



Investigating the Effect of Financial Distress on Tax Avoidance during the Global Financial Crisis in Companies Listed on Tehran Stock Exchange

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ABSTRACT

Due to the integration and interrelatedness of the global economy in recent decades, the onset of financial crisis from the U.S. economy and its diffusion to the other global economies has led to the most important events and global financial crisis at the beginning of the third millennium. This investigation aims to examine the impact of financial distress on tax avoidance of the listed companies in Tehran stock exchange during the global financial crisis. All listed companies in Tehran stock exchange were selected as the statistical population of the research during 2003 to 2013. In this investigation, the base year (crisis) is 2008 and 2003 to 2008 as before the financial crisis and 2008 to 2013 is regarded after the crisis period. 90 firms were selected through the systematic elimination method. Heteroskedasticity, F-Limer, Hausman and Lin-Levene tests were used as pretest and regression test as post test to confirm/reject the research hypotheses. EVIEWS9 software was used in this research to analyze data. The results showed that there is no significant relation between financial distress and tax avoidance of the listed companies in Tehran stock exchange.

Keywords:

Financial Distress; Tax Avoidance; Global Financial Crisis.



1. Introduction

Financial distress is always a deserving issue, and accounting and financial scholars throughout the world have tried to find methods to predict financial distress. Regarding the results provided by Edwards et al, (2013), financial restrictions increase the interest obtained from tax reserve. Therefore, macro financial-economical restrictions accompany with increased tax avoidance (Brondolo, 2009). However, the relation between financial distress and tax avoidance is intensified during financial crisis. In fact, in identifying tax income during financial crisis, International Monetary Fund (IMF) emphasized that firms suffered from credit limits are in a higher-levels of tax avoidance practices, that's because tax avoidance practices are the main mechanisms of business financing of these firms (Brondolo, 2009).

There have been performed various studies about financial distress, tax avoidance and financial crisis along the world, but few researches about the relation between them we can see. Those who investigate the stated relation have achieved to quite paradoxical and contradictory results. Since no considerable research has been conducted about tax avoidance possibility by active financially-distressed firms in Tehran stock exchange, the relation between financial distress and tax avoidance in the listed companies in Tehran stock exchange is discussed.

2. Literature Review

2.1. Financial crisis

Due to the integration and interrelatedness of the global economy in recent decades, the onset of financial crisis from the U.S. economy and its diffusion to the other global economies has led to the most important events and global financial crisis at the beginning of the third millennium. There are some reasons about why the global economy fundamentals become weakened in recent years: formation of economic bubbles in housing division due to low-interests' loans with the aim of preventing economic recession, lack of control on capital and business risks by banks, lack of intrinsic value in physical assets required by securities offering, removing banks' liabilities after securities offering based on the assets with the aim of increasing ability to repay by banks. This procedure continued to the point that its area embraced the world economic society and halted the

motion of economics wheels, after the first effects of economic recession was emerged in global economy. The major outcomes of this situation includes financial markets crash, stopping and reducing production, increase in unemployment, reduction in demand for commodity and service market, increasing distrust in financial and monetary markets, and bankruptcy of banks, and financial and monetary institutions (Bernard et al, (2007).

2.2. The impact and consequences of financial crisis in Iran

We should consider an important point in the effects of the U.S. economic crisis that the today's world is the interconnected world and the kind of their connection separates them, and there are no island countries in today world and all of them are deeply related to each other. In relation to Iran and the fields of crisis in addition to economic, political and social outcomes in different sections, the fact is that production and economy are the damaged sections. The recent financial crisis and its consequences on macroeconomic site and allocation of guided resources followed by structural reform plans and assignment process (Ghasem Bolo et al, (2012).

Intense changes of price in basic goods, including oil, metals and food were the outcomes of the crisis which intense increase in prices at the first stage, and decrease in prices at the second stage was occurred. Regarding the government tenure in Iran's economy, government budget deficit is the minimum impact of falling oil price on Iran's economy. Oil income shocks definitely impact on the government's annual budget because 66% of Iran's budget depends on oil incomes. A considerable deficit in the government budget specially impacts on construction sector and it leads to inflationary effects. Of course, it can be expected that decreased import (especially luxury goods) and increased exchange rate are occurred as the potential outcome of the financial crisis.

The other effect of financial crisis is seen on imports, as consumer goods of some countries have suffered from falling prices and their imports is not in favor of domestic production during the crisis. Formal and informal import of these cheap goods which in competition with domestic products, represents a challenge for the country; therefore, the government policy should move toward supporting domestic

production during the sanctions (Orouji & Hejazi, 2010).

The global financial crisis desirably impacted on Iran's industry, as the recession and falling prices of export goods was occurred. It threatened the life of some industrial domains such as steel, textile and syringe making. By the way, it followed by crisis in chemical industries (Sadeghi, 2009).

The psychological impact of financial crisis on stock market and its indirect effect is evident, as this new experience Iran's stock market faced with, have led to challenges in some domains. These effects not only raise concerns by shareholders through decreased profitability of the listed firms, especially steel, chemical and refinery firms, but also decreased liquidity and stock index, and also economic growth drop should be unavoidable.

2.3. Tax avoidance

There have been various definitions about tax avoidance by researches. Tax avoidance defines as "clear tax cut from each dollar of earning before tax" (Hanlon & Hitzman, 2010). Tax avoidance practices are commonly referred to tax-saving instruments transferred resources from the government or the shareholders and firms' after-tax value (Desai & Dhramapala, 2009). Pasternak & Risco (2008) have defined tax avoidance as "legal application of tax system for self-interests to decrease the amount of tax payable through the instruments available in regulations".

According to Eslemberd (2004), the legitimate kind of tax avoidance originates from the difference between tax rules and accepted accounting principles. The calculation method of depreciation is an example for this case. Tax rules require firms to amortize assets using the obligated method in the rule, but the accepted accounting principles enable them to calculate depreciation in a way that transfer better information to financial statements users.

Since, maximizing shareholders' wealth is one of the main goals of managers and shareholders' representatives in firms, and shareholders using different mechanisms to research on this issue and monitor on managers, it can be expected that meeting the goals of maximizing the shareholders' wealth is one of the major motivations of tax avoidance by managers. In most cases, additionally, which compensation plans are considered for managers and

directors, some plans are designed based on the firm performance criteria. Some of those criteria are depended upon firm's profit and free cash flows. Hence, it can be expected that managers have great motivation for tax avoidance in order to meet shareholders' objectives. Because tax avoidance is finally led to increased net income and decreased cash flows. This issue was confirmed in the research performed by Armstrong et al, (2012) and concluded that there is a negative and significant relationship between compensation plans for tax-related managers with effective tax rate calculated by the accounting standards (Armstrong et al, (2012).

Firms using tax planning strategies, credits are considered a vital factor. Bankman (2004) showed that when a firm aggressively avoid from tax paying, it may be labelled "a poor corporate citizen" which may have adverse impact on the results of production market. The prior researches examined the credit effect of tax planning for the firms accused for intervention in tax shields. Hanlon & Eslemberd (2009) examined market reaction to news about firms' interventions in tax shields. The results indicated that there is a partial negative market reaction, and there is a positive reaction to some cases which they were not identified as tax avoidance companies. As well, firms active in retail industries had severe negative reaction to the bad news about tax shield.

Financial reporting concerns are regarded as a preventive factor for tax planning. Financial reporting motivations are often inconsistent with tax minimization motivations, because decrease in taxable profit often resulting in low accounting earnings (Shakelford & Shelwin, 2001; Skalz & Walfson, 1992).

2.4. Financial distress and financial health

Iranian investors have fewer tendencies toward investing on financial assets which indicates lack of uncertainty and their identifications from financial markets. It should be found solutions to persuade investors and creditors to invest on financial assets, and provide situations in which help investors to inform them about financial markets and decision-makings. An important factor affecting the investors' decisions is financial health of business units. If financial health is measured and assessed as business unit ability to comply their commitments and provide profitability for all investors and stakeholders and

activity continuation and offers a model for it, a more confident condition is created in capital market helping investment deployment in financial markets (Khodabakhsh et al, 2013).

It has been always raised a question for shareholders or investors whether firms' financial health can be measured and assessed? So, identifying the effective factors on financial health is essential. To identify the factors influencing on profitability, commitments compliance and activity continuation, business unit practices should be measured. In some studies, there has been only used one index or factor, and group indices and factors have been used in some others to measure which some of them have indicated they yield better results in this situations (Pourali et al, 2010).

2.5. Hypotheses development

In a research on the relation between tax avoidance and financial distress during the global financial crisis in Australia, Richardson et al, (2015) found that the global financial crisis significantly and positively related with tax avoidance and financial distress, and more importantly, the relation between financial distress and tax avoidance is intense during the global financial crisis. On the other side, these researches showed in subsequent investigations that the global financial crisis has positive and significant relation with tax avoidance and financial distress, and also significant and the positive relationship between financial distress and tax avoidance become intense during the global financial crisis. As well, the relation between board independence and financial distress with tax avoidance practices is positive and significant (Richardson et al, 2015). Habib et al, (2013) showed that financially-distressed firms manage earnings to display less income during the global financial crisis. These firms manage their earnings because they need to increase cash flows. The researchers found that even in financially-distressed and despite of negative credit effects, income tax expenses are considered as an important cash flow (Chen et al, 2010). Therefore, firm management adopts risky strategies and tax avoidance practices. Financially-distressed firms have less liquidity for tax rates; as a result, there is a significant relation between financial distress and tax planning (Edwards et al, 2013). Stock liquidity has positive relation with tax avoidance. The effect of stock liquidity on tax avoidance for higher-level

companies is intensive. The effect of stock liquidity, however, is decreased for less tax-avoidance and financially-restricted companies, and stock liquidity is more effective on tax avoidance planning when stock price contains more useful information for managers (Chen et al, 2014).

Brondolo (2009) noted that tax avoidance practices decrease during the global financial crisis. Financial distress encourages firms to reduce tax debts. Financially-distressed firms are more sensitive compared with other countries to tax (Edwards et al, 2013). Generally, financial distress of firms is increased during the global financial crisis. These firms are forced to save their cash so that they can pay their current tax debts. During the global financial crisis, many financially-distressed firms require managers to take tax avoidance practices which is seen less before the crisis period (Campello et al, 2011).

Various studies have examined firms' investments, financing policies and firm performance during the global financial crisis. During the studies, Kall & Stalls (2013) found that access to credits, firm value and capital expenditure have been decreased during the global financial crisis. They also understood that cash holdings have been importantly and significantly decreased as a percent of firm's assets at the onset of the crisis. Followed by these external shocks, firms tended more to tax avoidance practices (Kall & Stalls, 2013). The research hypotheses are described here with regard to the provided literature:

2.5.1. Research Hypotheses

H1. Financial distress impacts on tax avoidance of the listed companies in Tehran stock exchange.

H2. The global financial crisis influences on tax avoidance of the listed companies in Tehran stock exchange.

H3. The impact of financial distress on tax avoidance of the listed companies in Tehran stock exchange is highlighted more during the global financial crisis.

3. Methodology

The research design is provided through a post-event approach (through past information). On the other hand, the current study is a kind of descriptive-correlation research. Due to the existence and intensity of relations is considered, the research is a kind of quantitative in terms of nature of data. It is also applied research based on the goals of the study. To

examine the hypotheses and due to data nature and the research data are based on the past quantitative and real data, the regression and correlation method are used in this research. In this study, the library method is used to collect data and information. In library section, the research basics are collected from books, Persian and Latin expert journals and internet, and the research data are gathered between collecting the given firm data referring to financial statements, descriptive notes, weekly reports and journal of stock exchange. To examine durability and non-durability, Dicky-Fuller test is used, to describe the explanatory power of the variables, the adjusted coefficient of determination is applied, to determine the autocorrelation, Durbin-Watson statistics is used, to examine the significance level of the variables, t-statistics and the investigate the whole efficiency of the model, F-Fisher test is used. The statistical analyses are also performed by EXCEL and EVIEWS 9 software.

3.1. Sample and Data

The required data are generally obtained from library method and referring to Tehran stock exchange and studying financial statements of the listed companies in Tehran stock exchange during 2003 to 2013. In addition to studying the financial statements, the required information has been collected from the website of Tehran stock exchange. The study population of the research includes all listed companies in Tehran stock exchange during 2003 to 2013 which need to have all the following conditions:

- 1) They should be listed in Tehran stock exchange before 2003.
- 2) Their fiscal year should be ended in 20/03/...
- 3) They have shouldn't suffered from operational loss during recent year.
- 4) They shouldn't be included in financial and investment firms.
- 5) Their necessary financial information should be available.

Regarding the systematic elimination method, 304 firms out of 415 cases were selected and the statistical sample is 90 cases by which the following equation was used:

$$n = \frac{N(Z_1 - \frac{a}{2})^2 \sigma^2}{(N + 1)d^2 + (Z_1 - \frac{a}{2})^2 \sigma^2}$$

Z1: It is the 95% confidence level

N: The population size

d: Sampling error

σ^2 : The population variance

3.2. Dependent Variable

Our dependent variable represented by tax avoidance. To measure tax avoidance, the measurement index provided by Deyreng et al, (2008) titled with "effective tax rate" is used.

Tax Avoidance = Tax Paid/ Earning before Tax

3.3. Independent Variables

3.3.1. Financial distress variable

The multivariable pattern provided by Soleimani Amiri (2002 to 2003) for predicting firms' financial health is used to measure financial distress. His model is based on some ratios showing liquidity, profitability, liability management and asset management. The general formula is:

$$FD_i = \alpha + \beta_1 * WCTA + \beta_2 * CACL + \beta_3 * PBTA + \beta_4 * TETA + \beta_5 * STA + \epsilon$$

FD: Financial distress index in each firm i

WCTA: Working capital to total assets ratio

CACL: Current assets to current debts ratio

PBTA: Earnings before interest and tax to total assets (profitability)

TETA: Shareholders' equity to total assets (liability management)

STA: Sale to total assets ratio (Assets management)

β : The coefficient of independent variables

ϵ : Error term

3.3.2. Global Financial Crisis Variable

GFC variable is studied in this research to examine the effectiveness of the global financial crisis. This variable is regarded 1 before the crisis period, otherwise 0 (Richardson et al, 2015).

3.3.3. Control variables:

AGE_{it} : Firm age

SIZE_{it} : It is equal with natural logarithm of total assets

LEV_{it} : It is equal with long-term debts to total assets ratio

CINT_{it} : Properties, equipment and machineries to total assets ratio

INVINT_{it} : Inventories to total assets ratio
 MTB_{it} : Market value of shareholders' equity to book value of shareholders' equity ratio

3.4. Regression Models

The regression model of the first secondary hypothesis Ordinary Least Square (OLS) is used as follow to test the hypotheses:

$$TA_{it} = \alpha_0 + \beta_1 FD_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 CINT_{it} + \beta_6 INVINT_{it} + \beta_7 MTB_{it} + \varepsilon_{it}$$

In the above model, i is the indicative of the sample firm and t is the sign of the studied year (2003 to 2013). Tait is tax avoidance and the dependent model which is obtained from division of tax payable by earnings before tax, according to Deyreng et al, (2008). Fdit is financial distress and the independent variable which is measured based on Soleimani Amiri model (2002 to 2003). The control variables are as follows: AGE_{it} is firm age; SIZE_{it} is firm size which equals with natural logarithm of total assets; LEV_{it} is financial leverage obtained from long-term debts to total assets ratio; CINT_{it} properties, equipment and machineries to total inventory assets; INVINT_{it} is inventory to total assets ratio and MTB_{it} is market value of shareholders' equity to book value of shareholders' equity ratio. The regression model of the second secondary hypothesis

$$TA_{it} = \alpha_0 + \beta_1 GFC_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 CINT_{it} + \beta_6 INVINT_{it} + \beta_7 MTB_{it} + \varepsilon_{it}$$

In the above model, i is indicative of the studied firm and t is indicative of the studied years t (2003 to 2013). TA_{it} is tax avoidance and the independent variables of the study obtained from division of tax payable by earnings before tax, according to Deyreng et al, (2008). GFC_{it} is the dummy variable. If this variable included the period before the crisis, the given number would be 1, otherwise 0 (Richardson, 2015). The control variables are AGE_{it} which is firm age; SIZE_{it} is firm size which equals with natural logarithm

of total assets; LEV_{it} is financial leverage obtained from long-term debts to total assets ratio; CINT_{it} properties, equipment and machineries to total inventory assets; INVINT_{it} is inventory to total assets ratio and MTB_{it} is market value of shareholders' equity to book value of shareholders' equity ratio. The third secondary hypothesis

$$TA_{it} = \alpha_0 + \beta_1 FD_{it} + \beta_2 GFC_{it} + \beta_3 (FD_{it} \times GFC_{it}) + \beta_4 AGE_{it} + \beta_5 SIZE_{it} + \beta_6 LEV_{it} + \beta_7 CINT_{it} + \beta_8 INVINT_{it} + \beta_9 MTB_{it} + \varepsilon_{it}$$

In the above model, i is indicative of the studied firm and t is indicative of the studied years t (2003 to 2013). Tait is tax avoidance and the dependent model which is obtained from division of tax payable by earnings before tax, according to Deyreng et al, (2008). Fdit is financial distress and the independent variable which is measured based on Soleimani Amiri model (2002 to 2003). GFC_{it} is the dummy variable. If this variable included the the period before the crisis, the given number would be 1, otherwise 0 (Richardson, 2015). GFCit*Fdit is the synergy of financial distress and the global financial crisis on tax avoidance and obtained from multiplying financial distress by the global financial crisis. The control variables are AGE_{it} is firm age; SIZE_{it} is firm size which equals with natural logarithm of total assets; LEV_{it} is financial leverage obtained from long-term debts to total assets ratio; CINT_{it} properties, equipment and machineries to total inventory assets; INVINT_{it} is inventory to total assets ratio and MTB_{it} is market value of shareholders' equity to book value of shareholders' equity ratio.

4. Results

4.1. Summary statistics

Table 1 is representing descriptive statistics for dependent variable (tax avoidance), Independent variables (financial distress and global financial crisis) and control variables (age, size, leverage, PP&E, inventory and MBE) The dependent variable (tax avoidance) has a mean (median) of 0.15(0.12) financial distress has a mean (median) of 1.6 (1.6). The

descriptive statistics of the control variables are also presented in table 1. Eventually, a sufficient range of variation is observed for all variables and there is a logical level of consistency between the means and medians, It shows that distribution is normal. The mean shows that half of data is less than and the rest is more than this amount. Generally, mean is used in the form of tendency size to asymmetrical-formed distributions. Distribution parameters, generally, is a

deterministic index for data distribution from each other or distribution amount toward the average. Standard deviation is one of the most important distribution parameter showing dispersion within variable. According to table 1, standard deviation in market-to-book equity ratio is the biggest standard deviation and after that standard deviation of inventory has the second rank.

Table 1. Descriptive statistics of the research's variables

Variable	Mean	Median	Max.	Min.	SD
Tax avoidance	0.152019	0.125069	1.608439	0.000142	0.126344
The global financial crisis	0.571296	1.000000	1.000000	0.000000	0.495120
Financial distress	1.623384	1.617124	9.410916	3.429239	1.550972
Firm age	35.66019	38.00000	61.00000	7.000000	12.21442
Firm size	13.91835	13.84916	18.53182	10.03122	1.514066
Financial leverage	0.613061	0.617683	2.077506	0.96415	0.227759
Properties, machineries, equipments	0.107624	0.055913	1.385386	0.000518	0.154150
Inventory	0.670700	0.648032	2.077506	0.089110	0.246473
Market to book value ratio	4.336904	2.277825	43.64769	0.130019	5.372947

4.2. Regression Results

4.2.1. The first hypothesis test

H0: There is not a significant relation between financial distress and tax avoidance of the listed companies in Tehran stock exchange.

H1: There is a significant relation between financial distress and tax avoidance of the listed companies in Tehran stock exchange.

Table 2 reports the regression results about the association between financial distress and tax avoidance through the period of 2003 to 2013. It can be found that the regression coefficient for financial distress is negative but statistically not significant ($p > 0.01$) which does not support H1. These results show that financial distress is not associated with tax avoidance. We also find that regression coefficient only for control variable of firm size is negative and statistically significant ($p < 0.01$). Larger firms are more likely to have tax avoidance as they profit from higher economic and political power relative to smaller firms and are able to decrease their tax burdens accordingly (Richardson and Lanis, 2007). Regarding the table 2, since Durbin-Watson statistics is among 1.5 to 2.5, there is no correlation between errors and

regression can be used. The adjusted coefficient of determination is 0.585, showing the independent and control variables can predict about 58.5% the dependent variable changes. F-statistics is significant in 1% error level, and it can be stated that the whole model is statistically significant. To confirm/reject the researcher's hypothesis, finally, it can be said that H0 is confirmed and H1 is rejected, due to significant level of t-statistics (financial distress) is not significant in 5% error level. Therefore, there is not a significant relation between financial distress and tax avoidance of the listed companies in Tehran stock exchange.

4.2.2. The second hypothesis test

H0: There is not a significant relation between the global financial crisis and tax avoidance of the listed companies in Tehran stock exchange.

H1: There is a significant relation between the global financial crisis and tax avoidance of the listed companies in Tehran stock exchange.

As it has been shown in the table 3, regression coefficient for global financial crisis is positive and statistically significant ($p < 0.05$) which provide support for H2. This result is consistent with

Brondolo's (2009) opinion that during the global financial crisis, credit-constrained firms may revert to tax avoidance as an alternative source of finance for their operations. Regarding table 3, the estimated coefficient of financial crisis is 0.475, showing there is a positive and direct relation between them, as increase in the global financial crisis can increase firms' tax avoidance. Durbin-Watson statistics is among 1.5 to 2.5, so it can be said that there is no correlation between errors and regression can be used. The adjusted coefficient of determination is 0.575, showing the independent and control variables can predict about 57.5% the dependent variable changes. The significance level of F-statistics is significant in 1% error level, and it can be stated that the whole model is

statistically significant. To confirm/reject the researcher's hypothesis, finally, it can be said that H0 is rejected and H1 is confirmed, due to significant level of t-statistics (global financial crisis) is significant in 5% error level. Therefore, there is a significant relation between the global financial crisis and tax avoidance of the listed companies in Tehran stock exchange. The empirical model of the research can be wrote as:

$$TA_i = 0.239 + 0.475GFC_i - 6.05AGE_i - 0.004SIZE_i - 0.004LEV_i - 0.043CINT_i + 0.029INVINT_i - 0.0002MTB_i + \varepsilon_i$$

Table 2. The regression test of the first hypothesis

Variable	Estimated coefficient	SD	t-statistics	Significance level
Fixed	0.280245	0.054911	5.103573	0.0000
Financial distress	-0.064849	0.064606	-1.003757	0.3157
Firm age	-0.000390	0.000344	-1.133351	0.2573
Firm size	-0.005409	0.002462	-2.197171	0.0282*
Financial leverage	-0.002050	0.017975	-0.114065	0.9092
Properties, machineries, equipments	-0.035230	0.025344	-1.390106	0.1648
Inventory	0.009403	0.016876	0.557170	0.5775
Market to book value ratio	-0.000745	0.000760	-9.79359	0.3276
Durbin-Watson			1.392452	
F-statistics			5.241727	
Significance level			0.000000**	
The adjusted coefficient of determination			0.5853	

* 5% error level, ** 1% error level

Table 3. The regression model of the second hypothesis

Variable	Estimated coefficient	SD	t-statistics	Significance level
Fixed	0.239027	0.026565	8.997918	0.0000*
The global financial crisis	0.475112	0.113625	4.241754	0.0174*
Firm age	-6.050005	0.000136	-0.445440	0.6561
Firm size	-0.004502	0.000920	-4.891376	0.0000*
Financial leverage	-0.004224	0.009375	-0.450536	0.6524
Properties, machineries, equipments	-0.043694	0.009817	-4.451054	0.0000*
Inventory	0.029665	0.006148	4.824756	0.0000*
Market to book value ratio	-0.000213	0.000291	-0.733582	0.4634
Durbin-Watson			1.251271	
F-statistics			16.23591	
Significance level			0.000000**	
The adjusted coefficient of determination			0.575472	

* 5% error level, **1% error level

4.2.3. The third hypothesis test

H0: The impact of financial distress on tax avoidance of the listed companies in Tehran stock exchange is not highlighted more during the global financial crisis.

H1: The impact of financial distress on tax avoidance of the listed companies in Tehran stock exchange is highlighted more during the global financial crisis.

The regression coefficient of the interaction term between global financial crisis and financial distress (i.e., financial distress* crises) is positive and significant ($p < 0.001$), providing support for H3. It can be concluded, however, the relation between financial distress and tax avoidance is highlighted more during the global financial crisis. Durbin-Watson statistics is among 1.5 to 2.5, so it can be said that there is no correlation between errors and regression can be used. The adjusted coefficient of determination

is 0.412, showing the independent and control variables can predict about 41.2% the dependent variable changes. The significance level of F-statistics is significant in 1% error level, and it can be stated that the whole model is statistically significant. To confirm/reject the researcher's hypothesis, finally, it can be said that H0 is rejected and H1 is confirmed, due to significant level of t-statistics (financial distress) is significant in 5% error level. Therefore, our results show that firms under financial distress increase their level of tax avoidance. The empirical model of the research can be written as:

$$TA_{it} = 0.23 - 0.03FD_{it} - 0.02GFC_{it} + 0.20(FD_{it} \times GFC_{it}) \\ - 0.0001AGE_{it} - 0.003SIZE_{it} - 0.007LEV_{it} \\ - 0.036CINT_{it} + 0.006INVINT_{it} - 0.0006MTB_{it} + \varepsilon_{it}$$

Table 4. The regression model of the third hypothesis

Variable	Estimated coefficient	SD	t-statistics	Significance level
Fixed	0.232470	0.049576	4.689184	0.0000
Financial distress	-0.036659	0.002874	-0.12.75404	0.0000
The global financial crisis	-0.020565	0.058188	-0.353429	0.7238
Financial distress*crisis	0.202068	0.013467	15.00451	0.0000
Firm age	-0.000171	0.000311	-0.548406	0.5835
Firm size	-0.003077	0.002220	-1.386256	0.1660
Properties, machineries, equipments	-0.036213	0.022806	-1.587857	0.1126
Inventory	0.006116	0.015184	0.402811	0.6872
Marekt to book value ratio	-0.000664	0.000684	-0.970439	0.3321
Durbin-Watson			1.658267	
F-statistics			8.732794	
Significance level			0.000000**	
The adjusted coefficient of determination			0.412570	

* 5% error level, ** % error level

5. Discussions and Conclusion

The current research aims to examine the impact of financial distress on tax avoidance of the listed companies in Tehran stock exchange during the global financial crisis. All listed companies in Tehran stock exchange were selected as the statistical population of the research during 2003 to 2013. In this investigation, the base year (crisis) is 2008 and 2003 to 2008 as before the financial crisis and 2008 to 2013 is regarded after the crisis period. 90 firms were selected through

the systematic elimination method. Heteroskedasticity, F-Limer, Hausman and Lin-Levene tests were used as pretest and regression test as posttest in order to confirm/reject the research hypotheses. EVIEWS 9 software was used in this research to analyze data.

Regarding the hypotheses test, this hypothesis indicated that financial distress significantly impact on tax avoidance of the listed companies in Tehran stock exchange. This result is consistent with the results of Richardson et al, (2015). They showed that there is a significant and positive relation between the global

financial crisis and tax avoidance and financial distress, and more importantly, the relation between financial distress and tax avoidance is more severe during the global financial crisis. On the other hand, these researchers indicated that there is a positive and significant relation between the global financial crisis with tax avoidance and financial distress, and the positive and significant relationship between financial distress and tax avoidance is intensified during the global financial crisis. They also showed that there is a significant and positive relation between board independence and financial distress with tax avoidance practices (Richardson et al, (2015). Habib et al, (2013) demonstrated that financially-distressed firms tend to manage their earnings to represent less income during the global financial crisis. Therefore, the results of the current investigation show that financially-distressed firms decrease their tax avoidance practices during the global financial crisis.

The results of the first hypothesis suggested that there is no significant relation between financial distress and tax avoidance of the listed companies in Tehran stock exchange. The results of the current research, however, is inconsistent with the results of Edwards et al, (2013). They found that financially-distressed firms have less liquidity for paying tax rate, as a result, there is a significant relation between financial distress and tax planning. Dastgir et al, (2012) examined earnings management in financially-distressed firms. They concluded that these firms increasingly manage their earnings during three years before bankruptcy. This management was implemented through accruals manipulation and test real practices, and was determined that these firms manage their earnings more than healthy firms through real practices, while healthy firms do this through accruals.

The results of the second hypothesis indicated that there is a significant relation among the global financial crisis and tax avoidance of the listed companies in Tehran stock exchange. The findings of the current study are consistent with the results of Lin et al, (2014) and Brandolo (2009). Lin et al, (2014) investigated the relation between tax avoidance practices and debts during the global financial crisis. According to the made analyses, the results suggested that the relation between tax avoidance and insolvency is intensified during the global financial crisis.

Brandolo (2009) noted that tax avoidance practices are increased during this period.

The results of the third hypothesis showed that there is a more significant relationship between financial distress and tax avoidance during the financial crisis. Brandolo (2009) pointed out that tax avoidance practices are increased during the financial crisis. Financial crisis persuades firms to reduce their tax liabilities. In fact, tax savings of the required wealth provide accessing to credit rating and reduced bankruptcy risk in financing the firm's current performance (brandolo, 2009). Financially-distressed firms have more sensitivity to tax in compared with other firms (Edwards et al, 2013). Generally, firms' financial distress is increased during the financial crisis. During this period, firms are forced to save their cash through reducing current tax liabilities. Many financially-distressed firms require managers to tend to tax avoidance practices during the global financial crisis, as this case was less seen before the crisis period (Campello et al, 2011). It is recommended that the relation between financial distress and tax avoidance of big and small firms to be comparatively dealt with before and after the global financial crisis. It is suggested that the relation between financial distress and tax avoidance of knowledge-based and other firms to be comparatively dealt with before and after the global financial crisis. It is recommended that the relation between financial distress and tax avoidance of strategic and non-strategic firm to be comparatively dealt with before and after the global financial crisis. It is recommended that the relation between financial distress and tax avoidance of private subsidiary firms to Article 44 to be comparatively dealt with before and after global financial crisis. It is recommended that the relation between financial distress and tax avoidance of manufacturing and non-manufacturing firms to be comparatively dealt with before and after the global financial crisis.

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