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# Influence of Tax Avoidance on Bank Loan Contracts with Emphasis on the Moderating Role of Disclosure Quality

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## Abstract

**Objectives:** This research aims to investigate the influence of tax avoidance on bank loan contracts, with a focus on the moderating role of disclosure quality. Emphasizing the quality of disclosure as a means to mitigate information asymmetry and agency costs can help alleviate the negative consequences of tax avoidance on bank loan contracts.

**Methodology/Design/Approach:** The multivariate linear regression method was utilized to test the research hypotheses and Eviews 9 software was utilized for the final analysis of the data. The statistical population for this research consists of firms listed on the Tehran Stock Exchange. Due to certain restrictions, a total of 125 firms were selected for examination from the years 2013 to 2019.

**Findings**: Tax avoidance positively impacts bank loan contracts. The influence of disclosure quality on this relationship varies depending on the criteria used to measure tax avoidance. When the effective rate of cash tax paid is considered, tax avoidance reduces the three criteria of bank loan structure, cost, and collateral. However, when using the book-tax difference criterion, tax avoidance reduces the structure, expense, and risk of non-payment of bank loans.

**Innovation**: This research, conducted for the first time in Iran's economic landscape, aims to enhance theoretical foundations and research literature on tax avoidance and bank loan contracts. The study first examines the theoretical framework and background, then explores the relationship between tax avoidance, bank loan contracts, and disclosure quality.

**Keywords:** Tax avoidance, Bank loan contracts, Disclosure quality.

## 1. Introduction

Today, companies have various methods aside from capital financing to address their financial needs, such as debt settlement, increasing working capital, and paying dividends to shareholders. Therefore, when making decisions about short-term and long-term financing, managers should carefully assess the impacts and outcomes of each approach, consider them, and gain a comprehensive understanding of financial instruments to utilize appropriate methods in financial markets and select the most optimal financing method. In major industrialized countries, common financing methods include issuing bonds, retaining profits, issuing shares, and obtaining bank loans (Malanazari et al., 2009). Conversely, in Iran, bank loans play a significant role in financing companies (Heidari and Hemti, 2014; Ahmadpour et al., 2015). Banks serve as primary suppliers to companies, and bank loan agreements serve as crucial methods of foreign financing for companies, even large state-owned ones (Brat and Sander, 2008).

Typically, company managers prefer financing through debt (borrowing) due to tax savings and lower rates compared to shareholders' expected returns. However, for lenders, the primary concern when granting loans and credits is the borrower's ability to repay the principal and interest. In Western countries like the United States, lenders rely on companies' financial statements to evaluate their repayment capacity, with the profit and loss statement, especially profit before interest, being of particular importance. Recognizing the significance of financial statements, particularly the profit and loss statement, in loan approval decisions, company managers can showcase the company's profitability to attract favorable opinions from creditors, secure necessary capital, and reduce debt costs. This financing method maintains shareholders' control over the company and proves cost-effective during inflationary periods (Kim et al., 2010).

Research background indicates that lenders factor in corporate tax avoidance when assessing loan repayment risks. Tax avoidance involves legally leveraging the tax system to gain personal benefits and reduce tax liabilities within legal boundaries (Pasternak and Rico, 2008). The impact of tax avoidance on bank loan agreements hinges on creditors balancing costs and benefits. Positive effects of tax avoidance on creditors include reducing debt default risks by lowering tax expenses and replacing potential debt financing, thus enhancing a company's credit quality. Conversely, negative effects of tax avoidance may result in increased company risks, tax authority penalties, transparency issues, and conflicts among management, shareholders, and creditors, leading to higher agency costs, damaging creditors' interests, lowering credit quality, increasing debt costs, and imposing restrictions on debt agreements (Blady et al., 2018).

Furthermore, research background reveals that an essential criterion for measuring tax avoidance is the effective cash tax rate, a crucial element in tax discussions. While numerous studies focus on tax avoidance, many rely on short-term effective tax rates, leading to significant deviations due to annual data limitations and potential negative rates from losses. To address these issues, utilizing long-term measures of tax avoidance can determine if companies can sustain tax avoidance practices over time. Long-term rates, as argued by Kim et al. (2010) and Hanlon and Heitzman (2010), offer insights into companies' sustained tax planning activities and overall tax avoidance practices.

Tax avoidance methods are strategies that increase a company's complexity and decrease the quality of its disclosure. Nichols and Stauben (2008) identified disclosure quality as a mechanism to reduce information asymmetry and agency costs resulting from the complexity of tax avoidance programs, alleviating owners' concerns about hidden costs. Therefore, higher disclosure quality correlates with lower tax avoidance, minimizing agency issues (Hikarit and Mohammadi, 1392). If tax avoidance methods diminish financial information quality, creditors may enhance monitoring by extending contract terms. Borrowers typically avoid higher-cost loans with stricter obligations and guarantees,

prompting this study to investigate such cases among firms listed on the Tehran Stock Exchange.

This research, conducted for the first time in Iran's economic landscape, aims to enhance theoretical foundations and research literature on tax avoidance and bank loan contracts. The study first examines the theoretical framework and background, then explores the relationship between tax avoidance, bank loan contracts, and disclosure quality.

## Theoretical foundations of research

### Avoiding tax and bank loan agreements

A bank loan contract is an agreement between a lender and a borrower on a specific date, where both parties commit to fulfilling each other's obligations according to the terms of the contract. Loan contracts are complex agreements between banks and their customers, typically involving various conditions, including price and non-price conditions (Strahan, 1999). In many countries, loans are offered in packages with conditions tailored to the borrower's needs (Melnik and Plot, 1986). The cost of debt, loan amount, maturity period, and collateral requirements are non-price conditions included in loan contracts. Banks may also impose restrictions on borrowers to ensure repayment, such as limitations on dividends, asset sales, mergers, investments, and production. Financial ratios like debt ratio and working capital ratio may also be used as restrictions. These non-price conditions can result in indirect costs for borrowers, such as missing profitable investment opportunities. Short-term loans may be offered by banks to assess repayment capability and maintain bargaining power. Non-price conditions are often linked to pricing terms, with higher interest rates typically associated with lower loan amounts, more collateral, and shorter maturity periods.

Previous studies (Graham et al., 2008; Ji, 2012) have considered loan characteristics like loan amount, lender type, maturity period, and guarantee as control variables when analyzing loan contract provisions. Both price and non-price conditions in loan contracts are used by banks as risk-compensating mechanisms for borrowers. Company-specific characteristics, such as tax avoidance, can also influence loan contract provisions. Tax avoidance involves legally reducing taxes to benefit shareholders and increase company value. Tax avoidance can lead to managerial opportunistic behaviors, increasing agency costs like profit manipulation and related party transactions. This behavior poses risks to companies and creditors, leading to higher agency costs and credit risk in companies with tax avoidance. High tax risk companies may face greater damage from tax avoidance, impacting loan agreements significantly.

### Tax avoidance, bank loan contracts, and disclosure quality

Since shareholders and creditors are the two main groups of users of financial information, providing timely and reliable information for these two groups is one of the main concerns of management and accounting information systems, with a focus on transparency. The information prepared for these two groups has a special importance (Qurbani et al., 2012). Achieving long-term economic goals depends on the proper functioning of financial markets, especially the capital market, which relies on the availability of highly transparent information. Transparent information not only reduces information asymmetry between company management and external investors but also between traders. Therefore, the quality of disclosure can decrease information inefficiency, leading to improved market conditions and increased liquidity of companies' shares. The provision of better and more information allows real and legal investors to conduct more thorough analyses, ultimately moving the capital market towards higher efficiency (Foroghi and Farjami, 2014). Financial statements are the cornerstone of the financial reporting process, including the balance sheet, profit and loss statement, comprehensive profit and loss statement, cash flow statement, and explanatory notes (Munajati et al., 2013). Financial reporting serves as the primary means of conveying information to investors, aiming to create a clear image and accurate expectations of the

company (Ming et al., 2011). However, following recent financial scandals like Enron, Worldcom, and Parmalat, investors' trust in financial reporting systems has waned, emphasizing the importance of disclosure quality in determining the credibility and reliability of reported figures. Consequently, the transparency of accounting information and its impact on financial reporting systems have become of interest to investors, managers, legislators, and standards compilers (Qurbani et al., 2013).

Singavi and Desai (1971) define quality as completeness, correctness, accuracy, and reliability. If companies disclose information that is reliable and timely, the quality of information disclosure is considered higher (Stock Exchange Organization, 2015). Constructs such as appropriateness, comprehensiveness, and timeliness have been used to represent disclosure quality (Wallace et al., 1994). King (1996) suggests that in the absence of anti-fraud regulations, the quality of disclosure can be defined by the degree of bias based on managers' interests. Hopkins (1996) describes the ease of studying and interpreting financial statements by investors as the quality of disclosure.

According to Hosseini and Mosli (2010), the quality of disclosure depends on the amount of information disclosed and the richness of additional information. Ponnall and Schipper (1999) consider financial statements to be of quality if they exhibit transparency, full disclosure, and comparability. The terms "quality" of disclosure of accounting information and "transparency" of a disclosure system are often used interchangeably, and defining precise consensus on "transparency" and "quality" remains challenging. Various constructs have been used to represent the quality of disclosure, such as appropriateness, comprehensiveness, awareness, and sometimes as a representative of disclosure quality (Mahdavi et al., 2014).

Transparency is defined as openness in dictionaries and platforms, indicating honesty, easy understanding, clarity of information, and ease of access to operations within institutions (Khajavi et al., 2014). Tax avoidance significantly impacts corporate debt financing, leading to higher bank borrowing costs and reduced loan terms. Companies must consider tax costs against capital costs when making tax decisions. Good corporate governance and improved information quality can mitigate the negative effects of tax avoidance on debt contracts, potentially reducing agency problems and tax avoidance costs by enhancing management and disclosure quality. Increasing disclosure quality reduces information asymmetry and the adverse effects of agency problems on a company's value. Quality corporate disclosure assists banks in identifying the motives behind corporate tax avoidance and evaluating its economic effects accurately. Enhanced corporate disclosures are often seen as indicators of improving information asymmetry, helping banks understand firms' operating conditions and reducing the negative impact of tax avoidance on quality debt financing (Blady et al., 2018).

Tax avoidance methods can increase a company's complexity and reduce the quality of its disclosure. Quality disclosure serves as a mechanism to reduce information asymmetry and agency costs resulting from tax avoidance programs, alleviating owners' concerns about hidden tax avoidance costs (Nichols and Stauben, 2008). Higher disclosure quality leads to lower tax avoidance and fewer agency issues (Hikarit and Mohammadi, 2012). For firms with lower disclosure quality, tax avoidance can significantly increase complexity, resulting in higher agency costs and additional direct costs. Banks are less worried about the negative impacts of tax avoidance on companies with high disclosure quality, potentially leading to lower bank loan restrictions for these companies compared to those with lower disclosure quality engaging in tax avoidance (Blady et al., 2018).

## Research background

Bladi et al. (2018) conducted research on the impact of tax avoidance on bank loan contracts. Utilizing data from Chinese listed companies, they discovered a positive correlation between tax avoidance and bank

loans and loan costs, while finding a negative correlation with loan terms. The study revealed that Chinese banks have heightened financial costs for companies engaging in tax avoidance. Additionally, tax avoidance behavior was linked to increased default probability and collateral requirements for bank loans. The study also noted that the influence of tax avoidance on bank loan contracts diminishes with improved corporate disclosure quality, highlighting the significance of potential agency costs in tax avoidance on bank loan agreements. These findings further elucidate the economic repercussions of corporate tax avoidance and credit-risk transactions by commercial banks.

Diaz Duarte et al.'s (2017) research indicated that bank loan collateral serves as a tool for banks to evaluate borrower credit quality and mitigate poor decision-making risks. By preventing asset replacement issues, bank guarantees lower debt agency costs. Furthermore, loan collateral mitigates moral hazard concerns by discouraging risk transfer behaviors. In less developed countries, information asymmetry and weak credit information systems make it challenging to assess bank risks, leading to increased collateral requests for loan approval.

Hassan and Song (2014) explored the impact of profit predictability on bank debt contracts. Analyzing 8022 bank loan contracts from American companies, they found that firms with higher profit predictability enjoy more favorable loan terms, such as lower interest rates and longer maturity periods, with less stringent conditions and collateral requirements. The study highlighted the relationship between profit predictability and bank loan costs, influenced by private information access, competition between banks and bond investors, and company size.

Kim et al. (2010) delved into the effects of tax avoidance on bank loans, revealing that companies engaging in tax avoidance face fewer contractual restrictions from banks, particularly those with higher credit risks. Firms adept at tax avoidance are less likely to breach contract terms, indicating that banks view tax avoidance as a positive factor in enhancing credit quality, leading to more favorable loan terms. Ebrahimi et al. (2016) investigated the impact of government ownership and political connections on disclosure quality and tax avoidance, finding that both factors negatively affect disclosure quality, with government ownership showing no significant impact on corporate tax avoidance.

Dilmi et al. (2014) studied the relationship between disclosure quality and bank financing facilitation, concluding that improved disclosure quality enhances companies' ability to secure bank loans. Enhanced disclosure quality is crucial in negotiating favorable debt contract terms and accessing bank loans. Satish et al. (2012) explored the link between disclosure quality and financing limitations, revealing a negative correlation between accrual quality and financing restrictions, while no significant relationship was found between overall disclosure quality and financing limitations.

Based on the theoretical foundations presented, the following research hypotheses have been formulated:

**First hypothesis:** There exists a correlation between corporate tax avoidance and bank loan contracts.

**Second hypothesis:** Disclosure quality moderates the association between tax avoidance and bank loan contracts.

## Research method

The multivariate linear regression method was utilized to test the research hypotheses and Eviews 9 software was utilized for the final analysis of the data. The statistical population of the current research consists of firms listed on the Tehran Stock Exchange, meeting specific criteria: firms listed on the Tehran Stock Exchange before the fiscal year 2015; firms in the intermediation, investment, leasing, and insurance industries with no changes in activity or financial year from 2006 to 2020; firms with a total profit before tax that is not negative and have received facilities during the research period with relevant data available. To ensure uniformity among the considered firms, only those with fiscal years ending on March 29 were

examined. Following these restrictions, 125 firms were selected for review from 2013 to 2019.

The research variables include four types: dependent, independent, moderator, and control variables. The dependent variable of the research is bank loan contracts, measured by four criteria according to Blady et al. (2018):

1) Loan structure: Ratio of total loan facilities obtained to total debts.
2) Loan cost: Ratio of loan interest cost to total loan amount.
3) Bank loan collateral (security): A virtual variable where checks and promissory notes are given a value of one (1), while other collaterals are considered zero (0) (Hajiha and Taghizadeh, 2017).
4) Loan default risk: Difference between the company's short-term loans from the past year and loans repaid in the current period. If the difference is greater than zero, indicating inability to repay debt, it is assigned a value of one (1); otherwise, zero (0).

The independent variable of the research is tax avoidance, with two criteria based on previous research (Boladi et al., 2018; Hassan and Sang, 2014; Manzon and Plasko, 2001):

1. The effective tax rate is the amount of cash paid in taxes, calculated by dividing the total cash taxes paid over a five-year period by the total profit before tax for the same period. A decrease in the effective cash tax rate indicates a higher level of tax avoidance.Which is as follows:

$$cashetr_{it} = \frac{\sum_{t-4}^{t} cashtaxespaid_{it}}{\sum_{t-4}^{t} pretaxincom_{it}} \qquad (1)$$

2. The key factor in determining tax differences is the method used, as measured by the model (Desi-Dharmapala).

Tax income discrepancies are influenced by a company's control over discretionary accruals, calculated by dividing total discretionary accruals by total assets.

In this approach, tax-accounting variances are analyzed against all accruals, with the remaining difference attributed to tax avoidance.

The DD regression model is outlined as follows:

$$Bt - diff_{it} = \beta_0 + \beta_1 \frac{ta_{it}}{at_{it}} + y_i + \varepsilon_{it} \qquad (2)$$

Which, in this model:

$ta_{it}$: The total accruals of Company i at the end of year t are calculated as the difference between profit (loss) after tax deduction and cash flows resulting from operational activities in the cash flow statement for the current period.

$at_{it}$: Total assets of the company at the end of the period.

$\varepsilon_{it}$ : The residual terms in equation (2) measure the tax book difference as the level of tax avoidance of the company.

The moderator variable in this research is Disclosure Quality (DQ), which measures the disclosure rating of companies calculated by the Tehran Stock Exchange Organization since 2012 over 3, 6, and 9-month periods. This rating reflects the organization's assessment of the information content in companies' disclosures, calculated based on the average weight of criteria such as timeliness and reliability of disclosed information. The ranking is primarily determined by the information disclosure regulations for stock exchange companies approved by the Supreme Council of the Stock Exchange. It evaluates companies based on published annual information, quarterly information, management forecasts, and other published information, using criteria of timeliness and reliability. To calculate the total rank of corporate disclosure, weights of two-thirds for timeliness and one-third for reliability are used. In this research, the points awarded to companies are used to measure the quality of disclosure, with a maximum quality score of 100 (Mojtahedzadeh et al., 2014).

The control variables in this research, based on theoretical foundations and background, include:

- Cash held, calculated as the ratio of total cash and short-term investments to total assets.
- Company size (Size), represented by the natural logarithm of stock market value.
- Return on Assets (ROA), the ratio of profit before tax deduction to total assets.
- Financial Leverage (LEV), the ratio of book value of total debt to total assets.
- Net ratio of property, machinery, and equipment to total assets (PPE).
- Annual sales growth rate (Growth), the ratio of the difference between current year's sales and previous year's sales to previous year's sales.
- Market value of equity to book value (M/B).

## Research findings

The descriptive statistics of the research variables are presented in Table 1. The structure of the loan and the cost of the bank loan, with averages of 0.361 and 0.173 respectively, indicate that 36% of bank loan facilities are present in most of the sample companies compared to total debts, and that bank loans have low costs in most of the sample companies. Additionally, 704 (about 81 percent) of the sample companies have used checks and promissory notes as guarantees to receive facilities, while 249 (about 29 percent) of the companies are unable to repay the loan. The average values obtained for the variables effective cash tax rate and tax book difference show that most data related to these variables are centered around the numbers 0.146 and 0.043, respectively. The average effective rate of cash tax paid indicates a high level of tax avoidance in most of the sample companies. In terms of the modifier variable of disclosure quality, the year-to-year disclosure rating of the sample companies in terms of timeliness and reliability recognized by the Stock Exchange Organization is around 220.76, indicating a high level of disclosure by most of the sample companies. Finally, it should be noted that the closeness of the mean and median in all variables of the model indicates the normality and symmetry of the data of these variables, and the dispersion parameters are a measure to determine the degree of dispersion of the data with each other or the degree of their dispersion compared to the average. One of the most important dispersion parameters is the standard deviation. The value of this parameter for cash holding and equity ratio is 0.072 and 2.00, respectively, showing that they have the highest and lowest dispersion among the research variables, respectively.

**Table No. 1. Descriptive statistics of research variables**

| standard deviation | minimal | the maximum | the middle | average | Average number of observations | Variables |
|---|---|---|---|---|---|---|
| 0.217 | 0.000 | 0.871 | 0.361 | 0.361 | 875 | Bank loan structure |
| 0.114 | 0.000 | 0.757 | 0.169 | 0.163 | 873 | Bank loan cost |
| 0.396 | 0.000 | 1 | 1 | 0.805 | 874 | Bank loan collateral |
| 0.451 | 0.000 | 1 | 0.000 | 0.285 | 875 | Risk of non-payment of bank loans |
| 0.096 | 0.000 | 0.965 | 0.139 | 0.146 | 874 | The effective cash tax rate |
| 0.083 | -0.349 | 0.473 | -0.016 | -0.43 | 873 | Book tax difference |
| 16.866 | 14.32 | 99.91 | 80.895 | 76.22 | 868 | Disclosure quality |
| 0.072 | 0.0003 | 0.479 | 0.037 | 0.062 | 875 | Keeping cash |
| 0.179 | 0.108 | 1.269 | 0.589 | 0.578 | 875 | Financial leverage |
| 2.005 | -23.405 | 18.255 | 2.168 | 2.575 | 874 | value ratio<br>Owners of shares at book value |
| 0.177 | 0.013 | 0.850 | 0.224 | 0.260 | 875 | Net property, plant, and equipment to total assets |
| 0.137 | -0.404 | 0.675 | 0.125 | 0.147 | 875 | Rate of return on assets |
| 1.520 | 10.660 | 19.190 | 13.768 | 13.988 | 875 | size |

In order to determine the appropriate model and estimate the research model where the dependent variable is not zero or one, i.e., ordinary least squares, Limer and Hausman's F test was utilized. This test was estimated in all OLS models with fixed effects. Based on the chi-square statistic and the significance level of the Hausman test, the fitting of the research model for testing all ordinary least squares models in panel data form was conducted using the fixed effects model.

To assess the goodness of fit in generalized least squares models, the Hosmer-Lemeshow test was employed. In all models, the statistic was above 5%, indicating a good model fit. The Levin, Lin, and Chu (2002) unit root test was used to determine the significance of the research variables, and all variables were found to be significant, avoiding the issue of false regression. Prior to Limer and Hausman's F test, a collinearity test was conducted. Collinearity occurs when an independent variable is a linear function of other independent variables. However, in all tests, the variance inflation factor for all variables was less than 10, indicating no collinearity issues among the independent variables in the research.

In both ordinary and generalized least squares models, the adjusted coefficient of determination and McFadden's R^2 were used to show the percentage changes of the dependent variable due to the independent variable, as well as the significance level of the model in ordinary and generalized least squares, respectively, compared to the F significance level. The probability statistic calculated for all models was less than 5%.

To test the first hypothesis, the following regression model was utilized:

$$blc_{it} = \beta_0 + \beta_1 tax\_avoidance_{it} + \beta_2 cash_{it} + \beta_3 size_{it} + \beta_4 roa_{it} + \beta_5 lev_{it} + \beta_6 ppe_{it} + \beta_7 growth_{it} + \beta_8 mtb_{it} + \varepsilon_{it} \quad (3)$$

The results of the test on the first hypothesis of the research, using bank loan structure as the criteria for measuring bank loan contracts in Table 2, show that at a 95% confidence level, there is a significant negative (positive) relationship between the effective cash tax rate (book-tax difference) and the bank loan structure. Therefore, the first hypothesis was confirmed by measuring the effective tax rate and accounting difference as the independent variable, and bank loan structure as the dependent variable.

**Table number 2. Results of the first hypothesis test**

| Bank loan structure | | | | | | independent variable |
|---|---|---|---|---|---|---|
| **significance level** | **t-statistic** | **regression coefficient** | **significance level** | **t-statistic** | **regression coefficient** | **variable** |
| ---- | ---- | ---- | 0.027 | 2.219 | -0.099 | The effective cash tax rate |
| 0.000 | 6.271 | 0.223 | ---- | ---- | ---- | Book tax difference |
| 0.047 | -1.987 | -0.078 | 0.713 | 0.369 | 0.025 | Keeping cash |
| 0.000 | 4.015 | 026/0 | 0.204 | -1.270 | -0.012 | Sales growth rate |
| 0.000 | 6.132 | 165/0 | 0.971 | 0.036 | 002/0 | Financial leverage |
| 0.000 | 5.381 | 0.007 | 0.010 | 2.598 | 004/0 | Ratio of market value to book equity |
| 0.000 | 7.125 | 0.262 | 0.023 | 2.274 | 0.239 | Property, machinery, and equipment |
| 0.076 | 1.777 | 0.049 | 0.009 | 2.642 | 0.072 | Rate of return on assets |
| 0.000 | -12.75 | -0.038 | 0.500 | -0.675 | -0.008 | Company size |
| 0.000 | 17.89 | 0.705 | 0.007 | 2.729 | 0.388 | Fixed coefficient |
| ---- | ---- | ---- | 0.000 | 5.083 | 0.475 | Virtual variable |
| 56.372 | | | 24.593 | | | F statistic |
| 0.000 | | | 0.000 | | | The significance level of F |
| 0.894 | | | 0.808 | | | Adjusted coefficient of determination |
| 1.846 | | | 2.158 | | | Durbin-Watson statistic |

The results of the first hypothesis test in the research, using the bank loan cost criterion to measure bank loan contracts in Table 3, indicate that at a 95% confidence level, there is a significant negative (positive) relationship between the effective cash tax rate (book-tax difference) and the bank loan cost. Therefore, the first hypothesis, which measured the effective tax rate and accounting difference as the independent variable and bank loan cost as the dependent variable, was confirmed.

**Table number 3. Results of the first hypothesis test**

| Bank loan structure | | | | | | independent variable |
|---|---|---|---|---|---|---|
| **significance level** | **t-statistic** | **regression coefficient** | **significance level** | **t-statistic** | **regression coefficient** | **variable** |
| ---- | ---- | ---- | 0.000 | -4.311 | -0.085 | The effective cash tax rate |
| 0.000 | 7.581 | 0.253 | ---- | ---- | ---- | Book tax difference |
| 0.004 | -2.861 | -0.108 | 0.011 | -2.558 | -0.079 | Keeping cash |
| 0.267 | 1.111 | 0.006 | 0.908 | 0.115 | 0.001 | Sales growth rate |
| 0.978 | 0.028 | 0.001 | 0.128 | -1.524 | -0.024 | Financial leverage |
| 0.000 | -5.199 | 005/0- | 0.000 | -4.360 | -0.006 | Ratio of market value to book equity |
| 0.000 | -6.165 | -0.130 | 0.000 | -7.730 | -0.146 | Property, machinery, and equipment |
| 0.000 | -6.579 | -0.189 | 0.000 | -6.925 | -0.109 | Rate of return on assets |
| 0.000 | 8.994 | 0.023 | 0.000 | 4.198 | 0.022 | Company size |
| 0.081 | -1.750 | -0.071 | 0.477 | -0.712 | -0.055 | Fixed coefficient |
| 10.293 | | | 10.224 | | | Virtual variable |
| 0.000 | | | 0.000 | | | F statistic |
| 0.585 | | | 0.583 | | | The significance level of F |
| 1.951 | | | 1.991 | | | Adjusted coefficient of determination |

The results of the first hypothesis test in the research, using the bank loan collateral criterion to measure bank loan contracts in Table 4, indicate that at a 95% confidence level, there is a significant negative (positive) relationship between the effective cash tax rate (book-tax difference) and the bank loan collateral. Therefore, the first hypothesis, which measured the effective tax rate and accounting difference as the independent variable and bank loan collateral as the dependent variable, was confirmed.

**Table number 4. Results of the first hypothesis test**

| Bank loan structure | | | | | | independent variable |
|---|---|---|---|---|---|---|
| **significance level** | **t-statistic** | **regression coefficient** | **significance level** | **t-statistic** | **regression coefficient** | **variable** |
| ---- | ---- | ---- | 0.005 | -2.814 | -2.567 | The effective cash tax rate |
| 0.005 | 2.842 | 3.284 | ---- | ---- | ---- | Book tax difference |
| 0.010 | -2.585 | -3.065 | 0.002 | -3.080 | -3.638 | Keeping cash |
| 0.944 | 0.070 | 0.020 | 0.829 | 0.216 | 0.060 | Sales growth rate |
| 0.370 | 0.896 | 0.572 | 0.138 | 1.485 | 0.957 | Financial leverage |
| 0.447 | -0.761 | -0.037 | 0.414 | -0.817 | -0.039 | Ratio of market value to book equity |
| 0.002 | -3.065 | -1.563 | 0.000 | -3.792 | -1.915 | Property, machinery, and equipment |
| 0.105 | -1.621 | -1.520 | 0.002 | -3.091 | -2.605 | Rate of return on assets |
| 0.001 | 3.243 | 0.205 | 0.004 | 2.881 | 0.182 | Company size |
| 0.373 | -0.891 | -0.845 | 0.933 | 084/0- | -0.080 | Fixed coefficient |

| Bank loan structure | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| 0.068 | | | 0.068 | | | R^2 McFadden |
| 60.947 | | | 60.860 | | | The probability ratio statistic |
| 0.000 | | | 0.000 | | | A significance level of the model |
| (0.390) 8.462 | | | (0.636) 6.098 | | | Hosmer-Lemshow statistic |
| (0.165) 14.189 | | | (0.366) 10.886 | | | Andrews statistics |

The results of the test on the first hypothesis of the research, using the bank loan non-payment risk criterion to measure bank loan contracts in Table 5, show that at a 95% confidence level, there is a significant negative (positive) relationship between the effective cash tax rate (book-tax difference) and the risk of non-payment of bank loans. Therefore, the first hypothesis was confirmed by measuring the effective tax rate and book difference as the independent variable and the non-payment risk as the dependent variable.

**Table number 5. Results of the first hypothesis test**

| Risk of non-payment of bank loans | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| ---- | ---- | ---- | 0.042 | -2.034 | -1.912 | The effective cash tax rate |
| 0.000 | 4.604 | 5.369 | ---- | ---- | ---- | Book tax difference |
| 0.217 | -1.236 | -1.575 | 0.582 | -0.550 | -0.674 | Keeping cash |
| 0.064 | 1.852 | 0.460 | 0.126 | 1.530 | 0.375 | Sales growth rate |
| 0.044 | 2.016 | 0.124 | 0.019 | 2.345 | 1.351 | Financial leverage |
| 0.794 | 0.261 | 0.010 | 0.966 | -0.043 | -0.002 | Ratio of market value to book equity |
| 0.000 | 5.003 | 2.233 | 0.000 | 5.702 | 2.517 | Property, machinery, and equipment |
| 0.150 | -1.441 | -1.332 | 0.582 | 0.551 | 0.443 | Rate of return on assets |
| 0.043 | -2.024 | -0.111 | 0.063 | -1.875 | -0.101 | Company size |
| 0.608 | -0.513 | -0.428 | 0.365 | -0.906 | -0.752 | Fixed coefficient |
| 0.062 | | | 0.046 | | | R^2 McFadden |
| 66.200 | | | 48.788 | | | The probability ratio statistic |
| 0.000 | | | 0.000 | | | A significance level of the model |
| (0.151) 12.009 | | | (0.104) 13.249 | | | Hosmer-Lemshow statistic |
| (0.096) 16.120 | | | (0.142) 14.727 | | | Andrews statistics |

The following regression model is also used to test the second hypothesis:

$$blc_{it} = \beta_0 + \beta_1 tax_{avoidance_{it}} + \beta_2 dq_{it} + \beta_3 tax_{avoidance_{it}} * dq + \beta_4 cash_{it} + \beta_5 size_{it} + \beta_6 roa_{it} + \beta_7 lev_{it} + \beta_8 ppe_{it} + \beta_9 growth_{it} + \beta_{10} mtb_{it} + \varepsilon_{it}$$

The results of the second hypothesis test in the research, using the bank loan cost criterion to measure bank loan contracts in Table 7, show that the modifier variable of disclosure quality was applied. This independent variable, effective rate of cash tax disclosure quality (book difference of tax disclosure quality), was used to test the research hypothesis. The regression coefficient value of the displayed variable indicates that at a 95% confidence level, the combined impact of tax avoidance (effective rate of cash tax and book-tax difference) and disclosure quality on bank loan costs is significant. Therefore, the quality of disclosure has an adjusting effect on the relationship between the effective cash tax rate (book-tax difference) and bank loan costs, either increasing or decreasing.

**Table number 6. Results of the second hypothesis test**

| Bank loan structure | | | | | | independent variable |
|---|---|---|---|---|---|---|
| **significance level** | **t-statistic** | **regression coefficient** | **significance level** | **t-statistic** | **regression coefficient** | **variable** |
| ---- | ---- | ---- | 0.008 | -2.674 | -0.231 | The effective cash tax rate |
| 0.059 | 1.895 | 0.136 | ---- | ---- | ---- | Book tax difference |
| 0.043 | -2.024 | 0.000 | 0.056 | 1.915 | 0.000 | Disclosure quality |
| ---- | ---- | ---- | 0.012 | -2.536 | -0.004 | Effective cash tax rate Disclosure quality |
| 0.006 | -2.753 | -0.002 | ---- | ---- | ---- | Tax Book Difference Disclosure Quality |
| 0.058 | 1.902 | 0.102 | 0.179 | 1.346 | 0.072 | Keeping cash |
| 0.956 | 0.055 | 0.000 | 0.056 | -1.914 | -0.008 | Sales growth rate |
| 0.091 | -1.695 | -0.016 | 0.484 | -0.700 | -0.013 | Financial leverage |
| 0.000 | 4.545 | 0.005 | 0.000 | 4.232 | 0.005 | Ratio of market value to book equity |
| 0.015 | 2.451 | 0.189 | 0.004 | 2.857 | 0.167 | Property, machinery, and equipment |
| 0.404 | 0.835 | 0.035 | 0.007 | 2.686 | 0.077 | Rate of return on assets |
| 0.005 | -2.836 | -0.019 | 0.001 | -3.268 | -0.020 | Company size |
| 0.000 | 7.303 | 0.562 | 0.000 | 6.618 | 0.528 | Fixed coefficient |
| 0.000 | 8.439 | 0.486 | 0.000 | 7.788 | 0.462 | Virtual variable |
| 68.263 | | | 70.159 | | | F statistic |
| 0.000 | | | 0.000 | | | The significance level of F |
| 0.928 | | | 0.927 | | | Adjusted coefficient of determination |
| 2.079 | | | 2.097 | | | Durbin-Watson statistic |

The results of the second hypothesis test in the research, using the bank loan cost criterion to measure bank loan contracts in Table 7, demonstrate that when the modifier variable of disclosure quality is applied to the independent variable effective rate of cash tax disclosure quality (book difference of tax disclosure quality), a research hypothesis is formulated. The regression coefficient value of the displayed variable indicates that, at a 95% confidence level, the combined impact of tax avoidance (the effective rate of cash tax and book-tax difference) and disclosure quality on the cost of bank loans is significant. Therefore, disclosure quality has an adjusting effect on the relationship between the effective cash tax rate (book-tax difference) and bank loan cost, either increasing or decreasing it.

The results of the second hypothesis test in the research, using the bank loan collateral criterion to measure bank loan contracts in Table (8), indicate that when the modifier variable of disclosure quality is applied to the independent variable of effective rate of cash tax (book-tax difference disclosure quality), a research hypothesis is formed. The regression coefficient value of the displayed variable shows that

only the interaction effect of the effective rate of cash tax and the quality of disclosure on bank loan collateral is significant at a 95% level. Therefore, disclosure quality has a moderating effect on the relationship between the effective cash tax rate and bank loan collateral, which increases.

**Table number 7. Results of the second hypothesis test**

| Bank loan cost | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| ---- | ---- | ---- | 0.003 | -9.962 | -0.231 | The effective cash tax rate |
| 0.490 | 0.691 | 0.054 | ---- | ---- | ---- | Book tax difference |
| 0.000 | -4.273 | 0.000 | 0.591 | -0.538 | 0.000 | Disclosure quality |
| ---- | ---- | ---- | 0.041 | -2.049 | -0.002 | Effective cash tax rate Disclosure quality |
| 0.010 | -2.577 | -0.003 | ---- | ---- | ---- | Tax Book Difference Disclosure Quality |
| 0.000 | -4.948 | -0.117 | 0.019 | -2.537 | -0.087 | Keeping cash |
| 0.821 | -0.226 | -0.002 | 0.476 | -0.714 | -0.004 | Sales growth rate |
| 0.841 | -0.201 | -0.003 | 0.355 | -0.925 | -0.022 | Financial leverage |
| 0.000 | -5.765 | -0.005 | 0.000 | -4.544 | -0.006 | Ratio of market value to book equity |
| 0.000 | -8.399 | -0.111 | 0.000 | -5.874 | -0.128 | Property, machinery, and equipment |
| 0.000 | -10.335 | -0.162 | 0.001 | -3.434 | -0.092 | Rate of return on assets |
| 0.000 | 5.870 | 0.025 | 0.000 | 8.251 | 0.023 | Company size |
| 0.261 | -1.124 | -0.070 | 0.165 | -1.390 | -0.061 | Fixed coefficient |
| 10.194 | | | 9.428 | | | F statistic |
| 0.000 | | | 0.000 | | | The significance level of F |
| 0.593 | | | 0.567 | | | Adjusted coefficient of determination |
| 1.988 | | | 2.035 | | | Durbin-Watson statistic |

**Table number 8. Results of the second hypothesis test**

| bank loan collateral | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| ---- | ---- | ---- | 0.013 | -2.485 | -5.467 | The effective cash tax rate |
| 0.136 | 1.493 | 2.261 | ---- | ---- | ---- | Book tax difference |
| 0.483 | 0.701 | 0.004 | 0.215 | 1.239 | 0.008 | Disclosure quality |
| ---- | ---- | ---- | 0.014 | -2.464 | -0.063 | Effective cash tax rate Disclosure quality |
| 0.097 | -1.291 | -0.027 | ---- | ---- | ---- | Tax Book Difference Disclosure Quality |
| 0.099 | -1.651 | -2.197 | 0.039 | 062/2- | -2.700 | Keeping cash |
| 0.907 | -0.118 | -0.037 | 0.508 | 0.661 | 0.216 | Sales growth rate |
| 0.219 | 1.229 | 0.910 | 0.094 | 1.673 | 1.266 | Financial leverage |
| 0.060 | -1.885 | -0.108 | 0.048 | -1.979 | -0.113 | Ratio of market value to book equity |
| 0.004 | -2.874 | -1.651 | 0.000 | -3.517 | -2.008 | Property, machinery, and equipment |
| 0.105 | -1.622 | -1.710 | 0.018 | -2.358 | -2.285 | Rate of return on assets |
| 0.001 | 3.261 | 0.235 | 0.003 | 3.012 | 0.214 | Company size |
| 500/0 | -0.674 | -0.789 | 0.167 | -1.382 | -1.167 | Fixed coefficient |
| 0.088 | | | 0.085 | | | R^2 McFadden |

| bank loan collateral | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| 64.196 | | | 62.681 | | | The probability ratio statistic |
| 0.000 | | | 0.000 | | | A significance level of the model |
| (0.280) 9.790 | | | (0.639) 6.075 | | | Hosmer-Lemshow statistic |
| (0.104) 15.868 | | | (0.325) 11.430 | | | Andrews statistics |

The results of the second hypothesis test in the research on bank loan non-payment risk criteria for measuring bank loan contracts in Table 9 indicate that the application of the modifier variable of disclosure quality affects the independent variable of effective rate of cash tax disclosure quality (book difference of tax disclosure quality). This variable was created to test the research hypothesis. The regression coefficient value of the displayed variable suggests that, at a 95% confidence level, the interaction effect of only the book-tax difference and the quality of disclosure on the risk of non-payment of bank loans is significant. Therefore, the moderating effect of disclosure quality on the relationship between book-tax difference and the risk of non-payment of bank loans is decreasing.

**Table number 9. Results of the second hypothesis test**

| Risk of non-payment of bank loans | | | | | | independent variable |
|---|---|---|---|---|---|---|
| significance level | t-statistic | regression coefficient | significance level | t-statistic | regression coefficient | variable |
| ---- | ---- | ---- | 0.805 | 0.247 | 0.343 | The effective cash tax rate |
| 0.662 | 0.437 | 0.590 | ---- | ---- | ---- | Book tax difference |
| 0.021 | -2.313 | -0.012 | 0.031 | -2.162 | -0.013 | Disclosure quality |
| ---- | ---- | ---- | 0.200 | -1.281 | -0.028 | Effective cash tax rate Disclosure quality |
| 0.000 | -3.622 | -0.072 | ---- | ---- | ---- | Tax Book Difference Disclosure Quality |
| 0.224 | -1.216 | -1.709 | 0.461 | -0.737 | -1.002 | Keeping cash |
| 0.174 | 1.360 | 0.377 | 0.412 | 0.820 | 0.226 | Sales growth rate |
| 0.032 | 2.141 | 1.413 | 0.016 | 0.820 | 1.615 | Financial leverage |
| 747/0 | -0.323 | -0.017 | 0.454 | 2.403 | -0.039 | Ratio of market value to book equity |
| 000/0 | 4.948 | 2.440 | 0.000 | -0.749 | 2.722 | Property, machinery, and equipment |
| 0.630 | -0.482 | -0.499 | 0.190 | 5.572 | 1.220 | Rate of return on assets |
| 0.063 | -1.862 | -0.111 | 0.050 | -1.959 | -0.115 | Company size |
| 0.820 | 0.228 | 0.226 | 0.781 | 0.278 | 0.275 | Fixed coefficient |
| 0.079 | | | 0.066 | | | R^2 McFadden |
| 71.476 | | | 59.672 | | | The probability ratio statistic |
| 0.000 | | | 0.000 | | | A significance level of the model |
| (0.173) 11.536 | | | (0.581) 6.596 | | | Hosmer-Lemshow statistic |
| (0.117) 15.435 | | | (0.728) 6.973 | | | Andrews statistics |

## Conclusions and suggestions

This research examines the impact of tax avoidance on bank loan contracts, focusing on the disclosure quality variable in companies listed on the Tehran Stock Exchange. The evidence for both the measurement criteria of tax avoidance and the four criteria of bank loan agreements shows a statistically significant and negative relationship between tax avoidance and bank

loan agreements at the 95% confidence level. When the effective rate of cash tax was used as a measure of tax avoidance, it had a negative and significant effect on all four criteria of a bank loan (structure, cost, collateral, and risk of non-payment). On the other hand, when book difference was considered as tax avoidance, it had a positive and significant effect on all four bank loan criteria.

These results suggest that the effective cash tax rate and book difference are inverse and direct measures of tax avoidance, respectively. In other words, as the effective cash tax rate increases (book-tax difference decreases), tax avoidance decreases (increases), leading to a decrease (increase) in bank loan contracts. This demonstrates the positive and significant impact of tax avoidance, even when considering the effective cash tax rate. The findings from the first main hypothesis align with Blady et al. (2018), contradicting the results of Khodamipour and Amininia (2012) and Kim et al. (2010) which showed no relationship between tax avoidance and the cost of debt.

Furthermore, the results indicate a statistically significant relationship between the interactive variable of tax avoidancedisclosure quality and bank loan contracts, particularly in some measurement criteria of these two variables. When using the effective rate of cash tax as a measure of tax avoidance, the moderating effect of disclosure quality was confirmed on the relationship between the effective rate of cash tax and bank loan contracts in terms of structure, cost, and collateral. The presence of disclosure quality in listed companies was found to amplify the negative effect of the effective cash tax rate on bank loan contracts in these areas.

On the other hand, when book difference was considered as tax avoidance, the presence of disclosure quality only affected the relationship between tax book difference and bank loan contracts in terms of structure, cost, and risk of loan non-payment. The presence of disclosure quality reduced the positive impact of tax book difference on bank loan contracts in these areas. These findings are consistent with internal research by Dianthi Dilmi et al. (2014) and external research by Hassan and Sang (2014) and Hope et al. (2018).

In conclusion, the moderating effect of the disclosure quality variable on the relationship between tax avoidance and bank loan contracts varies depending on the measurement criteria used. The results of this study shed light on the complex relationship between tax avoidance, disclosure quality, and bank loan contracts, offering valuable insights for companies listed on the Tehran Stock Exchange.

Based on the theoretical and experimental background, as well as the research findings, it is recommended that investors pay close attention to the ranking of disclosure quality of companies as reported by the Securities & Exchange Commission when making investment decisions. Creditors and financiers should first assess a company's level of tax avoidability and review its bank loan contracts to ensure the ability to repay principal and interest, adjusting debt contracts accordingly. When making tax decisions, managers should consider tax costs versus investment costs. By disclosing financial statements and transparent, high-quality reports, and achieving a high ranking in stock exchange ratings, they can mitigate the negative effects of tax avoidance. This will also help secure bank loan contracts. The country's tax affairs organization should consider bank loan contracts as an indicator of tax avoidance when reviewing tax declarations and the taxable income of companies.

Furthermore, it is recommended that future research explore various criteria for measuring disclosure quality, such as profit predictability, profit smoothing, and other accounting literature criteria, like those in Tesla et al.'s (2018) study. Researchers should also investigate the impact of tax avoidance on different aspects of bank loan contracts, including maturity and potential crimes, as well as the influence of corporate governance variables on the relationship between tax avoidance and bank loan contracts.

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