Investigation of the mediating role of real earnings smoothing in the relationship between financial distress and the use of trade credit

Investigação sobre o papel de mediação do nivelamento dos rendimentos reais na relação entre a angústia financeira e a utilização do crédito comercial

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Abstract

Taking into account the premise of rational expectations and the necessity of allocative efficiency, financial resources are expected to flow in the direction that would create the most efficiency. Also, given the asymmetry of information and the ethical risk raised between the providers of financial information and its users, external users are expected to have the required and sufficient knowledge of the final product of the financial reporting process, i.e., audited financial statements, the quality of financial statements, and the possibility of biased reporting, and also to optimally use the information contained in it for their economic decisions. Financially distressed firms are naturally expected to lose the trust of suppliers, and suppliers are reluctant to grant trade credit to such firms. The statistical population of the present research consists of all the companies listed on the Tehran Stock Exchange that have submitted their financial statements during the period of 1390 to 1400 (2011 to 2021). The present research, therefore, can also be helpful for standard-setting institutions (auditing organizations) to develop standards concerning the conditions by considering the financial situation of companies such as financial distress as exceptional conditions that may distort the...
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Keywords: Earnings Smoothing, Financial Distress, Accounting Rules.

Introduction

Bankruptcy is a global problem that can happen in both developing and developed economies. However, it generally occurs in developing countries (Geng et al., 2015). Some of the main reasons for the failure of companies, which are different in different countries, are the social, economic, and political environments of the countries, their effective implementation of some accounting standards. They can also revise and make adjustments to the stricter accounting rules affecting earnings management, especially in situations where managers are under a lot of pressure.

Keywords: Suavização de Ganhos, Angústia Financeira, Regras Contábeis.

Resumo
Tendo em conta a premissa de expectativas racionais e a necessidade de eficiência na efetuação de recursos, espera-se que os recursos financeiros avancem no sentido de criar a maior eficiência possível. Além disso, dada a assimetria de informação e o risco ético levantado entre os fornecedores de informação financeira e os seus utilizadores, espera-se que os utilizadores externos tenham o conhecimento necessário e suficiente do produto final do processo de relato financeiro, ou seja, demonstrações financeiras auditadas, a qualidade das demonstrações financeiras e a possibilidade de relato enviesado, e também que utilizem da melhor forma as informações contidas nas mesmas para as suas decisões econômicas. Espera-se naturalmente que as empresas com dificuldades financeiras percam a confiança dos fornecedores, e os fornecedores mostram-se relutantes em conceder crédito comercial a essas empresas. A população estatística da presente pesquisa consiste em todas as empresas listadas na Bolsa de Valores de Teerã que apresentaram suas demonstrações financeiras no período de 1390 a 1400 (2011 a 2021). O presente estudo pode, por conseguinte, ser útil para as instituições de normalização (organizações de auditoria) desenvolverem normas relativas às condições, considerando a situação financeira de empresas como as dificuldades financeiras como condições excepcionais que podem distorcer a aplicação efetiva de algumas normas contabilísticas. Eles também podem revisar e fazer ajustes nas regras contábeis mais rígidas que afetam a gestão de ganhos, especialmente em situações em que os gerentes estão sob muita pressão.

Keywords: Suavização de Ganhos, Angústia Financeira, Regras Contábeis.
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Financial distress and finally bankruptcy of companies can result into huge losses for investors, creditors, suppliers of financial resources, suppliers of raw materials, and customers. Financial distress has several definitions that refer to situations such as negligence, default, inability to pay debts, and bankruptcy (Geng et al., 2015). Parkinson (2018) defines financial distress as the probability of bankruptcy, which depends on the magnitude of current assets and the level of credit. Other definitions indicate that financial distress occurs when the company fails to fulfill its creditors' obligations and its operations are almost stopped (Binti and Ameer, 2010; Kamaluddin et al., 2019). Due to the complexity of financial distress, there is no precise definition that can be used for this term. Furthermore, the factors and causes of financial distress are diverse and cannot be listed separately (EL Deeb & Shafik Ramadan, 2020). Business financing activities are the main pillars of an organization's survival. Trade credit is an important source of financing provided by suppliers of products and services to their customers (trade credit supply), and it has played a significant role in the sustainability of company growth in comparison with formal channels of financing, such as bank loans (Garmaise & Moskowitz, 2003). Simply put, trade credit is the largest and most important source of short-term financing and plays an important role in providing liquidity to the economy—especially in developing economies including Iran where formal financing is insufficient and informal financing is common (Bernanke and Gertler, 1995). In special conditions, i.e., the ideal state of capital markets (no taxes, no transaction costs, symmetric information, etc.) (Modigliani and Miller, 1958), any combination of debt and equity investment is as effective as it is accepted. However, in the real world, there are aspects that are inconsistent with Modigliani's and Miller's ideal assumptions and make the choice of capital structure valuable (Younis et al., 2020). Making decisions on the way of financing is different in different conditions, which depends on several factors such as the relative costs of financing, the company's situation, the company's strategy, the amount of access to resources, etc. Investors, on the other hand, are not very interested in long-term investment in financially distressed companies (Adizes, 1998). Therefore, creating long-term debts is more difficult for such companies. Short-term debt is often the only option left to finance the company's operations during periods of financial distress. Research studies supporting this idea suggest that trade credit is a substitute for when other sources accounting standards and the difference in their capital structures (Argenti, 1976; Her and Choe, 1999). An economic enterprise is called bankrupt when its total debts are more than the fair value of its assets in the market (Sautner and Vladimirov, 2018).
of financing are not available or are more difficult to obtain (Younis et al., 2020). For example, Guariglia and Mateut (2006) indicated that the use of trade credit increases in situations where companies are in a tight monetary period. Similarly, Fisman and Love (2007), Molina and Preve (2009), and Ferrando & Mulier (2013) support this idea empirically by showing that more trade credit is used by firms with financial problems compared to healthy companies. Another reason why some firms may be limited in using trade credit is their limited access to external debt market (Younis et al., 2020). Petersen and Rajan (1997) found that smaller firms use more trade credit during financial distress. Moreover, previous studies and the pecking order theory also agree with these arguments that, when banks refuse to provide loans to companies or there are more restrictions on the use of loans, companies use expensive sources of financing such as credit cards and trade credit (Danielson and Scott, 2004). These ideas show the existence of a positive relationship between the use of trade credit and financial distress (Sumiyana et al., 2023).

On the contrary, there are studies suggesting that the use of trade credit indicates unstable conditions in the company, and if there is not enough information to directly estimate the company's risk, investors use the amount of trade credit used in the company as an indirect tool to estimate the company's risk (Younis et al., 2020). In addition, Nislen (2002) argues that larger companies that are financially sound, have good bond ratings and have access to alternative financing sources do not use trade credit. Similarly, Baxter (1967) found that suppliers are not willing to provide products and services to companies in financial distress; thus, the only remaining option for these companies is to purchase products and services in cash, leading to a decrease in trade credit in their balance sheet. Likewise, sellers may not be very willing to sell their products and services to companies in financial distress except in some limited circumstances where they can impose higher costs or cash payment upon delivery, etc. to such companies. Hence, one of the issues addressed in the present research is to investigate the effect of financial distress on the use of trade credit.

The first study regarding earnings management (EM) started in the middle of the 20th century when Hepworth (1953) analyzed income smoothing. However, the cornerstone definition of earnings management was not established until the late 1990s when Healey and Wahlen (1999) defined it as "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." This definition refers to changing financial statements so that managers can
hide information in order to be not transparent and mislead shareholders or people outside the organization (users of financial statements). The definition provided by these authors becomes the basis of the topic and then earnings management is defined as the intended manipulation in financial statements. In this regard, each author has provided new definitions based on the purpose of their study; however, the concept of manipulation is common in all definitions. For example, García-Lara et al. (2009) defined earnings management as "executive management actions to report intended and not actual results". While Scott (2009) defines it as "choosing accounting measures that can influence income in order to achieve the desired goal". Therefore, earnings management describes the operations performed by managers to change financial statements to achieve their goals.

A review of earnings management literature shows that there are two types of tools available to management to perform earnings management. The first type is accounting earnings management or accrual earnings management (AEM), which refers to the interpretation of accounting standards and their application to transactions and events that have already occurred. Examples of AEM include choosing accounting methods such as depreciation or inventory valuation. The second type is real earnings management (REM), which is a deviation from normal operating procedures, motivated by the desire of managers to mislead at least some of the interested groups into believing that the specific goals of financial reporting (the goals that the manager pursues from REM) has been achieved in the normal course of operation. Manipulation of real activities to increase income is done by manipulating sales, reducing discretionary costs, or producing more than necessary. In particular, companies may increase their reported income by giving significant discounts to customers, but their operating cash flows decrease. Additionally, companies that reduce discretionary cost experience an increase in net profit and earnings per share. Also, companies may reduce cost of goods sold (CGS) in order to increase earnings. Therefore, companies may overproduce in order to reduce the cost of each unit of ready-to-sell goods, because overproduction reduces the fixed costs of each unit (Lin et al., 2016). Several studies suggest that REM is used in various fields (Ramezanzadeh Zeidi and Faghani Makrani, 2021). Gunny (2005) found that REM has a significant negative effect on future performance. Tabassum et al. (2014) provided documented evidence that shows that companies performing REM through abnormal production costs face lower financial performance in the following years. Campa and Camacho-Miñano (2015) found that the level of financial distress affects the way earnings are manipulated. Companies with higher levels of financial distress show more extensive signs of
incremental earnings management by manipulating real transactions instead of accruals and vice versa. This shows that in the presence of more complicated financial situations, managers try to use less recognizable and more effective strategies to increase revenues with the aim of avoiding several negative aspects that this situation can create, which is a participation in the process of bankruptcy with all its effects and consequences such as potential damages to shareholders, investors, employees, and social welfare. García Lara et al. (2009) showed that during financial distress, managers use both types of earnings management (accounting and real activity), but when the probability of their bankruptcy is high, manipulation of real activities is done more aggressively. According to the above arguments, one of the other important issues that the present research addresses is the investigation of the effect of financial distress of companies on the level of REM. Previous studies have shown that earnings management (EM) affects the information content of financial information in stock markets, so it can be effective for predicting bankruptcy and determining the financial health of companies. In other words, in countries—including Iran—with a not very strong capital market and not very knowledgeable users, REM by manipulating sales and reducing the cost price can well mislead the suppliers to gain their trust and be a tool to achieve the opportunistic goals of management and attract more trade credit as the only remaining option in times of financial distress. Accordingly, according to the theoretical foundations provided and the existing research gap in this field, the relationship between REM and the use of trade credit in financial distressed companies is investigated in this research. According to the aforementioned concepts, if the results of the present research indicate a positive relationship between financial distress and the use of trade credit, the last issue studied in this research is the investigation of the mediating role of REM in the relationship between financial distress and the use of trade credit.

**Research Based on Investigating the Effect of Financial Distress on the Use of Trade Credit**

Petersen and Rajan (1997) in a study entitled "Trade credit; theories and evidence" with a cross-sectional time horizon during the years 1988 to 1989 and targeting small non-financial and non-agricultural companies in the United States and using the ordinary least squares estimation method found that companies with less access to financial credit use more trade credit. Molina and Preve (2009), in a study entitled "Empirical analysis of the effect of financial distress on trade credit" during the period from 1978 to 2000 using data
from the United States, found that companies with financial distress use more trade credit. They also showed that the use of suppliers' trade credit is considered as an alternative source of financial security, despite its high cost, in the time of financial distress of companies. Younis et al. (2020), in a study entitled "Investigation of the nonlinear relationship between financial distress and trade credit: empirical evidence from Pakistan" during the period from 2010 to 2017 using data from Pakistan, analyzed the relationship between distress financial and trade credit, and by focusing on solving the research conflict of relevant past studies, they found that the studies supporting the existence of a positive relationship between financial distress and trade credit focus on the argument of limited access to external capital, stating that companies with financial distress rely more on trade credit due to limited (or sometimes very expensive) access to other financial sources. Also, the results of this research indicate that the level of financial distress is effective on this relationship, so that at the level of medium to low probability of financial distress, the relationship between financial distress and trade credit is positive, and with the increase in the level of probability of financial distress, the degree of reliance of the company on trade credit would decrease.

Research Based on Investigating the Relationship Between REM and Financial Distress

García Lara et al. (2009) in a study entitled "Earnings quality in ex-post failed firms" using companies that declared bankruptcy during the period of 1998 to 2004, in England, found that firms with the higher possibility of bankruptcy have ended the opportunities of successful manipulation through accruals and are engaged in manipulation through real activities (REM). Campa and Camacho-Miñano (2015) in a study entitled "The effect of financial distress before bankruptcy on earnings management tools in small and medium-sized companies" during the period from 2006 to 2009, using the data of firms that had bankruptcy cases from May to June 2010 in 12 commercial courts of Madrid, Spain, they found that with the increase in the financial distress of companies, earnings management through real items increases compared to accruals (Bakar et al., 2023). Given the problems that agency theory points to—the conflict of interests between owners and managers and the difference in their attitude towards risk and the moral hazard raised between managers and interest groups outside the organization, it can be argued that managers apply earnings management for various
reasons and motivations, such as rewards, debt contracts, taxes, political expenses, etc. (Scott, 2009). This can be caused by the weak efficiency of the capital market and the lack of sufficient awareness of the suppliers of goods and services regarding the earnings management done to cover financial distress in such companies. The earnings management considered in this research is REM, which cannot be easily discovered by auditors. Therefore, the present research investigates whether REM during the period of financial distress can explain the relationship between financial distress of companies and the use of trade credit. In other words, can REM during the period of financial distress be considered as a factor to cover the financial distress and mislead trade credit providers (providers of goods and services) and and justify establishing a positive relationship between financial distress and the use of trade credit? During this research, the relationship between REM and the amount of receiving trade credit is also investigated, considering that such a relationship has not been investigated before. Hence, the research hypotheses are as follows:

Hypothesis 1: Financial distress has a significant effect on the use of trade credit.
Hypothesis 2: Financial distress has a significant effect on the level of REM.
Hypothesis 3: REM has a significant effect on the amount of receiving trade credit.

**Methodology**

This research is applied in terms of purpose and it is descriptive research in terms in terms of its nature, with an emphasis on correlational relationships. The statistical population of the research consists of all the companies listed on the Tehran Stock Exchange that have submitted their financial statements during the period of 1390 to 1400 (2011 to 2021). According to the following models, research hypotheses are tested:

Regression model 1:

\[
TC_it = \beta_0 + \beta_1FD_{it} + \beta_2AGE_{it} + \beta_3SGROW_{it} + \beta_4SIZE_{it} + \beta_5LEV_{it} + \beta_6Profitability_{it} + \beta_7LOAN_{it} + \beta_8PAY_{it} + \beta_9ROA_{it} + \beta_{10}CFO_{it} + \beta_{11}LIQ_{it} + \beta_{12}LOSS_{it} + \epsilon_{it} \tag{1}
\]

Where:

TC_it: Dependent variable—the level of trade credit in each company and for each year. FD_it: independent variable—level of financial distress in each company and for each year. The control variables of the above equation are introduced as follows. It should be noted that the method of measurement and calculation of each
is preferably discussed in the relevant section. AGEit: company age, SGROWit: company sales growth rate. SIZEit: company size. LEVit: leverage ratio. Profitabilityit: Profitability. LOANit: bank loan. PAYit: dividend. ROAit: return on assets. CFOit: cash flow from operation. LIQit: ratio of current assets. LOSSit: company loss. εit: Disturbance components or regression residual values

Regression model 2:

\[ REM_{it} = \beta_0 + \beta_1FD_{it} + \beta_2AGE_{it} + \beta_3SIZE_{it} + \beta_4MEV_{it} + \beta_5CSG_{it} + \beta_6A-DNI_{it} + \beta_7CR_{it} + \beta_8ROA_{it} + \epsilon_{it} \]  \[2\]

Where:

\( REM_{it} \): dependent variable—the level of REM in each company and for each year. \( FD_{it} \): independent variable—level of financial distress in each company and for each year. The control variables of the above equation are introduced as follows. It should be noted that the method of measurement and calculation of each is preferably discussed in the relevant section. CSG_{it}: Current sales growth. A-DNI_{it}: Changes in income. CR_{it}: current ratio.

Regression model 3:

\[ TC_{it} = \beta_0 + \beta_1FD_{it} + \beta_2REM_{it} + \beta_3AGE_{it} + \beta_4SGROW_{it} + \beta_5SIZE_{it} + \beta_6LEV_{it} + \beta_7Profitability_{it} + \beta_8LOAN_{it} + \beta_9PAY_{it} + \beta_{10ROA_{it}} + \beta_{11CFO_{it}} + \beta_{12LIQ_{it}} + \beta_{13LOSS_{it}} + \epsilon_{it} \]  \[3\]

Where:

\( TC_{it} \): dependent variable—the level of trade credit in each company and for each year. \( FD_{it} \): independent variable—the level of financial distress in each company and for each year. REM_{it}: the mediator variable inserted in the model as an independent variable—the level of real earnings management in each company and for each year. Control variables: AGEit: SGROWit: SIZEit: LEVit: Profitabilityit: LOANit: PAYit: ROAit: CFOit: LIQit: LOSSit: εit. In this model, REM and financial distress are entered into the model simultaneously in order to measure the effect of financial distress on the company’s trade credit level in the presence of REM.

Results and Discussion

According to the results, the first research model should be fitted with fixed effects panel (with robust covariance matrix). The fitting results of the mentioned model are listed in Table 1.
Table 1. Results of fitting the first research model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Symbol</th>
<th>Coefficient</th>
<th>Std. deviation</th>
<th>T-statistic</th>
<th>P-value</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>y-intercept</td>
<td>C</td>
<td>-25071372.0</td>
<td>3715541.0</td>
<td>-6.748</td>
<td>0.000</td>
<td>1.137</td>
</tr>
<tr>
<td>Financial distress</td>
<td>FD</td>
<td>-4632778.0</td>
<td>1297088.0</td>
<td>-3.572</td>
<td>0.000</td>
<td>1.110</td>
</tr>
<tr>
<td>Company age</td>
<td>AGE</td>
<td>-57583.7</td>
<td>41008.3</td>
<td>-1.404</td>
<td>0.161</td>
<td>1.040</td>
</tr>
<tr>
<td>Sales growth rate</td>
<td>CSG</td>
<td>308894.2</td>
<td>213922.7</td>
<td>1.444</td>
<td>0.149</td>
<td>1.040</td>
</tr>
<tr>
<td>Company size</td>
<td>SIZE</td>
<td>5421627.0</td>
<td>603516.0</td>
<td>8.983</td>
<td>0.000</td>
<td>1.137</td>
</tr>
<tr>
<td>Financial leverage</td>
<td>PROFITABILITY</td>
<td>2393708.0</td>
<td>842360.9</td>
<td>2.842</td>
<td>0.005</td>
<td>2.225</td>
</tr>
<tr>
<td>Profitability</td>
<td>PROFITABILITY</td>
<td>18957.9</td>
<td>7550.6</td>
<td>2.511</td>
<td>0.012</td>
<td>1.060</td>
</tr>
<tr>
<td>Bank loans</td>
<td>LOAN</td>
<td>-1459398.0</td>
<td>522982.1</td>
<td>-2.791</td>
<td>0.005</td>
<td>1.269</td>
</tr>
<tr>
<td>Dividends</td>
<td>PAY</td>
<td>-1386473.0</td>
<td>669850.4</td>
<td>-2.070</td>
<td>0.039</td>
<td>1.464</td>
</tr>
<tr>
<td>Return on assets</td>
<td>ROA</td>
<td>-2750498.0</td>
<td>982073.3</td>
<td>-2.801</td>
<td>0.005</td>
<td>3.201</td>
</tr>
<tr>
<td>Operating cash flow</td>
<td>CFO</td>
<td>-170456.0</td>
<td>796439.7</td>
<td>-0.214</td>
<td>0.831</td>
<td>1.550</td>
</tr>
<tr>
<td>Ratio of current assets</td>
<td>LIQ</td>
<td>-4594.8</td>
<td>848739.9</td>
<td>-0.005</td>
<td>0.996</td>
<td>1.385</td>
</tr>
<tr>
<td>Company loss</td>
<td>LOSS</td>
<td>51606.7</td>
<td>332089.8</td>
<td>0.155</td>
<td>0.877</td>
<td>1.373</td>
</tr>
</tbody>
</table>

Durbin-Watson's test is used to check the presence or absence of autocorrelation between the residuals. In the table above, based on the reported results, the value of the Durbin-Watson statistic is 1.625 within the range of 1.5 to 2.5, and it can be said that the assumption of independence of the residuals has been met. The coefficient of determination (R squared) is 0.571, which indicates that 57% of the variance and changes in trade credit are explained by the independent variables of the first model. According to the results of the variance analysis test to check the second model, the F-value obtained is 10.615, which is significant at the 0.005 level, showing that the independent variables of the first model can explain the changes related to the changes in trade credit well and that the model is suitable. In the above table, the variance inflation factor (VIF) of the independent variables is less than 10 for all variables and as a result, there is no collinearity problem. Taking into account that the t-statistic related to financial distress is -6.748 and its p-value is estimated at 0.000, which is less than 0.05, it can be stated with 95% confidence that "financial distress has a significant effect on the use of trade credit" and the first hypothesis is confirmed. Also, given that the
The coefficient of financial distress is estimated at -4632778.0, which is negative, it can be said that "financial distress has a significant inverse effect on the use of trade credit". According to the results, the first model of the research should be fitted by weighted ordinary least squares method with a robust covariance matrix. The fitting results of the mentioned model are given in the table below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Symbol</th>
<th>Coefficient</th>
<th>Std. deviation</th>
<th>T-statistic</th>
<th>P-value</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>y-intercept</td>
<td>C</td>
<td>0.129</td>
<td>0.061</td>
<td>2.102</td>
<td>0.036</td>
<td></td>
</tr>
<tr>
<td>Financial distress</td>
<td>FD</td>
<td>-0.089</td>
<td>0.044</td>
<td>-2.024</td>
<td>0.043</td>
<td>1.291</td>
</tr>
<tr>
<td>Company age</td>
<td>AGE</td>
<td>0.00003</td>
<td>0.0005</td>
<td>0.055</td>
<td>0.956</td>
<td>1.007</td>
</tr>
<tr>
<td>Company size</td>
<td>SIZE</td>
<td>0.004</td>
<td>0.006</td>
<td>0.731</td>
<td>0.465</td>
<td>1.097</td>
</tr>
<tr>
<td>Financial leverage</td>
<td>LEV</td>
<td>-0.034</td>
<td>0.023</td>
<td>-1.498</td>
<td>0.134</td>
<td>2.101</td>
</tr>
<tr>
<td>Sales growth rate</td>
<td>CSG</td>
<td>-0.006</td>
<td>0.003</td>
<td>-2.224</td>
<td>0.026</td>
<td>1.027</td>
</tr>
<tr>
<td>Income changes</td>
<td>A-DNI</td>
<td>-0.000000002</td>
<td>0.000000001</td>
<td>-2.469</td>
<td>0.014</td>
<td>1.256</td>
</tr>
<tr>
<td>Current ratio</td>
<td>CR</td>
<td>-0.008</td>
<td>0.004</td>
<td>-1.897</td>
<td>0.058</td>
<td>1.638</td>
</tr>
<tr>
<td>Return on assets</td>
<td>ROA</td>
<td>-0.209</td>
<td>0.029</td>
<td>-7.157</td>
<td>0.000</td>
<td>1.820</td>
</tr>
</tbody>
</table>

Table 2. Results of fitting the second research model
Source: the authors

According to the reported results, the value of Durbin-Watson statistic is 1.582 within the range of 1.5 to 2.5 and it can be said that the assumption of independence of the residuals has been met. The coefficient of determination (R squared) is 0.104, which indicates that 10% of the variance and changes in REM are explained by the independent variables of the second model. Based on the results of the variance analysis test to check the first model, the F-value obtained is 14.872, which is significant at the 0.005 level, showing that the independent variables of the second model can explain the changes related to REM well and that the model is suitable. The variance inflation factor (VIF) of independent variables is less than 10 for all
variables and as a result there is no collinearity problem. Considering that the T-statistic related to financial distress is 3.024 and its p-value is estimated at 0.043, which is less than 0.05, it can be stated with 95% confidence that "financial distress has a significant effect on the level of REM" and the second hypothesis is confirmed. Also, given that the coefficient of financial distress is estimated at -0.089, which is negative, it can be said that "financial distress has a significant inverse effect on the level of REM".

According to the results, the third research model should be fitted with fixed effects panel method (with robust covariance matrix). The fitting results of the mentioned model are given in the table below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Symbol</th>
<th>Coefficient</th>
<th>Std. deviation</th>
<th>T-statistic</th>
<th>P-value</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>y-intercept</td>
<td>C</td>
<td>-19208531</td>
<td>3035431</td>
<td>-6.328</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Financial distress</td>
<td>FD</td>
<td>-4300764</td>
<td>1583264</td>
<td>-2.716</td>
<td>0.007</td>
<td>1.139</td>
</tr>
<tr>
<td>Company age</td>
<td>REM</td>
<td>944208.3</td>
<td>284472.1</td>
<td>3.319</td>
<td>0.001</td>
<td>1.036</td>
</tr>
<tr>
<td>Company age</td>
<td>AGE</td>
<td>-35147.1</td>
<td>39978.4</td>
<td>-0.879</td>
<td>0.380</td>
<td>1.113</td>
</tr>
<tr>
<td>Sales growth rate</td>
<td>CSG</td>
<td>235355.7</td>
<td>213589.1</td>
<td>1.102</td>
<td>0.271</td>
<td>1.043</td>
</tr>
<tr>
<td>Company size</td>
<td>SIZE</td>
<td>4398839.0</td>
<td>492812.3</td>
<td>8.926</td>
<td>0.000</td>
<td>1.142</td>
</tr>
<tr>
<td>Financial leverage</td>
<td>LEV</td>
<td>1933769.0</td>
<td>575093.6</td>
<td>3.363</td>
<td>0.001</td>
<td>2.225</td>
</tr>
<tr>
<td>Profitability</td>
<td>PROFITABILITY</td>
<td>15430.9</td>
<td>8596.6</td>
<td>1.795</td>
<td>0.073</td>
<td>1.069</td>
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<td>Bank loans</td>
<td>LOAN</td>
<td>-989587.9</td>
<td>407743.2</td>
<td>-2.427</td>
<td>0.015</td>
<td>1.275</td>
</tr>
<tr>
<td>Dividends</td>
<td>PAY</td>
<td>-436828.7</td>
<td>526396.7</td>
<td>-0.830</td>
<td>0.407</td>
<td>1.464</td>
</tr>
<tr>
<td>Return on assets</td>
<td>ROA</td>
<td>-1873100.0</td>
<td>1155519.0</td>
<td>-1.621</td>
<td>0.105</td>
<td>3.215</td>
</tr>
<tr>
<td>Operating cash flow</td>
<td>CFO</td>
<td>166414.0</td>
<td>618341.7</td>
<td>0.269</td>
<td>0.788</td>
<td>1.550</td>
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<tr>
<td>Ratio of current assets</td>
<td>LIQ</td>
<td>-43288.9</td>
<td>631216.7</td>
<td>-0.069</td>
<td>0.945</td>
<td>1.386</td>
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<td>Company loss</td>
<td>LOSS</td>
<td>35306.1</td>
<td>225236.0</td>
<td>0.157</td>
<td>0.876</td>
<td>1.380</td>
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</tbody>
</table>

Table 3. Results of fitting the third research model
Source: the authors

Revista Gestão e Secretariado (GeSec), São Paulo, SP, v. 14, n. 10, 2023, p. 19159-19176.
According to the reported results, the Durbin-Watson statistic value is 1.610 within the range of 1.5 to 2.5 and it can be said that the assumption of independence of the residuals has been met. The coefficient of determination (R squared) is 0.576, which indicates that 57.6% of the variance and changes in receiving trade credit are explained by the independent variables of the third model. Based on the results of the variance analysis test to check the third model, the F-value obtained is 10.731, which is significant at the 0.005 level, which shows that the independent variables of the third model can explain the changes related to receiving trade credit well and that the model is suitable. The variance inflation factor (VIF) of independent variables is less than 10 for all variables and as a result there is no collinearity problem. Considering that the T-statistic related to REM is 3.319 and its p-value is estimated at 0.001, which is less than 0.05, so it can be stated with 95% confidence that "REM has a significant effect on the amount of receiving trade credit" and the third hypothesis is confirmed. Also, given that REM is estimated to be 944208.3, which is positive, it can be said that "REM has a significant positive effect on the amount of receiving trade credit".

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Coefficient</th>
<th>Std. deviation</th>
<th>T-statistic</th>
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</thead>
<tbody>
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<td>2</td>
<td>Financial distress</td>
<td>REM</td>
<td>-0.089</td>
<td>0.044</td>
<td>-2.024</td>
</tr>
<tr>
<td>3</td>
<td>REM</td>
<td>Trade credit</td>
<td>944208.3</td>
<td>284472.1</td>
<td>3.319</td>
</tr>
<tr>
<td>Sobel's method</td>
<td>Effect of financial distress on trade credit mediated by REM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Results of investigating Hypothesis 4
Source: the authors

In order to calculate the indirect effect of financial distress on trade credit through REM, as seen in the table above, the value of the path coefficient for the relationship between the two variables of financial distress and REM equals -0.089 (the standard error rate based on software outputs = 0.044), and it is 3.944208.3 for the relationship between the two variables of REM and trade credit (standard error rate based on software outputs = 284472.1). Therefore, as calculated below, the indirect effect of financial distress on trade credit through REM is equal to -84034.5.

\[
B_{\text{indirect}} = a \times b \rightarrow -0.089 \times 944208.3 = -84034.5
\]

Now, according to the obtained results, the significance of the indirect effect is investigated, and since the value of Z-value is outside the range of ±1.96, it can be said that
the indirect effect of financial distress on trade credit through REM is significant and this hypothesis is confirmed, in other words, there is a significant relationship between financial distress and the use of trade credit with the mediating effect of REM. It can be seen that the Z-statistic is estimated at -1.673 and is within the range of ±1.96; therefore, the fourth hypothesis is rejected and there is no significant relationship between financial distress and the use of trade credit with the mediating effect of REM.

\[
Z\text{-Value} = \frac{ab}{\sqrt{(b^2 \times SE_a^2) + (a^2 \times SE_b^2) + (SE_a^2 \times SE_b^2)}} = -1.673
\]

**Conclusion**

Financial distress generally refers to a situation where a firm cannot pay its financial obligations in full. Financial distress can have a significant effect on a company's trade credit, as trade credit is usually based on a company's ability to pay shareholders, customers, and other related agents. The effect of financial distress on trade credit can be further explained through the mediating role of earnings management (Sumiyana et al., 2023). Earnings management refers to activities and methods that aim to change the company's financial reporting, without actually changing the organization's performance. Earnings management may significantly affect trade credit. If a company uses earnings management in the face of financial distress, it may improve financial results and appear to have resolved financial problems. But in reality, financial distress will remain in the company, and when customers, shareholders, and other agents become aware of the reality, the trust in the company will decrease. Therefore, although earnings management can have a temporary effect on trade credit, this effect will not be significant in the case of real and permanent financial distress. It is better for companies to try to solve their financial problems seriously and pay their financial obligations in full, because these measures will make the improvement in their trade credit valuable and permanent. It has confirmed the effectiveness of cash capital and hidden profit in the first form in the credit of companies. Considering this fact, it can be said that financial distress can have an indirect and significant effect on trade credit, and this effect can also be explained through the mediating role of earnings management. Here, earnings management acts as a possible mediator between financial distress and trade credit. When a firm is facing financial distress, it may take measures regarding its financial reporting to improve the company's financial performance. These measures can include changes in auditing, recording
of intangible assets, changes in accounting policies, and other activities. These actions may help the company take a more positive view of its financial situation and make it appear that its financial problems have been resolved. Financial distress will remain in the company permanently if there is no proper management and resolution of financial problems. This may cause skepticism among customers, shareholders, and other stakeholders, and as a result, trust in the company will decrease. When the reality of this issue is revealed to others, it will have a more destructive effect on the company's trade credit. Therefore, although earnings management can have a positive effect on trade credit in the short term, it will not have a significant effect in the case of permanent financial distress. The best way to improve the company's trade credit is to solve financial problems and fulfill obligations completely and honestly. These measures will restore the trust of customers and other agents to the company and create a healthy and stable trade credit for the company. The following suggestions are provided: Improving financial management: improving accounting and financial systems, controlling costs and other financial factors, improving methods of collecting and managing funds, and improving financial processes can be effective in decreasing financial distress and improving trade credit. Better financial visualization: Providing accurate, transparent and reliable financial reporting can positively affect trade credit. It should be ensured that financial reports are prepared properly and are consistent with relevant accounting standards. Improving the relationship with financial resources: efforts to improve shareholder satisfaction and increase the trust of investors and banks can help the company in attracting financial resources. This includes providing transparent and accurate information to investors and banks, promoting public relations, and establishing strong relationships with business partners. Improving operational efficiency: improving production and service processes, optimizing processes, reducing loss and optimal management of existing resources can improve the company's operational capacity and increase productivity. These factors promote financial recovery and have a direct effect on trade credit. Empowering employees: Paying attention to the development and training of employees, encouraging cooperation and creativity, creating a supportive work environment, and promoting job satisfaction can be effective in REM and improving trade credit. Optimum use of technology: Improving business processes and productivity in accessing information and communications can increase organizational efficiency and have a direct effect on trade credit. Effective marketing strategy: Using strong and appropriate marketing strategies has a direct effect on the company's performance and attracting new customers, and will have a positive effect on the company's trade credit. Innovation strategy: Developing the latest technologies and innovation in the
relevant industry can help the company to be strong competitive and improve financial performance and trade credit. Increased focus on customers: Paying attention to customers' needs and wants, improving customer service and creating a superior customer experience can help a company to increase customer satisfaction and improve trade credit.

References


Investigation of the mediating role of real earnings smoothing in the relationship between financial distress and the use of trade credit


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