ölçeğe evrildiği böyle bir ortamda, işletmelerin faaliyetlerini ve hedeflerini gerçekleştirirken bu riskleri kontrol etmeleri zorunludur. Bu çalışma, günümüz iş dünyasında firmaların karşılaştığı en önemli risklerden biri olan iflas riskini araştırmayı amaçlamaktadır.

Mevcut literatürdeki iflas riski modellerinin çoğu tahakkuk esaslı muhasebe bilgilerine dayanmaktadır. Ancak günümüzün çağdaş muhasebe biliminde odak, tahakkuk esaslı muhasebe bilgilerinden nakit esaslı bilgilere hızla kaymaktadır. Dolayısıyla böylesine önemli bir konunun, nakit temelli finansal bilgi bakış açısıyla araştırılması muhasebe, finans ve işletme literatürüne önemli katkılar sağlayacaktır.

ARAŞTIRMA YÖNTEMİ

Bu çalışmada şirketlerin iflas risklerini ölçmek için literatürdeki en popüler üç model kullanılmaktadır. Bu modeller sırasıyla Altman Z, Springate ve Zmijewski modelleridir. İflas riski skorları bağımlı değişken olarak kullanılırken, nakit akış profilleri, faaliyet nakit akışları, yatırım nakit akışları, finansman nakit akışları, firma büyüklüğü ve firma yaşı ise bağımsız değişken olarak baz alınmıştır. Ekonometrik yöntem olarak havuzlanmış OLS yöntemi seçilmiştir. Modellere ilişkin değişkenler listesi Tablo 1'de verilmiştir.

$$Zmij\_X = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M1)$$

$$Altman\_Z = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M2)$$

$$Springate\_S = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M3)$$

Değişken Kodu	Tanımı	Ölçümü
LNTA	Firma Boyutu	Toplam aktiflerin logaritması
AGE	Firma Yaşı	Firmanın yaşı
CFP	Nakit Akış Profili	Kukla değişken, firma tespit edilen nakit akışı profili grubundaysa 1, aksi halde 0 alır.
CFO_TA	Esas Faaliyet Nakit Akışı	Esas Faaliyet Nakit Akışı / Toplam Aktif
CFI_TA	Yatırım Faaliyetlerinden Nakit Akışı	Yatırım Faaliyetlerinden Nakit Akışı / Toplam Aktif
CFF_TA	Finansman Faaliyetlerinden Nakit Akışı	Finansman Faaliyetlerinden Nakit Akışı / Toplam Aktif
Altman_Z	Altman Z Skoru	Altman_Z=6,56X_1+3,26X_2+6,72X_3+1,05X_4 X_1: Net İşletme Sermayesi/Toplam Aktif X_2: Birikmiş Karlar/Toplam Aktif X_3: FVÖK/Toplam Aktif X_4: Özkaynak Defter Değeri/Borçların Defter Değeri
Springate_S	Springate S Skoru	Springate _S=1,03X_1+3,07X_2+0,66X_3+0,4X_4 X_1: İşletme Sermayesi/Toplam Aktif X_2: FVÖK/Toplam Aktif X_3: FVÖK/KVYK X_4: Net Satışlar/Toplam Aktif
Zmij_X	Zmijewski X Skoru	Zmij_X=-4,3-4,5X_1+5,7X_2-0,004X_3 X_1: Net Kar/Toplam Aktif X_2: Toplam Borç/Toplam Aktif X_3: Dönen Varlıklar/KVYK

Araştırmanın örneklemi, finans sektörü dışında, 2015-2019 yılları arasında BİST'te kesintisiz işlem gören tüm şirketleri (224 şirket) kapsamaktadır. Tespit edilen 46 aykırı gözlem değerinin çıkartılması sonucunda analizler 1074 kesin gözlem ile gerçekleştirilmiştir.

BULGULAR VE TARTIŞMA

İlk modelimizde bağımlı değişken olarak Zmijewski X skorları kullanılmıştır. Bu model sonuçlarına göre, X puanı ile firma büyüklüğü arasındaki ilişkinin pozitif ve istatistiksel olarak anlamlı olduğu bulunmuştur. Bu durum, firma büyüklüğündeki artışın Türkiye'deki finansal olmayan firmaların iflas riskini de artırdığını göstermektedir. Bu modelin ikinci bulgusu, firma yaşı ile X puanlarının negatif ilişkili olduğu ve bu ilişkinin istatistiksel olarak anlamlı olduğudur. Bu sonuç firma yaşı arttıkça iflas riskinin azaldığını göstermektedir. CFO_TA ve X skor değişkenlerinden de benzer bir sonuç elde edilmiştir. Borsaya kayıtlı Türk firmaları için, faaliyet nakit akışları arttıkça iflas riski azalmaktadır. Ayrıca borsada işlem gören Türk firmaları için finansman faaliyetlerinden kaynaklanan nakit akışı arttıkça iflas riskinin azaldığı görülmektedir. İkinci modelimiz, bağımlı değişken olarak Altman Z puanlarını kullanmaktadır. Model 2 sonuçlarına göre, tüm değişkenler Altman Z puanını açıklamakta yetersizdir. Şaşırtıcı bir şekilde, Model 2 sonuçları, nakit akışı bilgileri ile iflas riski arasında istatistiksel olarak anlamlı bir ilişki olmadığını göstermektedir.

Nakit temelli muhasebe bilgilerinin iflas riski üzerindeki etkisini araştırmak için son model, bağımlı değişken olarak Springate modelini kullanan model 3'tür. Model 3'ün bulguları, model 1 sonuçlarını desteklemektedir. Model 1'e benzer şekilde, bu model de gerileyen firma profili ile iflas riski arasında pozitif ve doğrusal bir ilişki bulmaktadır. Model 1'in aksine, model 3 sonuçları firma büyüklüğünün iflas riski üzerinde önemli bir etkisinin olmadığını göstermektedir.

SONUÇ VE ÖNERİLER

Bu çalışma, nakit bazlı muhasebe bilgilerinin iflas riskini açıklamada zayıf bir etkiye sahip olduğunu ortaya koymaktadır. Çalışma modellerinde bazı önemli değişkenler tespit etmemize rağmen, genel olarak, modellerimiz iflas riskinin sadece küçük bir bölümünü açıklayabilir. Bu sonuçların literatürdeki birçok iflas riski modelinin güncelliğini yitirmiş olmasından kaynaklanabileceğini iddia etmekteyiz. Bu modeller tahakkuk esaslı muhasebe verilerine dayanmaktadır. Ayrıca bu modellerin ortaya atılmasından bu yana küresel ekonomide, finansal raporlamada, muhasebe biliminde ve muhasebe standartlarında birçok değişiklik olmuştur. İflas riski literatürünün nakit bazlı muhasebe bilgilerine dayalı olması gereken çağdaş modellere ihtiyacı olduğunu önermekteyiz.

1. INTRODUCTION

In today's business environment, firms face many challenges and risks. In such an environment where globalization and economic integration have increased significantly and competition has evolved from a local to a global scale, it is imperative for businesses to control these risks in realizing their activities and objectives. This study aims to investigate bankruptcy risk which is one of the most important risks that firms encounter in today's business world.

Many of the bankruptcy risk models in the current literature are based on accrual-based accounting information. But in today's contemporary accounting science, the focus has been shifting from accrual-based accounting information to cash-based information rapidly. Thus, we believe that investigating such an important topic with a contemporary accounting perspective, which is cash-based financial information will important contributions to accounting, finance, and business literature.

Some studies in the literature investigate cash flow information and bankruptcy risks of firms. One of the pioneer studies is conducted by Ward and Foster (1997). With a sample of financially distressed and not distressed firms in the U.S., Ward and Foster (1997) applied a binary regression model. The findings of this study showed that cash flows are the most important predictors of financial distress.

Gentry et al. (1990) analyzed financial statements of 333 firms to reveal the relationship between financial distress and cash flow components. After some comprehensive analysis, they demonstrated that the financial health of a firm highly depends on its ability to generate sufficient cash flow from operating activities.

Kordestani et al., (2011) studied on financial distress and cash flows of Iranian firms. They used data from 70 financially healthy firms and 70 financially distressed ones and investigated whether lagged values of cash flows can predict financial distress. Their empirical model showed that by using different components of cash flows, bankruptcy risk can be predicted from one, two, and three years before the financial distress occurs. A similar study is carried out by Kamaluddin et al., (2019). In their study, Kamaluddin et al., (2019) investigated the explanatory ability of cash flow ratios on the financial distress of Malaysian firms. Their results indicate that cash flow ratios can be used faithfully for the prediction of bankruptcy risk.

An interesting study on this topic is conducted by Giarto and Fachrurrozie (2020). In their study, Giarto and Fachrurrozie (2020) examined Indonesian chemical sector firms and analyzed the effect of financial leverage, sales growth, and cash flows on financial distress with moderating role of corporate governance. The abovementioned study showed that financial leverage has a positive and significant impact on bankruptcy risk while sales growth and cash flows performed negative and significant effects.

On the other hand, corporate governance moderates the influence of financial leverage and sales growth on bankruptcy risk.

Arlov et al. (2013) investigated whether cash flows affect business failure prediction using bankruptcy models. They conducted their study both on financially failed and non-failed firms to display whether the predictive ability of cash flows works on financial distress. Their findings showed that using cash flow information makes better financial distress predictions possible.

Sayari and Mugan (2013) investigated the impact of cash flow components on the financial distress scores of listed firms on the Istanbul Stock Exchange. Their study aims to analyze whether cash flow components have an explanatory effect on bankruptcy risk the and financial health of firms. The results of this study showed that there is an inverse relationship between operating cash flows, firm size, and bankruptcy risk of firms. On the other hand, Sayari and Mugan (2013) found that financing cash flows have a positive effect on bankruptcy risk. Although there is a study on Turkish firms which investigated financial distress scores and cash flow components already, that study (conducted by Sayari and Mugan, 2013) utilize a dataset from 2005-to 2009. In the intervening time, many changes have been experienced in Turkey both in terms of accounting standards and macroeconomic and financial risks. For this reason, the relationship between bankruptcy risk and cash flows of Turkish companies has been examined by reviewing the situation with both a more recent (2015-2019) and a larger data set (224 companies) and including different bankruptcy risk models as well.

2. METHODOLOGY AND VARIABLES ESTIMATION

In this study, the extent to which the bankruptcy risks of companies can be explained by cash-based accounting information and the relationships between them will be examined. For this reason, three bankruptcy risk models, which are the most frequently used in the literature, are used to measure the bankruptcy risk of companies.

2.1. Research Models

We used the three most popular models in the literature to measure the bankruptcy risks of companies. These models are Altman Z, Springate, and Zmijewski models respectively. Financial distress scores are used as regressand variables whereas cash flow profiles, operating cash flows, investing cash flows, financing cash flows, firm size, and firm age are our regressor variables. We choose pooled OLS method for the econometric method.

$$Zmij\_X = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M1)$$

$$Altman\_Z = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M2)$$

$$Springate\_S = \alpha_0 + \beta_1 LNTA + \beta_2 AGE + \beta_3 CFP + \beta_4 CFO\_TA + \beta_5 CFI\_TA + \beta_6 CFF\_TA \quad (M3)$$

Three research models of this research are given above, equation M1, M2, and M3 respectively. In addition, model variables and their estimations are given in Table 1.

Table 1. Model Variables

Variable Code	Definition	Measurement
LNTA	Firm Size	Log of Total Assets
AGE	Firm Age	Firm Age
CFP	Cash Flow Profile	The dummy variable takes 1 if the firm is in the group of the estimated cash flow profile and 0 otherwise
CFO_TA*	Operating Cash Flows	Operating Cash Flows / Total Assets
CFI_TA*	Investing Cash Flows	Investing Cash Flows / Total Assets
CFF_TA*	Financing Cash Flows	Financing Cash Flows / Total Assets

* Cash flow components are given in a normalized way. We divided cash flow components by total assets for having better results from econometric models.

The sample of the study included all companies (224 companies) listed in BIST continuously between the years 2015-and 2019, except for the finance sector. We detected 46 outlier observations and subtracted them from 1120 firm observations. So, our analyzes were carried out with 1074 firm observations.

2.2. Financial Distress Models

2.2.1. Altman Z Score Model

The Z-score model developed by Altman (1968) is a frequently used bankruptcy risk measurement model in the literature. The original model was developed for publicly traded manufacturing firms. Afterward, Altman (1993) modified the original formula and extended the scope of Z-Score for both private (or publicly traded) firms and non-manufacturing (or manufacturing) firms. Thus, the latest version of Z-Score is applied since this study uses data from many different sectors. Z-Score model developed by Altman (1993) is given in Equation 1. The explanations of the variables are given in Table 2.

$$Z = 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4 \qquad (1)$$

Table 2. Altman Z-Score Variables

Variable	Measurement
X1	Net Working Capital / Total Assets
X2	Retained Earnings / Total Assets
X3	EBIT / Total Assets
X4	Book Value of Equity / Book Value of Debt

According to Altman (1993), firms with a Z score lower than 1.10 are at a high risk of bankruptcy, those between 1.10 and 2.60 are in the gray area, and others with a Z score higher than 2.60 are in the safe zone. The model results in the vast majority of Turkish non-financial firms having a low risk of bankruptcy. According to the Altman Z model, on average, 56 firms per year (%25) have a high risk of bankruptcy whereas 135 firms per year have a low level of bankruptcy risk (%60). The number of firms in these groups are fluctuating around the mean.

Table 3. Altman Z Model Results

Altman Z Model Results						
	High Risk	**Frequency**	**Grey Area**	**Frequency**	**Low Risk**	**Frequency**
2015	49	21,9%	26	11,6%	149	66,5%
2016	60	26,8%	30	13,4%	134	59,8%
2017	49	21,9%	44	19,6%	131	58,5%
2018	61	27,2%	30	13,4%	133	59,4%
2019	62	27,7%	30	13,4%	132	58,9%

2.2.2. Springate Model

Springate S score model was developed by Springate (1978) and it is the second bankruptcy risk model used in the study. The Springate model is based on discriminant analysis. Model variables are given in Table 4 and the model equation is given in equation 2.

$$S = 1,03X_1 + 3,07X_2 + 0,66X_3 + 0,4X_4 \qquad (2)$$

Table 4. Springate Model Variables

Variable	Measurement
X1	Working Capital / Total Assets
X2	EBIT / Total Assets
X3	EBT / Current Liabilities
X4	Net Sales / Total Assets

In the Springate model, it is interpreted that firms with an S score above 0.862 are financially healthy, while small ones are at risk of bankruptcy. The results of the Springate model are given in Table 5. According to the model results, more than half of the firms in our sample are financially healthy firms with a low level of bankruptcy risk. As the Springate model indicates, on average, 116 firms per year (%52) have a high level of financial distress whereas 108 firms performed with a low level of financial distress (%48).

Table 5. Springate Model Results

Springate Model Results				
	High Risk	**Frequency**	**Low Risk**	**Frequency**
2015	115	51,3%	109	48,7%
2016	127	56,7%	97	43,3%
2017	116	51,8%	108	48,2%
2018	105	46,9%	119	53,1%
2019	118	52,7%	106	47,3%

2.2.3. Zmijewski Model

The Zmijewski X score is a model that measures bankruptcy risk based on a firm's performance, financial leverage, and liquidity. The model equation is given in equation 3 and its variables are given in Table 6.

$$X = -4,3 - 4,5X_1 + 5,7X_2 - 0,004X_3 \qquad (3)$$

Table 6. Zmijewski Model Variables

Variables	Measurement
X1	Net Profit / Total Assets
X2	Total Debt / Total Assets
X3	Current Assets / Current Liabilities

If the X score obtained in the Zmijewski model is less than 0, it is interpreted that the firm is financially healthy, and if it is larger than zero, then it is evaluated as having a risk of bankruptcy (Djamaluddin et al., 2017). Model results are given in Table 7. Zmijewski's model results show that the majority of firms are not at risk of bankruptcy.

Table 7. Zmijewski Model Results

Zmijewski Model Results				
	High Risk	**Frequency**	**Low Risk**	**Frequency**
2015	37	16,50%	187	83,50%
2016	47	21,00%	177	79,00%
2017	49	21,90%	175	78,10%
2018	51	22,80%	173	77,20%
2019	53	23,70%	171	76,30%

2.3. Cash Flow Profiles

The cash flow profiles method is based on studies by Gup et al. (1993), Bruwer and Hamman (2005), and Dickinson (2011). This method has been developed based on the signs of the cash flows arising from the three main activities; operating (CFO), investing (CFI), and financing (CFF) cash flows. This method helps us to categorize firms according to certain stages of the firm life cycle. The cash flow profiles application and results of listed Turkish firms are given in Table 8. In parallel with the findings obtained in many studies in the literature, the most common business profiles are Successful, Growing, and Young businesses, respectively.

Table 8. Cash flow profiles of listed Turkish firms

Cash Flow Signs	**Cash Flow Profile**	**2015**	**2016**	**2017**	**2018**	**2019**
Profile 1- (+,+,+)	Unusual Situation	6 (%2,7)	0 (%0)	3 (%1,3)	1 (%0,4)	2 (%0,9)
Profile 2- (+,-,-)	Successful Firm	78 (%34,8)	91 (%40,6)	80 (%35,7)	89 (%39,7)	108 (%48,2)
Profile 3- (+,+,-)	Restructuring Firm	17 (%7,6)	18 (%8,0)	20 (%8,9)	17 (%7,6)	20 (%8,9)
Profile 4- (+,-,+)	Growing Firm	59 (%26,3)	54 (%24,1)	52 (%23,2)	54 (%24,1)	37 (%16,5)
Profile 5- (-,+,+)	Declining Firm	5 (%2,2)	6 (%2,7)	14 (%6,3)	9 (%4,0)	6 (%2,7)
Profile 6- (-,-,+)	Young Firm	48 (%21,4)	37 (%16,5)	49 (%21,9)	44 (%19,6)	42 (%18,8)
Profile 7- (-,+,-)	Liquidation	10 (%4,5)	7 (%3,1)	4 (%1,8)	7 (%3,1)	5 (%2,2)
Profile 8- (-,-,-)	Unusual Situation	1 (%0,4)	11 (%4,9)	2 (%0,9)	3 (%1,3)	4 (%1,8)

3. FINDINGS AND DISCUSSION

Before introducing regression model results, correlation coefficients of dependent and independent variables are given in Table 9. As the results exhibit, most of the variables have low degree correlations. Operating cash flows have an inverse and moderate degree correlation with investing cash flows and

financing cash flows. Similarly, there is also an inverse and moderate degree correlation between financing cash flows and investing cash flows. Although Altman Z scores show no significant correlation with others, Zmijewski X scores and Springate S scores correlate inversely, and this relationship is moderately strong.

Table 9. Correlation Matrix

	AGE	Altman_Z	Springate_S	Zmij_X	LNTA	CFO_TA	CFI_TA	CFF_TA
AGE	1							
Altman_Z	-0,01	1						
Springate_S	0,06	0,00	1					
Zmij_X	-0,08	0,01	-0,46	1				
LNTA	0,20	0,04	0,05	0,06	1			
CFO_TA	0,07	0,01	0,35	-0,16	0,20	1		
CFI_TA	0,04	0,03	-0,05	0,04	-0,12	-0,30	1	
CFF_TA	-0,12	-0,03	-0,19	0,07	-0,10	-0,61	-0,33	1

Regression model results are given in Table 10. Firstly, almost in all models, there is no statistically significant relationship between cash flow profiles and bankruptcy risk except profile 3, restructuring firms.

In our first model, Zmijewski X scores are used as dependent variables. According to this model results, it is found that the relationship between X score and firm size is positively and statistically significant. This indicates that an increase in firm size also increases the bankruptcy risk of non-financial firms in Turkey. The second finding of this model is that firm age and X scores are negatively related and this relation is statistically significant. This result demonstrates that as firm age increases, bankruptcy risk decreases. A similar result has been obtained from CFO_TA and X score variables. There is an inverse relationship between these variables and this relationship is significant at a %99 confidence interval. For listed Turkish firms, as operating cash flows increase, bankruptcy risk decreases. In addition, we find that CFF_TA and X score are inversely related and this relationship is statistically significant. This finding indicates that as cash flow from financing activities increases, bankruptcy risk decreases for listed Turkish firms. Lastly, on Zmijewski score-based regression model, we estimate a positive and statistically significant (at %90 confidence level) impact of restructuring firm profile on bankruptcy risk. Other variables in this model have no significant impact on bankruptcy risk. The explanatory ability of model 1 is represented by R^2. According to the R^2 value, cash-based

accounting information can explain only %9,7 of the variation in bankruptcy risk. To evaluate model results, F statistics are given in Table 10. As F statistics is 9,603 (p<2,2e-16), model 1 is statistically significant for the evaluation of obtained results.

Table 10. Regression Models Results

M1 Results (Zmijewski X)					**M2 Results (Altman Z)**				**M3 Results (Springate S)**			
	Est.	Std. Er.	t	Pr.	Est	Std. Er.	t	Pr.	Est.	Std. Er.	t	Pr.
(Intercept)	-4,90	0,81	-6,08	0,00	25,64	28,66	0,90	0,37	1,38	0,46	3,04	0,00
LNTA	0,19	0,03	5,81	0,00	1,43	1,04	1,38	0,17	-0,03	0,02	-1,42	0,16
AGE	-0,01	0,00	-3,30	0,00	-0,08	0,10	-0,76	0,45	0,00	0,00	1,16	0,24
Profile_2	0,71	0,57	1,27	0,21	-26,17	20,60	-1,27	0,20	-0,53	0,32	-1,64	0,10
Profile_3	1,00	0,59	1,71	0,09	-24,86	21,24	-1,17	0,24	-0,61	0,33	-1,84	0,07
Profile_4	0,68	0,56	1,22	0,22	-28,20	20,58	-1,37	0,17	-0,33	0,32	-1,03	0,30
Profile_5	0,10	0,63	0,16	0,87	-36,10	22,41	-1,61	0,11	0,06	0,35	0,18	0,86
Profile_6	0,83	0,57	1,47	0,14	-28,54	20,72	-1,38	0,17	-0,10	0,32	-0,30	0,77
Profile_7	0,34	0,65	0,52	0,61	-35,67	22,97	-1,55	0,12	-0,27	0,37	-0,72	0,47
Profile_8	0,36	0,70	0,52	0,60	-17,92	24,46	-0,73	0,46	0,06	0,39	0,15	0,88
CFO_TA	-6,39	1,01	-6,30	0,00	-12,03	27,03	-0,45	0,66	7,04	0,57	12,29	2e-16
CFI_TA	0,00	1,36	0,00	1,00	18,15	33,32	0,55	0,59	2,28	0,77	2,98	0,00
CFF_TA	-2,35	1,14	-2,06	0,04	-10,87	26,86	-0,38	0,71	1,53	0,64	2,37	0,02
R^2 **Adj. R^2** **F Stat.**	0,097 0,087 9,603(p-value:<2,2e-16)				**R^2** **Adj. R^2** **F Stat.**	0,008 0,000 0,674 (p-value:0.7776)			**R^2** **Adj.R^2** **F Stat.**	0,185 0,175 20,08(p-value:<2,2e-16)		

Our second model utilizes Altman Z scores as the dependent variable. According to model 2 results, all variables fail to explain the Altman Z score. Surprisingly, Model 2 results indicate that there is no statistically significant relationship between cash flow information and bankruptcy risk.

The last model for investigating cash-based accounting information effect on bankruptcy risk is model 3 which utilizes the Springate model as the dependent variable. The findings of model 3 support model 1 results. Similar to model 1, this model also finds a positive and linear relationship between

restructuring firm profile and bankruptcy risk. Contrary to model 1, model 3 results show that there is no significant impact of firm size on bankruptcy risk. However, we reach the following findings: an increase in operating, investing, and financing cash flows will decrease the financial distress of non-financial listed Turkish firms. Model 3 displays no other statistically significant relationships. Finally, model 3 can explain %18,5 variation in S-scores with F-value of 20,08 (p-value:<2,2e-16). For the multicollinearity problem, we calculate VIF scores and find that only Profile_2, Profile_4, and Profile_6 perform multicollinearity and the others are in the range of 1<VIF<5.

4. CONCLUSION

In business and economics sciences, a for-profit firm's purpose is defined as maximizing economic profit which can be interpreted as maximizing firm value for shareholders. All of a firm's operations, activities, and efforts should be shaped parallel to this purpose. However, the concept of ongoing concern has an important place in achieving this goal. For achieving the purpose, one must survive. To reach its goals, a firm should in a financially healthy position. If a firm is not financially healthy, there may be many problems arise such as an increase in the cost of capital, decreases in multipliers, being have to sell fixed assets, etc.

Bankruptcy risk is usually measured with financial distress models which are very popular in literature. But main problems with these models are that they utilize accounting information which is from the statement of financial position and statements of profit and loss. Thus, these models are based on accrual-based accounting information. But contemporary accounting and finance theory and perspective suggest that bankruptcy risk is related to cash flows management. If a firm's cash inflows and outflows are not managed effectively, there may be a bankruptcy occurs. For this reason, this study investigated bankruptcy risk with cash-based accounting information.

We firstly find that the only cash flow profiles that have any impact on bankruptcy risk are restructuring firms. Our findings suggest that restructuring firms have significantly higher bankruptcy risks. In addition, larger firms (in monetary size) tend to have higher bankruptcy risks. Besides, model results suggest that operating cash flows are important in accounting for bankruptcy risk. Firms should manage their operating cash flows for a healthier financial position. For financing cash flows, econometric models with Zmijewski and Springate models display that higher financing cash flows decrease bankruptcy risk. While the Springate model indicates that an increase in investment cash flows is also decreasing bankruptcy risk, the Zmijewski model does not support this finding. Most importantly, the econometric model with the Altman Z score does not show any significant relationship between cash flow information and bankruptcy risk. Thus, some of our findings are contradictory. These contradictory

results may be due to different applications of IAS-7. In our sampling period, we detected this problem. It has been seen that some firms reported dividend payments, dividend income (from subsidiaries), and paid interest (due to long-term borrowing) under operating cash flows, and others do strictly reverse decisions or some different applications. These are only some examples that we have observed and there are more mistakes or different applications of IAS-7.

This study finds that cash-based accounting information has a weak degree of effect on explaining bankruptcy risk. Even though we detect some significant variables in study models, overall, our models can explain only a small part of bankruptcy risk. We assert that these results may arise from the fact that many bankruptcy risk models in the literature are old-dated. These models are based on accrual-based accounting data. In addition, there have been many changes in the global economy, financial reporting, accounting science, and accounting standards since these models are put forward. We suggest that the literature on bankruptcy risk needs contemporary models which should be based on cash-based accounting information.

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AUTHOR'S DECLARATION

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

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