Interaction between leverage, Dividends and profitability: Simultaneous model approach

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ABSTRACT

According to agency theory, the use of tools such as dividends and leverage can reduce the conflict of interest between managers and shareholders. However, the decision to use one or both of these tools simultaneously, as well as their interrelationships with the profitability of the company is not an easy choice. The present study aims to provide a model to explain the relationship between dividends, leverage and profitability with a simultaneous interaction approach among companies. To achieve the research objectives, 144 companies were selected in the period 2013 – 2018. To test the interrelationship between variables, simultaneous equation measurement methods of three-stage least squares (3SLS) and two-stage (2SLS) are applied. The results of examining the relationship between leverage and profitability based on each 2SLS and 3SLS methods show a positive effect of leverage on companies' profitability, but profitability based on 3SLS method has a simultaneous negative interaction on leverage. Also, the study of the simultaneous relationship between profitability and payable interest showed that these two variables have significant positive mutual effects on each other. The results of the study of the simultaneous interactions of dividends and leverage show that both models emphasize that higher payable interest will lead to higher leverage. However, the simultaneous interaction of leverage on dividends is different in the two models, and this is the only contradiction between the results of these two methods in this study. And in 3SLS a negative effect of leverage on dividends is shown, but 2SLS shows the opposite effect.

Keywords:
Profitability, Leverage, Dividends, Simultaneous Equations Models.

1. Introduction

One of the most important goals that managers must consider in order to maximize shareholder wealth is to determine the best combination of company financing sources or the optimal capital structure. It can be stated that choosing the desired capital structure reduces the cost of capital and increases market value (Azarnia et al., 2019). Additionally, the use of debt in the financial structure increases the expected returns of shareholders, but it can also increase the company's risk. In general, the use of debt in the capital structure of companies, acts like a double-edged sword and can both increase the value of companies and reduce the value of the company (Rezaei and Piri, 2011). Hashemijoo et al. (2012) consider dividend policy as a company policy that determines the amount of dividend and the amount of dividends to be reinvested in new projects. The philosophy of dividends is that investors do not want any dividends lower than expected, unless they believe that an investment in which the interest is committed will yield higher returns. Dividend is the cash amount that a company sends to its shareholders in the form of dividends. The company can decide to return all profits to its shareholders or investors, or it can keep part of it as savings profit. From the shareholders' point of view, increasing wealth is important either by offering cash dividends or raising stock prices. On the other hand, managers pay attention to this increase in wealth in order to evaluate their performance and that of other departments under management and to calculate the correct reward, which is definitely their right.

Therefore, the three variables of dividends, financial leverage and profitability of companies are monitored and commented by both groups of managers and shareholders. But these three variables cannot be considered separately. Managers are well aware that the adoption of any kind of financial facility can affect the profitability at the end of the period and also the amount of dividends paid by the company (Dehghanzadeh et al., 2013). Conversely, it is clear that profit-sharing policies will impose restrictions on providing facilities. Financial managers also consider the company's return as the main pillar of dividends and the ability to pay the debts incurred.

On the other hand, dividends and leverage are corporate governance mechanisms. They have alternative or complementary relationships (Setia et al., 2009). This means that managers and shareholders pay attention to these two variables to reduce the conflict of interests and managers can reduce shareholders' concerns about free cash flow by paying more dividends (Pakmaram et al., 2019). By obtaining bank facilities, managers can also assure shareholders that the third party will be financing the projects and the third party has taken more financial risk and examined the profitability of the projects (JabarzadeKangarlooei et al., 2016). In addition, this financial leverage will generate more future profits for shareholders (Leonard et al., 2018), which in turn reduces the conflict of interest between managers and shareholders. Managers can use one or both of these tools to reduce the representation problem and how the use of each of these tools has a simultaneous effect on the other variable but cannot be explained with confidence. In fact, in choosing any of these tools, managers have to consider the impact of this tool on the company's profitability. On the other hand, the company's profitability will automatically provide managers with other choices regarding the amount of dividends and how they are financed.

Therefore, other theories such as signaling theory and financing options hierarchy theory can be used to explain the simultaneous interactions of these three variables. Considering dividend from an information perspective, dividend signaling theory states that dividend can be used as a means of communicating information about a company's financial performance to investors (Enekwe and et al., 2015). Also, the policies of managers based on more financial leverage are significant signals from the shareholders' point of view that they try to interpret it correctly by looking at the company's profitability (Ghasemi et al., 2018). Also, in some cases, managers' preference for internal financing can be explained in terms of hierarchical theory (preferential theory). Given the high cost of foreign financing and the difficulty of accessing it, companies have a preference for domestic financing in the first place. But how this prioritization can affect the amount of dividends or how it can effect on the company's profitability, considering not using financial leverage will require more research.

In summary, understanding the simultaneous effects of dividend, capital structure and corporate returns is one of the most important issues not only for the company's financial managers and senior management, but also for all capital market participants as well as lenders. However, the

simultaneous interactions of these three main variables with each other can be considered as the most complex and at the same time the most controversial issue in relation to the three basic financial variables. At the same time, the results of a number of studies indicate that the simultaneous effects of these variables were not the same as their long-term effects (Ghasemi et al., 2015). While the studies conducted by the authors of this article show that such a case has not been studied in Tehran Stock Exchange and therefore, by providing comprehensive results in this field, a more appropriate understanding of the relationship between these variables and causal relationships can be achieved and the defect between them becomes more apparent. Therefore, according to the presented materials, the main research question is formulated as follows: Are there any synchronous interactions between dividend, financial leverage and profitability? In this article, after giving an introduction to the subject, the theoretical framework of the research is discussed and then, by stating the research background, hypotheses related to the interaction of these three variables are developed and then a model is developed to study their interaction effects. The proposed model is analyzed based on the simultaneous equation system using 2SLS and 3SLS measurement methods and the research findings are presented. Finally, based on the research findings, conclusions and suggestions will be made.

2. Background and Theoretical Framework of the Research

• Relationship between Dividend and Profitability

According to the hypothesis, the cost of cash dividends can be used to reduce the conflict of interest between managers and shareholders as a tool to prevent the company's revenues from being spent on inefficient projects, because dividend reduces financial resources that are controlled by managers and as a result, it reduces the power of managers. According to this theory, the representation of the interests of managers with shareholders is not necessarily aligned (Moussaand Chichti, 2014) and the payment of cash dividends reduces this conflict. In many cases, even when the business unit is seeking to raise new capital, the market of the company is evaluated based on dividend (Camilleriet al., 2019). The greater the

company's free cash flow, the greater the conflict of views between managers and shareholders about dividend policies; because dividend reduce the free cash flow available to managers to invest and manage resources (George et al., 2003). The goal of investors is to maximize their profits and the expected return reflects the expectations of investors. Dividend is one of the important information for investors in making investment decisions. Under signaling theory, cash profits promise an outlook for the company's future profits. Proponents of the signaling theory believe that the company's profit-sharing policy is used as a means of conveying the company's status due to lower costs than other methods (Kurdistani et al., 2010). Companies use their cash to pay dividends to inform the market of the company's future profitability. Higher profits of the company can allow the company to withdraw more cash through dividends and therefore, in a stable situation, dividends will indicate the profitability of the company (Kurdistani et al., 2010).For example, Liu and Chen (2015) show that managers change profit-sharing to send a message about their future earnings prospects. Paying more dividends can reduce risk and it can have some effectson the cost of capital, but it can also result in reduced stock returns (Fun & Tran, 2019). And also Ehikioya(2015) examined the relationship between profitability and dividend and found that there is a positive and significant relationship between dividend and profitability. On the other hand, it can reduce profit-sharing of the available resources for investment (Gonzalz& Luis, 2007). The profit reinvestment approach leads to the growth of the economic unit, and the attraction of potential stakeholders (Weng et al., 2004) and therefore the non-distribution of profits can be assumed to be consistent even with positive profitability. As a result, none of the dividend theories alone has been more successful than other theories, probably because of different incentives to pay dividends.

In short, it can be stated that higher profitability brings more free cash flow to the company, and managers pay cash dividends to shareholders to try to reduce conflicts of interest with shareholders and reduce their worries about the loss of their assets, as well as to send a signal to shareholders that they (managers) have no doubts about the future profitability of the company and are willing to lose their existing resources. But this dividend can also

mean that there are no profitable plans and projects for the company in the future, because if managers had identified such situations, then it might have been preferable to invest the company's free cash flow in those projects. Therefore, more dividends can definitely not be interpreted as maintaining or increasing profitability in the future (Fun and Tran, 2019). On the other hand, the decrease in dividend profit can be seen at first glance as a sign of managers' lack of confidence in the future situation of the company. This means that managers are sending signals to shareholders and market participants about future difficulties by reducing dividends. But on the other hand, this decrease in dividends may lead to more financial capacity of the company and increase profitability. For example, instead of distributing profits among shareholders, managers prefer to liquidate one of the company's most expensive facilities and thus increase the company's profitability. Two hypotheses that can be considered in this study for the simultaneous interactions of these two variables are:

Hypothesis 1: Increase in dividends leads to a significant increase in the profitability of the stock exchange company.

Hypothesis 2: Increasing the profitability of the company simultaneously causes an increase in the amount of dividends among the companies listed on the Tehran Stock Exchange organization.

- **The Relationship between Financial Leverage and Returns**

The purpose of capital structure policies is to determine the composition of financial resources in order to maximize shareholder wealth. Companies can obtain the resources they need from both internal and external sources. Funding from internal sources requires the current and past profitability of the company, and financing from external sources can be done through debts and potential investors who are interested in investing in the company (Ramgupal, 2016). According to agency theory, a company's financing policies directly affect the interests of management, shareholders, and creditors. One of the tools that stakeholders are constantly encouraging managers to use is to get loans to finance new projects. Therefore, managers try to show their proper profitability and financial discipline by selecting the most optimal projects based on risk-return and financing them by obtaining facilities. In fact, both the signaling and representation theories of borrowing, respectively, are interpreted to reduce conflict of interest and more appropriate future returns. From another point of view, according to the hierarchical theory, among the sources of financing, accumulated profit over debt and debt is preferable to the issuance of shares, and if a company finances intra-organizational financing over external financing and in terms of external financing, it prefers debt financing over capital outflows. In addition, the theory of equilibrium in deciding on the structure of capital and choosing the combination of debt and equity is based on the balance between financial cost and profit from debt financing (tax shield). Because debt financing from debts has some advantages, all financial costs resulted from financial crisis should be considered, including bankruptcy costs and other contract costs (Aghaei et al., 2011). Financial leverage also affects the return on equity of a business unit due to the financial costs of borrowing (Rahimian et al., 2016). Of course, the amount of return is also effective in determining the level of debt. For example, Abdullah et al. (2014) showed that return of equity (ROE) has a significant effect on each level of debt. In fact, instead of referring to the shareholders, the managers prefer to finance their projects by referring to lenders. In this way, the shareholders make sure that the lenders have reviewed the project and ensured that the loan is repaid. By taking a loan, the managers show that they have planning and discipline to repay the loans. In addition, managers provide shareholders with the possibility of higher profitability by using loans as financial leverage. But from another point of view, managers have taken heavy loans backed by the assets of shareholders to mortgage banks and other lenders. These loans are investigated without careful planning in projects that are imagined with no high returns and/or they can bear the risks that are more than company's resilience. For example, Khan (2012) examined the relationship between capital structure decision and firm profitability in engineering companies mentioned in KSE in Pakistan and showed a significant negative relationship between financial leverage and firm profitability. Also, higher profitability according to the hierarchical theory of financing should reduce managers' recourse to foreign financing (Foroughi and Mohammadi, 2011). But on the other hand, in many cases, managers who are

confident in choosing their projects and can meet all future commitments on time, increase profitability in the form of dividends and/or pay dividends to shareholders and apply for a loan, send this signal to shareholders and other market participants. In addition, increased profitability sometimes led to more ambitious decisions by managers, and they try to gain shareholder satisfaction not only to invest the surplus financial profit generated in new projects, but also by showing the company's profitability to lenders to accompany them for large loans. As a result, the relationship between profitability and financial leverage can be described as a complex one that its simultaneous interactions in the Iranian capital market need to be examined. However, according to previous research and scientific conjectures of the authors of this article, the following two hypotheses are claimed to be related to them:

Hypothesis 3: Increasing the financial leverage leads to a significant simultaneous increase in the profitability of the stock exchange company.

Hypothesis 4: Increasing the profitability of the company simultaneously reduces the tendency to use financial leverage in companies listed on the Tehran Stock Exchange Organization.

- **Relationship between Dividends and Financial Leverage**

Therefore, according to agency theory, the dividends profit tools is introduced as a way to solve the agency problem. On the other hand, as mentioned in the previous sections, agency theory has also described financial leverage as a way to resolve or reduce conflicts of interest between managers and shareholders (Peter et al., 2012). But the main issue is whether to use dividends or financial leverage to resolve conflicts of interest among Iranian stock exchange companies? In this case, if there is a desire to use one of these two methods; they are alternative to each other and using one reduces the desire to use the other. But in a number of studies, these two methods are considered as complementary to each other (Ghasemi et al., 2015). On the other hand, it should be noted that the use of financial leverage from the other part will increases the conflict of interest between managers and lenders, which in itself makes it difficult to use this tool (Shen, 2014). Hierarchical theory also emphasizes that companies' willingness to finance is the last resort in the borrowing approach (DeAngelo

and DeAngelo, 2007). Brooke, Charlton Jr., and Henderson (1998) explicitly state that the complexity of dividend decisions is such that there is no reason to believe that corporate dividend policy is pursued with a single goal. In addition, the policy of financial leverage is not an independent decision, but is determined simultaneously with other factors such as the company's profit-sharing policy (Kruchi, Jensen, Vejahra, 2020). Therefore, some researchers have considered the interrelationship between leverage and dividends are very important and have done some researches on this. For example, Kim et al. (2007) and Faulkender et al. (2006) have shown a significant positive effect of leverage on dividends. Findings from Persson(2014) showed a positive two-way causal relationship between total debt and dividends. However, based on the findings of VO & Nguyen (2014), there is a substitution relationship between leverage and dividends in the conflict-of-interest control mechanism. Ghasemi et al. (2018) who studied profit sharing, financial leverage and foresight of Malaysian companies also concluded that profit distribution is endogenous and has a positive and significant effect on companies' financial leverage, but at the same time, financial leverage has had a negative effect on the distribution of corporate profits. According to the above, the following hypotheses are expressed in relation to the relationship between these two variables:

Hypothesis 5: Increasing financial leverage leads to a significant simultaneous increase in dividends by the stock exchange company.

Hypothesis 6: At the same time, increasing dividends will increase financial leverage in companies listed on the Tehran Stock Exchange Organization.

3. Development of Research Model and Method

In terms of research method, this research is included in the category of descriptive research. The design of this research is using a post-event approach. In terms of the purpose of this research, this research is among the applied researches. As explained in the previous sections, dividends and leverage are governance mechanisms and have alternative or complementary relationships (Setia et al., 2009) and also both of these tools have reciprocal relationships with the company's profitability (Ghasemi et al., 2015). In this research, in

order to find their simultaneous mutual relations, the system of equations and methods of three-stage least squares and two-stage least squares (3SLS, 2SLS) will be used. In this research, the period of 2013 to 2018 has been considered for review. The active companies listed on the Tehran Stock Exchange organization constitute the statistical population of the present study. Due to some inconsistencies among members of the community, the following conditions were considered for the selection of the research sample and the sample was selected in the following purposeful way:

1) The sample does not include companies such as financiers, investors and insurances
2) Sample companies with fiscal year ending the end of the calendar year (March 20)
3) The research variables data should be available for the companies in question
4) The company's shares have been traded during the years of the research period

The statistical model used in this study is structural equations modeling using cross-sectional data. The present structural model consists of three multivariate regression relationships. To examine the interrelationships, the variables are divided into two groups: endogenous and exogenous. An exogenous variable is a variable that does not accept any effect from other variables within the model and affects endogenous variables. Therefore, it has a one-way relationship. Endogenous variable is a variable that is affected by other exogenous and endogenous variables and affects other endogenous variables. Therefore, it has a two-way relationship. As a result, the separation of variables as independent and dependent variables loses its validity (Taghizadeh,Khaneghah and Badavarnandhi, 2015). In general, to estimate simultaneous equation systems as different estimators, using both 2SLS and 3SLS methods would be a common approach among researchers who study the simultaneous effects between financial factors, dividends and leverage (Ghasemi et al., 2018).

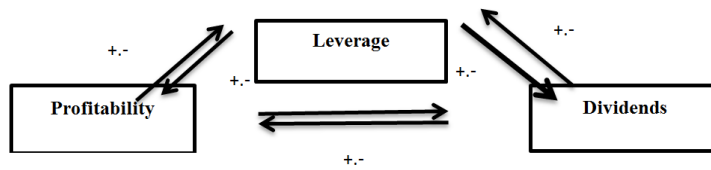The conceptual model of the research is shown in the diagram of Figure (1):

Figure (1): Potential interactions between variables

Therefore, in this research, an equation system will be used to examine the conceptual model.

$$Leverage_{it} = \alpha_1 + \beta_1 Profitability_{it} \\ + \gamma_1 Dividends_{it} + \beta_2 Liquidity_{it} \\ + \beta_3 Size_{it} + \beta_4 Reputation_{it} \\ + \beta_5 Asset\,Tan_{it} + \beta_6 Grow_{it} \\ + \beta_7 MB_{it} + \beta_8 INS_{it} + \varepsilon_{it}$$

$$Dividends_{it} = \alpha_1 + \beta_1 Profitability_{it} \\ + \gamma_1 Leverage_{it} + \beta_2 Liquidity_{it} \\ + \beta_3 Size_{it} + \beta_4 Reputation_{it} \\ + \beta_5 Asset\,Tan_{it} + \beta_6 Grow_{it} \\ + \beta_7 MB_{it} + \beta_8 INS_{it} + +\varepsilon_{it}$$

$$Profitability_{it} = \alpha_1 + \beta_1 Leverage_{it} \\ + \gamma_1 Dividends_{it} + \beta_2 Liquidity_{it} \\ + \beta_3 Size_{it} + \beta_4 Reputation_{it} \\ + \beta_5 Asset\,Tan_{it} + \beta_6 Grow_{it} \\ + \beta_7 MB_{it} + \beta_8 INS_{it} + \varepsilon_{it}$$

Where in:

Leverage: To measure the financial leverage of companies, the ratio of total balance sheet liabilities to total book assets of companies at the end of the fiscal year has been used (Pradipta and Handayani, 2020; Jozef and Paais, 2020). **Profitability**: To measure the profitability of companies, the equity return index has been used. Based on the theoretical principles, it is equal to the ratio of net profit to total equity of the company at the end of the fiscal year (Susanti et al., 2020; Ghasemi et al., 2018). **Dividends**: Dividends in

the present study are equal to the ratio of dividends per share at the end of the fiscal year (Pradipta and Handayani, 2020; Ghasemi et al., 2018).

Control variables
Liquidity: it is equivalent to the ratio of the difference between current assets and current liabilities to the total assets of the company at the end of the fiscal year (Rumasukun et al., 2020; Marjohan and Arsid, 2020). **Company Size**: it is equal to the natural logarithm of total company assets at the end of the fiscal year (Jozef and Paais, 2020; Krisnawati, 2019). **Reputation of the Company**: it is equal to the number of years of admission of the company in the Tehran Stock Exchange Organization (Mehmood et al., 2019; Flavin et al., 2018).

Asset Tangibility: it is the ratio of tangible assets to total assets of the company at the end of the fiscal year (Saona et al., 2020; Fajaria et al., 2018). **The Company's Growth**: it is the ratio of changes in sales to total first sales of the company at the end of the fiscal year (Astakoni et al., 2019; Rajorma et al., 2019). **Growth Opportunities** (MB): it is the ratio of stock market value (number/stock price) to the book value of the company's total equity at the end of the fiscal year (Khan and Ahmad, 2017; Sudiani and Wiksuana, 2018). **Institutional shareholders** (INS): it is the ratio of shares owned by institutional shareholders at the end of the financial year (Rajorma et al., 2019; Wei and Paul, 2017).

4. Research Findings
Descriptive Statistics
According to Table (1), the minimum value for institutional shareholders is 0.055 and the maximum value is 1. The average institutional shareholder is obtained from the ratio of shares owned by institutional shareholders at the end of the fiscal year, which is collected for companies through major

shareholder notes that are above 5% and is summed up and is equal to 0.71. This indicates that the proportion of shares owned by institutional shareholders at the end of the fiscal year for the sample companies under survey is 0.71. The average reputation of the company is 17,472, which is obtained from the relationship between the numbers of years of admission of the company in the Tehran Stock Exchange Organization. Also, the standard deviation related to this variable is equal to 12.644. The ratio of the difference between current assets and current liabilities to the total assets of the studied companies at the end of the fiscal year is 0.345, which shows that 34% have liquidity, which is the ratio of the difference between current assets and current liabilities to total assets of the company at the end of the fiscal year. Also, the average equity return index for sample companies is 0.245, in other words, the average ratio of net profit to total equity of the company is 24%. The average growth of the company, which is obtained from the ratio of changes in sales to the total first sales of the company at the end of the fiscal year, is 0.18 for sample companies. Also, 62% of the average debt-to-asset ratio can be seen for the surveyed companies. The average dividend of the sample companies is 0.107, which shows that the dividend per share ratio at the end of the fiscal year for companies is 10% on average. The average company size for sample companies is 13.713 and the average ratio of stock market value (number/stock price) to the total book value of the company's equity at the end of the fiscal year is 0.445, which shows that 44.5% had a chance to grow. Also, the average ratio of tangible assets to total assets of the company at the end of the fiscal year for the sample is equal to 25%. Also, company reputation, company size and company profitability have the highest dispersion according to the amount of standard deviation, which indicates the difference in the selected samples.

Table (1): Descriptive analysis of quantitative research data

Variable (symbol)	Observation	Average	Minimum	Maximum	Standard deviation
Institutional shareholders	864	0.718	0.055	1	0.197
Company's reputation	864	17.472	1	18	1.644
Liquidity	864	0.345	0.0002	1.599	0.226
Profitability	864	0.245	-16.037	9.486	0.845
Company's growth	864	0.183	-0.898	4.651	0.413
Leverage	864	0.623	0.090	2.224	0.225

Variable (symbol)	Observation	Average	Minimum	Maximum	Standard deviation
Size of the company	864	13.713	10.031	19.050	1.282
Dividends	864	0.107	0.0002	0.881	0.120
Growth opportunities	864	0.445	-1.084	1.550	0.249
Tangible assets	864	0.252	0.018	0.838	0.166

Reliability Test of Research Variables

Not having reliable variables, whether in the case of time series data or composite data, causes the problem of pseudo-regression. If the model in question is a compound data type, two of the classical hypotheses of linear regression, which include autocorrelation, will also be tested. In order to determine the reliability of the data, we used Levin Test and Watson Camera Statistics to determine the correlation. In addition, the Fisher Test was used to examine the significance of the whole pattern. The results in Table (2) show that the significance level of the Levin test is less than 5%. Therefore, all variables are reliable.

Table (2): Durability Test of research variables

Variable (symbol)	Observations	Levin, Lin and Chou Statistics Amount	Levin, Lin and Chou Statistics Probability
Institutional shareholders	864	-50.543	0.000*
Company's reputation	864	-16.255	0.000*
Liquidity	864	-46.777	0.000*
profitability	864	-36.547	0.000*
Company's growth	864	-52.929	0.000*
Leverage	864	-44.979	0.000*
Size of the company	864	-14.630	0.000*
Dividends	864	-54.220	0.000*
Growth opportunities	864	-33.900	0.000*
Tangible assets	864	-8.45	0.000*
*Significance at 95%, **Significance at 90%			

Simultaneous Skew Test (intra-trans and exogenous test)

Given that the coefficient of residual sentences in Table (3) is significant for all three relationships in the model; all three relationships have simultaneous skewed. At the same time, the existence of a skew violates the classical assumption of covariance equal to zero. Therefore, the ordinary least squares method cannot be used to estimate these relationships. Table (3) shows the results of endogenous testing between the main variables based on the DWH test. For endogenous testing, each pair of principal variables in each model is tested. Each of the two dependent variables in each model must be examined to determine if they are endogenous. For example, Model 1 consists of three equations, which are dependent variables of profitability, dividends and leverage.

Therefore, three pairs of variables must be tested. In the first stage, being endogenous between leverage and profitability should be tested. In the second stage, being endogenous between leverage and dividends should be tested and in third stage, it should be tested between dividends and profitability. As can be seen in this table, the results also show that financial leverage, profitability and dividends are endogenous. In addition, the first, second, and third tier results show that profitability and dividends are endogenous variables.

Table (3): Wu Hausman's camera endogenous test

	Financial leverage endogenous test	Profitability endogenous test	Dividend endogenous test
Financial leverage and profitability	8.250 0.000*	53.740 0.000*	31.907 0.0001
Financial leverage and dividends	19.401 0.000*		54.654 0.000*
Profitability and dividends		3.720 0.000*	23.655 0.000*

SarganTest to Check Identified Limitations:

In order to check the validity of the instrument matrix, we have used Sargan Test in this research. Since in the equations of each model, the number of exogenous variables is greater than the number of endogenous variables, so to check the identified limitations, it is necessary to use Sargan-HansenTest. Since in the present study, the interrelationship is considered, as a result, it is not possible to use the ordinary least squares estimation method; But the methods of estimating the two-stage least squares equation system (2SLS) and the three-stage least squares equation system (3SLS) are applicable (Namazi and Shokrollahi, 2014); Therefore, in the following, the research hypotheses are examined using the mentioned methods. To test the first to third hypotheses of the research (study of the simultaneous interactions of financial leverage, profitability and dividends), we used system of simultaneous equations. The results obtained from solving simultaneous equations are presented in Table (4), which indicates the validity of the three estimation models.

Table (4): Identifying Limitations

	First model	Second model	Third model
3SLS	Chi-sq=1238.58	Chi-sq=85.78	Chi-sq=838.64
	ρ-value=0.000	ρ-value=0.000	ρ-value=0.000
2SLS	Chi-sq=174.70	Chi-sq=1.72	Chi-sq=12.27
	ρ-value=0.000	ρ-value=0.100	ρ-value=0.000

Testing Research Hypotheses using the 3SLS and 2SLS equation system

In this section, the results of the three-equation system for each of the equations are reported separately based on two methods of 2SLS and 3SLS. The results for the variables of profitability, dividend and financial leverage are presented in three separate sections.

A) After solving equations system, based on the profitability equation, the effects of dividend and financial leverage on profitability, which is related to the first and third hypotheses, are determined. The profitability equation is again mentioned below

$$Profitability_{it} = \alpha_1 + \beta_1 Leverage_{it} + \gamma_1 Dividends_{it} + \beta_2 Liquidity_{it} + \beta_3 Size_{it} + \beta_4 Reputation_{it} + \beta_5 Asset\ Tan_{it} + \beta_6 Grow_{it} + \beta_7 MB_{it} + \beta_8 INS_{it} + \varepsilon_{it}$$

Table (5): Estimated coefficients for the profitability variable

Variable	Symbol	3SLS		2SLS	
		Coefficient	Statistics z	Coefficient	Statistics z
Constant amount	C	0.270*	5.04	-0.167	-0.52
Financial leverage	Lev	0.001*	3.59	0.147*	2.12
Dividend	Div.	0.086*	4.59	0.082*	4.01
Company's growth	Grow	0.144	2.09	0.145*	2.09
Size of the company	Size	0.010	0.85	0.020	0.88
Growth opportunities	MB	1.128	1.12	0.132	1.15
Liquidity	Liq.	-0.095	-0.66	-0.091	-0.62
Company's reputation	Rep.	0.001	0.59	0.001	0.66
Institutional shareholders	Ins.	0.136	0.95	0.152	1.04
Tangible assets	Asset	-0.368**	-1.89	-0.353**	-1.78
RMSE		0.639		0.843	
Determination coefficient		0.090		0.013	

Note: **, * is statistically significant at the level of 0.05 and 0.01.

Table (5) shows the 2SLS, 3SLS findings for the profitability equation. According to the findings of 3SLS, it can be seen that dividends have a positive and significant relationship with profitability. Financial leverage also has a positive relationship with profitability. Being positive and significant means that as profitability increase, so the financial leverage will increase, too. As a result, it is found that the results using the three-stage least squares equation system

(3SLS) method indicate a positive and significant effect of profitability on financial leverage. Also, according to the results of estimating the profitability equation, dividends have a positive and significant relationship with profitability. Therefore, the significant relationship between financial leverage and payable dividends with profitability is also confirmed using the three-stage least squares equation system (SLS3). The positive and significant nature of this variable, in addition to confirming the concurrence of the relationship between dividends and profitability, means that an increase in dividends will increase profitability. The results using the two-stage least squares equation system (SLS2) method show a positive and significant effect of profitability on financial leverage. Also, according to the results of estimating the profitability equation, we find that the variable coefficient of dividends using the two-stage least squares equation system (SLS2) is also positive and significant. Large companies, due to having higher social participation than smaller corporations, may have greater reputation and legitimacy in society. They are less likely to voluntarily disclose information in

order to increase capital (Deeganet al., 2000). Therefore, more profitable companies can be expected to disclose more social and environmental information. Managers of companies with high debt are more likely to pay attention to the side effects of environmental disclosure. And also by expanding the distribution of ownership, the level of social and environmental disclosure of companies increases (Cormier et al., 2011).

B) After solving the equation system, based on the payroll equation, the effects of profitability and financial leverage, which are related to the second and fifth assumptions, are determined. Again, dividend equation is provided as follows:

$$Dividends_{it} = \alpha_1 + \beta_1 Profitability_{it} + \gamma_1 Leverage_{it} + \beta_2 Liquidity_{it} + \beta_3 Size_{it} + \beta_4 Reputation_{it} + \beta_5 Asset\,Tan_{it} + \beta_6 Grow_{it} + \beta_7 MB_{it} + \beta_8 INS_{it} + \varepsilon_{it}$$

Table (6): Estimated coefficients for the dividend variable

Variable	Symbol	3SLS		2SLS	
		Coefficient	Statistics z	Coefficient	Statistics z
Constant amount	C	0.270*	5.04	-0.167	-0.37
Profitability	Perf.	0.004**	1.66	0.038*	3.93
Financial leverage	Lev	-0.463*	-11.00	0.007*	2.22
Company's growth	Grow	0.034*	3.60	0.034*	3.59
Size of the company	Size	0.010*	6.17	0.011*	3.54
Growth opportunities	MB	-0.004	-0.29	-0.004	-0.26
Liquidity	Liq.	-0.127*	-6.35	-0.126*	-6.28
Company's reputation	Rep.	-0.0007*	-2.29	-0.0006*	-2.20
Institutional shareholders	Ins.	0.085*	4.39	0.087*	4.34
Tangible assets	Asset	-0.112*	-4.21	-0.110*	-4.09
RMSE		0.114		0.115	
Determination coefficient		0.492		0.091	
Watson Camera		-		-	
F Statics		-		-	
Significance of F Statics		-		-	

Note: **, * is statistically significant at the level of 0.05 and 0.01.

Table (6) shows the findings of 2SLS, 3SLS for the dividend equation. According to the 3SLS findings, it can be seen that profitability has a positive relationship with dividends. Financial leverage also shows a

negative and significant relationship with dividends. The negativity and significance of this coefficient means that as the dividend increases, so does the financial leverage. Also, according to the results of

estimating the profitability equation, we find that the coefficient of profitability using the two-stage least squares equation system (2SLS) is also positive and significant at the 90% confidence level. The positive and significant nature of this variable, in addition to confirming the concurrence of the relationship between profitability and dividends, means that increasing dividends will increase profitability. Two-stage (2SLS) indicates the positive and significant effect of profitability on dividends. The age of the company is the governor's criterion of the company's reputation in capital structure models. El et al. (2004) stated that firm age is positively associated with long-term debt and negatively correlated with short-term debt. The results of studies by GhalibafAsl and Izadi (2009) also show a negative relationship between company size and capital structure. According to the parallel model, the ability to view a company's assets can indicate agency costs and financial turmoil costs. When a company's tangible assets are large, these assets can be used as collateral and reduce the risk of representing the lender's debt costs. Therefore, the more tangible assets a company has, the greater its financial leverage. According to the hierarchical model, the higher the amount of tangible fixed assets of a company, the less information asymmetry between managers and external investors of the company will occur. And such companies are more inclined to issue shares. Therefore, there is a negative relationship between tangible fixed assets and debt

ratio (Kurdistani&NajafiOmran, 2008). The amount of tangible fixed assets somehow indicates the company's debt capacity. These assets are easy to pledge and will be less valuable than other corporate assets in the event of a bankruptcy crisis. In addition, the existence of tangible fixed assets prevents shareholders from easily replacing low-risk assets with high-risk assets (Kimiagari&Einali, 2008). Larger companies have more bargaining power when using debt and can reduce the transaction costs associated with issuing long-term debt. Larger companies, on the other hand, have more shareholder diversity, which results in less control over management. And then, management is more likely to incur debt to reduce the risk of personal loss from bankruptcy (Kurdistani and NajafiOmran, 2008).

C) By solving the equation system, the results obtained for the financial leverage equation will help us to reject or accept the fourth and sixth hypotheses that dealt with the effect of profitability and interest on financial leverage. The equation under study is reintroduced in the system of equations below

$$
\begin{aligned}
Leverage_{it} = \alpha_1 &+ \beta_1 Profitability_{it} \\
&+ \gamma_1 Dividends_{it} + \beta_2 Liquidity_{it} \\
&+ \beta_3 Size_{it} + \beta_4 Reputation_{it} \\
&+ \beta_5 Asset\ Tan_{it} + \beta_6 Grow_{it} \\
&+ \beta_7 MB_{it} + \beta_8 INS_{it} + \varepsilon_{it}
\end{aligned}
$$

Table (7): Estimated coefficients for the financial leverage variable

Variable	Symbol	3SLS		2SLS	
		Coefficient	Statistics z	Coefficient	Statistics z
Constant amount	C	0.270*	5.04	0.275*	4.93
Profitability	Perf.	-0.548*	-8.92	0.039	4.03
Dividend	Div.	0.681*	68.71	0.008*	2.67
Company's growth	Grow	-0.023*	-1.98	0.023*	-1.98
Size of the company	Size	-0.010	-2.60	0.010	-2.60
Growth opportunities	MB	-0.037**	-1.90	0.037*	-1.90
Liquidity	Liq.	0.835*	33.04	0.837*	32.87
Company's reputation	Rep.	0.001*	3.62	0.001*	3.59
Institutional shareholders	Ins.	0.122*	4.85	0.121*	4.80
Tangible assets	Asset	0.323*	9.52	0.323*	9.46
RMSE		0.144		0.145	
Determination coefficient		0.588		0.588	

Note: **, * is statistically significant at the level of 0.05 and 0.01.

Table (7) shows the findings of 2SLS and 3 SLS for the financial leverage equation. According to the findings of the three-step equation system (3SLS), it can be seen that the dividend ratio at the level of 0.01 is positive and significant. According to the results of estimating the financial leverage equation, it can be seen that in this equation, the coefficient of variable profitability is negative and ρ-value is 0.000. Therefore, in the first equation, the profitability variable is significant at the 95% level. Negative and significant of this coefficient means that with increasing profitability, financial leverage also decreases. As a result, it is found that the results using the three-stage least squares equation system (3SLS) method indicate a negative and significant effect of profitability on financial leverage. Also, according to the results of estimating the financial leverage equation, we find that the variable coefficient of dividends using the two-stage least squares equation system (2SLS) is also positive and significant. The positive and significant nature of this variable, in addition to confirming the concurrence of the relationship between dividends and financial leverage, means that increasing dividends increases the use of more financial leverage. As a result, a decrease or increase in the company's sales can be an effective factor in reducing or increasing the company's

leverage. Also companies that have a high tangible fixed asset ratiohave high borrowing power due to the high collateral value of fixed assets and the reduction of debt default risk. Return on assets is a measure of a company's profitability. This ratio indicates the efficiency and effectiveness of the company in using the assets under its ownership. Researches by Titman &Wassel (1988) and Rajan&Zinglas (1995) have shown that according to hierarchical theory, when a firm's profitability increases, managers prefer financing through the company's internal resources to external sources. On the other hand, according to research by Müller and Modigliani (1963) and Danbolt et al. (2000) profitable companies due to their ability to cover the cost of interest on loans may prefer debt to issuing shares because its role as a tax shield. Companies with high growth opportunities are willing to finance through the issuance of shares. Tui et al. (1974) showed that growth in assets increases corporate debt. On the other hand, because large companies have a high degree of diversification, they are less likely to go bankrupt. The expected low cost of bankruptcy has enabled these companies to borrow at a lower cost. Finally, in Figure (2), the results are presented schematically and in a symbolic way to show the simultaneous interactions of variables.
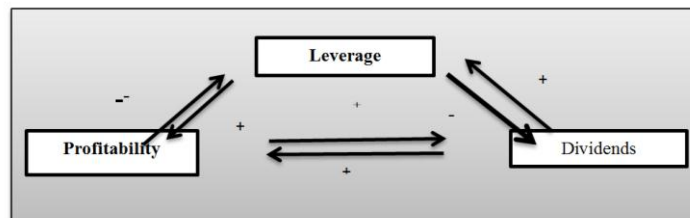

Figure (2): Simultaneous interrelationships between variables

Discussion and Conclusion

The results of the equation system based on both 3SLS and 2SLS models show that dividends payable have a significant positive effect on financial leverage, but these two methods do not report the same results on the effect of financial leverage on dividends. Due to the superiority of 3SLS results over 2SLS, the negative effect of financial leverage on interest paid is interpreted.This means that managers do not view the use of these two tools (financial leverage and dividend) to solve the agency problem. Managers

consider the use of high financial leverage to be sufficient to resolve conflicts of interest, and when they increase lending, they have shown their financial discipline and therefore do not need to gain more trust by distributing cash dividends among shareholders. But even with the increase in dividends, managers are still willing to take foreign facilities to solve the agency problem and try to use financial leverage as a complementary method alongside dividends. On the other hand, when more interest is paid, foreign financing is needed to carry out future projects and

development projects. However, obtaining foreign facilities reduces the company's financial ability to pay dividends among shareholders, which is predictable due to the payment of installments at the time of commitment, as well as loan agreements. The fact that dividends alone are not a complete way to solve the problem of representation in Iran can be rooted in the country's tax laws, which logically does not harm shareholders from receiving dividends and does not require the payment of tiered taxes as in many developed countries. Therefore, the use of dividends paid by managers to solve the problem of agency has diminished, and therefore managers with external financing also try to send the message to shareholders that they have secure future projects and have financial discipline. Of course, among stock exchange companies, dividend has a high sensitivity that managers prefer not to reduce it in any way possible. The significant positive effect of paid dividends is consistent with the results of research by Ghasemi et al. (2018) and Pearson (2014) in Malaysia and Sweden, respectively. But the negative effect of financial leverage on paid dividends is only similar to research conducted in Malaysia. It indicates that the simultaneous interactions of these two variables in different countries can be different according to laws and regulations, ease of foreign financing and other economic conditions.

Examining the simultaneous relationship between profitability and financial leverage also showed that according to both models (2SLS and 3SLS) financial leverage option leads to a simultaneous increase in profitability. However, the results of the 3SLS method show that increasing profitability will have a negative effect on financial leverage. In fact, when companies generate more returns, the desire of managers to obtain facilities will decrease. This can be related to the inflow of sufficient cash flow into the company and the hierarchical theory of financing, which prefers domestic financing. Also, the finding that financial leverage simultaneously increases the company's return is also interesting in its own way and indicates that the managers of listed companies try to get loans taken in short-term projects or projects that its efficiency will be determined in the short term. On the other hand, by increasing the profitability of the company, the managers themselves bring the necessary message to the shareholders and there is no need for the managers to try to show that the third

party, as a lender, monitors the selection of their projects and then he lends them. In fact, they consider themselves worthy of trust by increasing their profitability.

Also according to 2SLS and 3SLS results, it can be seen that dividends have a positive and significant two-way relationship with profitability. This means that as soon as the company's profits increase, the directors distribute more of the profits among the shareholders, which indicates that they prefer to solve the agency problem generated by the extra free cash flow by dividing among the shareholders. On the other hand, perhaps in terms of the negative effect of increasing returns on financial leverage and its positive effect on dividends, which has been significant in the market as a whole, it can be said that managers of Iranian stock companies are not willing to invest long-term and risk project selection and they follow short-term perspective. It is also interesting to note that paying more interest leads to higher profitability, which can be rooted in two facts. As a primary reason, it can be mentioned that most stock exchange companies are in their maturity period and pay profit by ensuring the cash flow produced by the company. And when they pay more profit, their accumulated profit decreases and as a result, more profitability is shown. On the other hand, higher dividends cause managers to pay more attention to the company's costs and operating activities, which will also lead to greater profitability.

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