The Impact of Option Contract and Embedded Equity Put Option on the Synchronicity of Stock Return/s Considering the Moderating Role of Financial Leverage and Using Difference-in-Difference Approach

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ABSTRACT

Derivative instruments are regarded as a basic need of investors and portfolio ,managers in the capital market whereby they can cover their portfolio risk from price fluctuations. Among the derivative instruments, index-based derivative instruments are a .type of instruments that allow investors to insure against systemic riskThis function is particularly necessary for encouraging foreign investors to invest .in a highly volatile countryThese functions have been the source of the highly significant trading of these .instruments in reputable stock exchanges this study examines the impact of options contracts and ,Therefore embedded equity put options on the synchronicity of the stock return by considering the moderating role of financial leverage and using the Difference-in- .Difference approach A sample of 112 companies from Tehran Stock Exchange was selected using .the sampling method This research was conducted in Tehran Stock Exchange for the period .٢٠١٨-٢٠١٣The statistical method used in this research is "Difference-in-Difference". The results of this study showed that: 1) The decrease in the synchronicity of the stock return for companies that issued embedded equity put option was more than the companies that issued options contracts; .2) The fall in the synchronicity of the stock return occurs more rapidly in companies that issued embedded equity put options and with higher trading leverage ratios.

Keywords:

1. Introduction

As the purpose of investment in the stock exchange is acquiring a good return, preparing a good ground for the extensive participation of different groups of investors, and then getting the trust of people, consolidating the market and deepening it will bring about the most fundamental instruments for economic development. A requirement for the capital market to act efficiently concerning the optimum allocation of resources is the existence of various securities. Thereby, the majority of the reputable stock exchanges across the world provide different securities and as a result, investors have got the chance to invest in these securities in accordance with their preferences about risks and returns (MacKenzie, Donald and Millo, Yuval 2001)

Embedded equity put options are regarded as an instrument through which the company's share is insured against negative fluctuations and losses. Due to his/her knowledge of stocks and their capabilities, the blockholder issues embedded equity put options of his/her firm, if the price of the share is lower than the one agreed upon on the strike date, the loss of the one having purchased the said instruments will be compensated (Ge, L., Lin, T.C., & Pearson, N.D 2016). For what mentioned, the present study attempts to illustrate what is the role of derivative financial instruments in the stability of financial markets, and accordingly, it lets actors and lawmakers understand the part of this innovative instruments better and more clearly. And thus, derivative financial instruments (options contracts and embedded equity put options), together with the synchronicity of the stock return as some evidence taken from Tehran Stock Exchange were chosen to make the topic of the present work. Furthermore, in order to provide some useful instructions plus good suggestions for investors allowing them to gain the highest return during the similar time eras, some experimental investigations and practical scientific examinations were carried out on the information belonging to several years of Tehran Stock Exchange work.

The rise of trading of different securities improves the efficiency of the stock exchange, and this in turn suggests that the public trust in the stock exchange has increased. In stock exchanges of different countries, the chief purpose of the issuer with such securities is acquiring profits (Ge, L., Lin, T.C., & Pearson, N.D, 2016).

In Iran such instruments are issued for supporting the market, lowering the risks of investors and encouraging them to purchase more stocks. Whether the issuance and employment of these securities are increased, and if stockholders welcome them, it adds to the market boom and brings a bigger number of potential shareholders to the markets (the ones are ready to invest in case risks of investments are lessened). The boom of the stock market leads to the economic development of the state, and whether the attraction of resources is facilitated, investment and growth of economic firms will be promoted, and they, in turn, raise the level of employment and social welfare (Khozin, 2017).

The synchronicity of stock return is a scale for measuring the relative amount of frim-specific information reflected by the return; put it differently, the synchronicity of the stock return is a domain inside which the return of the market and industry explains the difference in the stock return across the firm.

As these derivative securities are quite new in Iran, some few research has been conducted in this regard. The present work deals with derivative financial instruments (options contracts and embedded equity put options). Here a single significant variable, i.e., the stock return was chosen to be investigated though different factors are possible to contribute to the volume and number of transactions and the boom of the derivative financial instrument (options contracts and embed equity put options). Therefore, this study, considering the moderating role of financial leverage and using the Difference-in-**appro Difference**ach, deals with the impact/s of options contracts and **embedded equity put options on the .synchronicity of stock return** The research goes on introducing theoretical foundations, reviewing the related literature and elaborating on its method and hypotheses [adopted from its question and theoretical foundations], and then explains the results of the hypotheses tests, and finally, concludes and provides some suggestions.

2. Theoretical Foundations and Literature Review

The option contract is a type of contract concluded between two parties, and then, an amount is paid to issuer of the option contract by the purchaser that indeed is [named] the premium. In return for this rate,

the purchaser of the option contract gets the right to buy from the issuer a specific part of some goods or a part of a future contract concluded around some goods with a strike price and an expiry date in the future (as specified through the options contracts). It is noteworthy that the decision for purchasing or selling goods or future contract lies with the purchaser of the option contract, and the issuer of the option is supposed to follow any decision made by the purchaser; and if the purchaser feels that the use of the option contract bears her/him no profit, s/he is authorised to put aside the option contract at any time. In the present work, derivative financial instruments, including option contract and embedded equity put option, form a kind of financial instrument for the management of risks issued together with the stock; it provides its holder, as the "*owner of the option* "with some rights against the seller of these instruments as the "committed party". It is also possible to provide the issuer, as the "*option owner* "with some rights against the owner of the securities as the "*committed party*". Embedded options are a part of basic instruments (such as bonds and stocks) and can't be purchased and sold; besides, they have no secondary market. However, embedded options impact the market price of bonds or the stock that they are a part of which or issued on their basis.

In Iran, option contract and embedded equity put option are issued and sold with the permission of the Tehran Stock Exchange Organisation and by applicant companies.[1] The embedded equity put options is a financial instrument employed for covering risks and for ensuring stocks against the price decrease of firms ' stock in the Tehran Stock Exchange. The embedded equity put option is a less known financial instrument for the management of risks. However, as mentioned earlier, this type of options contracts is principally utilised for bonds, and also for stocks. These instruments have similar examples in other markets. Concerning the essential function of these derivative financial instruments, two utterly opposite perspectives exist. According to the negative perspective, as these instruments build confidence about the price support provided by the issuing company or the seller, they reduce the pace of market actors in transferring the information influencing the frim's stock price from the company to the market, and accordingly, it makes the stock get away from its essential price; in addition, it is possible to create instability in the market. The present

mechanism of issuing derivative instruments, though reducing the risks of micro-shareholder in the short-run, adds to the risks of the issuing company, an act that can reduce the profitability of the company in the long run. The cause of what mentioned is that if the price of the stock goes lower than the price agreed upon or the strike price, the company will sustain losses. Contrary to the negative perspective, the positive one states that derivative financial instruments strongly insure the investment in stocks, and their issuance sends this positive signal to the market that the firm-specific information is reflected by the price of the stock in the market. The existence of such opposite approaches has led theoreticians and professionals to critically attend to this financial product and introduce it as a part of the market essence. The present study explores positive dimensions of derivative financial instruments by examining whether such instruments cause a better reflection of firm-specific information in the firm's stock price or not. It specifically deals with the fact that how the issuance of such instruments is the cause of attribution of a firms 'stock price fluctuation to firm-specific information (non-systematic risk) rather than to market-related factors (systematic risk). This study helps us illustrate the role of derivative financial instruments in bringing stability to financial markets, besides, it helps actors and lawmakers understand the part of the innovative financial instruments. On the other hand, the financial economy literature has widely used the synchronicity of stock return as the criterion for measuring the firm-specific information reflected by the stock price[2]. This criterion demonstrates how much the changes in the stock return is attributed to the changes in the market return. Roll (1988) argues that less than 40 percent of the changes in stock price are explained by the systematic risk, and the remaining are caused by the changes in the firm-specific information. The results of some studies suggest that the increase in the amount of firm-specific information reduces the synchronicity of the stock return. As with the increase of firm-specific information, market activists and investors, considering this information, change their trading position and as a result, the stock price is moderated, and then, what mentioned reduces the stock's correlation with the market return. In other words, the synchronicity of the stock return decreases (Ferreira, Laux 2007 ,Crawford et al. 2012, Dehong et al. 2019). This experimental background principally

motivated the authors of this work to measure the impact of derivative instruments on the synchronicity of the stock return of the firms admitted to Tehran stock exchange. Through this study, researchers attempt to answer the key question that "whether do derivative instruments [examined here] increase the firm-specific information impacting stock price? And does this function reduce the stock price?

3. Literature Review

Julian Bye et al. (2017) deal with the impact of credit default swaps on the synchronicity of stock return in Shanghai Stock exchange. They have used Crawford model (2012). The results of their study showed that the issuance of swap financial instrument reduces the synchronicity of the stock return, and the higher the debt rate of companies, the more the said reduction.

Saberamanian (2014) studied the effect of the contract index futures on the fluctuation of the total share of the companies present in the Dow Jones Industrial Average list (DJLA). The study was conducted through GARCH method. The results of research suggest that the sale of index futures has had no impact on the daily fluctuation of the share of the companies existing in the index prior to and following the period of sale of index futures.

In their research, Karjounapa and Afzal (2007) measured the impact of the *CNXIT* secondary market index futures sale on the synchronicity of the stock return. They found that the fluctuation of the price of the basic stock increases in an unexpected manner by the start of issuing the index future contract. Their results have been contrary to the results of other research. Dealing with this contradiction, they found that the secondary index of the market has always had a different behaviour in the Indian Stock Exchange. As they had reached results different from those of others, they concluded that they ought to expand the domain of their research to other main indices, moreover, they should increase their precision in choosing research samples and method.

Shambargarman (2003) examined the effect of the futures contract and Nifty Index premium on the size of the stock's fluctuations domain. The results of this research show that the synchronous issuance of the futures contract and options contract has no significant relationship with the fluctuation of the basic stock. Furthermore, the said work measured the impact of these two derivative financial instruments on the

fluctuations in the return of the basic stock but found no evidence on the significant impact of the future market variables on the cash market.

Chiang and Wang (2002) analysed the impact of future contracts on the control of the fluctuations in the stock price in Taiwan [Cash] Stock Exchange. Their study included the analysis of the impact/s of the macroeconomic variable and asymmetric information on the fluctuations of the stock price. The experimental results showed that the issuance of the future contract leads to the control of fluctuations of the stock price, but they do not affect the reduction of asymmetric information.

In a research titled "The Impact of Stock Return and Fluctuation of Stock Exchange Index on the Volume of the Trading of Embedded Equity Put Options", Rahimian et al. (2109), relying on the past research results and the results of statistical analysis, found that when the return of the stock of these firms is good and positive, shareholders, due to the higher risks of investment, prefer to purchase embedded equity put options in Tehran Stock Exchange to hedge their stocks against the risks caused by investment though expecting higher positive returns. However, large fluctuations in the Stock Exchange index is equal to big risks in the market, and in such a situation, shareholders prefer not to purchase embedded equity put options.

In his research titled the "Analysis of the Relationship between Dimensions of Stock's liquidity and the Amount of the Initial Sale of the Embedded Equity Put Options as a New Financial Instrumen", Khozin (2017), having carried out tests on his hypotheses, found no relationship between the stock price gap and the depth of the market and the embedded equity put options, although the relationship between the times of the stock trading and the amount of the sale of the embedded equity put options was positive and significant. The results of this study show that different from what is done in many other investment environments and research, in Iran, stockholders pay no attention to the liquidity of the stock while purchasing the embedded equity put options, and they usually buy these instruments only for covering risks.

Foroughi and Farjami (2015) performed research titled "The Impact of Price Synchronicity and Stock Return Fluctuations on Stock's Liquidity". The results of their work point to the positive impact left by the

synchronicity of the stock return and also the systematic fluctuation of stock return on the stock liquidity, but, these researchers maintain that unsystematic fluctuation negatively impacts the stock liquidity.

In his research "The Comparative Analysis of Options Contracts and Embedded Equity Put Options", Hooshmand (2015) points out that derivative financial instruments, as an innovation of financial markets, play an important role regarding the boom of the said markets. A highly important instrument here is the option contract, that compared to other derivative instruments, is more flexible. Thereby, it can better cover the risks created by price fluctuations. This paper, comparing the option contracts with embedded equity put options, deals with jurisprudential and legal challenges of this type of contract.

Hassanloo et al. (2015), in a work on the provision of accurate guidelines for pricing embedded equity put options, state that stock markets, because of the diversity of tools and their legal structure, provide many different instruments for the coverage of risks, and as a result, investors can properly benefit from these facilities. And thus, the present work attempts to explore one of such instruments provided by the stock market, i.e., options contracts, and how they are priced in reputed stock markets across the world, and then, they and their counterpart, and their pricing manner there and here are compared against each other. Finally, the research proposes some necessary guidelines in this regard.

4. Research Hypotheses

This study first introduces its position through hypotheses that are based on the existing related theories, and in the next steps, these hypotheses are practically analysed in order that their accuracy is defined.

In order to define the synchronicity of the stock return, this study employs R^2 criterion that shows how the firm's stock price moves with the market price. The stock price is determined using two factors of systematic risk (non-firm factors) and non-systematic risk (firm-specific information). The more the firm-specific information, the more the trust of investors in the stock price. Synchronicity applies to the relationship between the market return and the return

of the firm's stock. If there is a weak relationship between the firm's return and the market return (weak synchronicity), it shows that more firm-specific information exists in the market and investors trust the firm's stock price more (Ferreira and Laux 2007).

On the one hand, as the embedded equity put options are issued by the firm issuing stocks, and as it provides purchasers with necessary guarantees, compared to option contracts issued by investors, they should enjoy more stability, and thus, according to the above argument, the first hypothesis is developed as below:

Hypothesis no. 1 The decrease in the synchronicity of stock return for the companies that issued the embedded equity put option was more than the companies that issued options contracts.

The second and third hypotheses deal with the question that whether the impact of derivative financial instruments (embedded equity put options and options contracts) on the synchronicity of stock return is equal in different firms or not. Via testing these two hypotheses, we are going to examine the stronger relationship between derivative instruments and the synchronicity of the stock return. During the analysis, the level of synchronicity decreased while more firm-specific information entered the capital market via issuance of embedded equity put options. In other words, the level of synchronicity of the firm's stock return can decrease the changes in the price of the stocks belonging to the companies from which more firm-specific information is flowed to capital market by means of issuance of the embedded equity put option. In this framework, Bushman et al. (2010) in research exhibited that there is more information of those firms with higher leverage ratios both in bonds markets and capital markets, and as a result, the price of these firms 'stocks is discovered more rapidly in secondary markets. Besides, this relationship is seen more in companies with greater credit risks. The logical conclusion here is that riskier firms have a greater tendency to control the fluctuation in the price of their stock in the market, as it is possible to convince loaners that all the final information affecting the stock price in the market is published. Thereby, the riskier borrowers are expected to be more inclined to attract the attention of loaners using derivative instruments and letting more information flow to the market based on the timely publication of information. It can thus be said, the companies with a higher

leverage ratio are riskier, and the issuance of derivative instruments [by them] is a proper message for the market that the price of their stock reflects the firm-specific information.

Accordingly, hypotheses no. 2 and 3 are presented as below:

Hypothesis no. 2: 2- Fall in the synchronicity of the stock return occurs more rapidly in firms issuing embedded equity put option and with higher trading leverage ratios;

Hypothesis no. 3: Fall in the synchronicity of the stock price occurs more rapidly in firms issuing options contracts and with the higher financial leverage ratio.

5. Research Method

In terms of the type of purpose, the present study is applied. The research was carried out through a deductive-inductive reasoning framework; two sections of theoretical foundations and literature review fall in the deductive side of the said framework (library studies, analysis of papers and websites are the means used for the development of these two sections); the collection of the data used for confirmation and rejection of hypotheses fall in the inductive of the framework. The information utilised by the present study include financial statements and the notes appended to them, moreover, the initial information on the Stock Market Board (collected by Rah Award Nowin Software and the data bank of the Stock Exchange Statistics office) were employed.

those companies admitted to Tehran Stock Exchange from 2013 to 2018 form the statistical society of the present work. The sample size was determined using systematic or purposive sampling and via elimination method considering the following terms:

Esfand (February 19th to March 20th) should be the end of the financial year of the firms; they should have been present in Tehran Stock Exchange for 6 years from 2013 to 2018; their financial statements should be available; they should have published the required information for measuring this variable of this research, and finally, according to the mentioned terms, 112 companies were selected as the statistical sample of this work.

5.1. Research Model and Variables
Dependent Variable
The synchronicity of stock return: measuring the synchronicity of the stock return in this study was done based on the model proposed by Crawford. According to this model, in the first step, for each year-firm, the below regression model is estimated. And according to the weekly data of the stock return, R^2 value is calculated. Crawford et al. model (2012) is as below:

$$R_{i,t} = \alpha + \beta_1 R_{m,t} + \beta_2 R_{1,t} + \prod_{i,t}$$

Where $R_{i,t}$ shows the stock return of the firm i in the week t, $R_{m,t}$ shows the weighted average of the market in week t and $R_{1,t}$ demonstrates the weighted average of the industry in the week t. $\prod_{i,t}$ refers to the accidental error of the return. Here, R2 value is restricted to the interval between 0 and 1, and thus, in order to reach a normal distribution and to extract the unlimited continuous variable, the logarithmic transformation of R2 was used. Therefore, in the second step, the estimation of R2 value was transformed to the return synchronicity for each firm's stock through the above-mentioned model as below:

$$SYNC = LN\left[R_i^2(1 - R^2)\right]$$

Through this transformation, the SYNC interval will extend from negative infinity to positive infinity. The bigger SYNC shows a bigger movement between the firm's stock return and the return of the industry or market, in other words, it shows a higher concurrency of the stock return.

Independent Variable
(SSS[3]) is the dependent variable and the criterion for issuance of derivative instruments; if its coefficient is statistically significant, it shows the positive and significant impact of derivative instruments on the synchronicity of stock return.

(If the company has issued embedded equity put options sale option, this variable is equal to 1, otherwise, it is equal to 0).

(STO[4]) is another independent variable and a criterion for issuance of the derivative instruments; if its coefficient is statistically significant, it shows the

positive and significant impact of derivative instruments on the concurrency of stock return.

(If the company has issued options contracts, this variable is equal to 1, otherwise, it is equal to 0).

The control variables of the research are the following:

Table no. 1: research control variables

Symbol	Variable	Measuring Method
LME	Firm Size	the natural logarithm of the market value of the firm i equity at the end of the year
LEV	Financial Leverage	the book value of total debts compared with all properties at the end of the year
MTB	Growth Opportunity	the ratio of the stock exchange to the book value of equities of firm i.
ROA	Firm Profitability	The ratio of the operational profit of the firm to the total properties of the company at the end of the year
EVOL	Income dispersion	Profit fluctuation that is measured through ROA standard deviation for 5 years.
VOLUME	Stock Trading Volume	The Average monthly logarithm of the number of stock's trading during 12 months of the year t
INDSIZE	Size of Industry Properties	Natural Logarithm of the total properties of the companies belonging to the firm i in the year t

Hypothesis no. 1 Test

Hypothesis no. 1 The decrease in the synchronicity of the stock return for companies that issued the embedded equity put option was more than the companies that issued options contracts.

Hypotheses no.2 and 3 Tests

Hypothesis no. 2: 2- The fall in the synchronicity of the stock price occurs more rapidly in the firm that issued embedded equity put options and with higher trading leverage ratios

Hypothesis no. 3: The fall in the synchronicity of the stock price occurs more rapidly for companies that have issued options contracts and with the higher financial leverage ratio.

The experimental method for testing the hypotheses of this research is a standard method called the examination of "Difference-in-Difference". The method is based on the outcomes of the observation done on the "behaviour change" of the experimental group and control group during two different time eras. The experimental group experienced a "behaviour", however, the control group doesn't undergo "it" during a similar period. In order to analyse the impact of "behaviour" in the experimental group, the difference is critically analysed. The difference includes the behavioural changes in the experimental group minus the behavioural shifts of the control group. Then, the correlation of "behaviour after making change" (an imaginary variable showing the behaviour of experimental and control groups) with "behaviour before change" (an imaginary variable

for showing the year before "change" (is calculated. In this research, "behaviour" means the issuance of subordinate securities sale option. The experimental group here are those firms that issued embedded equity put options. The control group in this study are the sample companies that issued derivative instruments in the year t. Besides, the difference in the behaviour in these two groups in the year t-1 is examined. The difference-in-difference includes the analysis of the behavioural differences in two groups in the years t-1 and t. The utilisation of the difference-in-difference examination not only eases the concerns around the changes of the behaviour in the experimental and control groups aroused by changes in the examined period but also eliminates the behavioural biases caused by fundamental behaviour differences of these two groups. This study has approved of the difference-in-difference method for the analysis of the impact of derivative financial instruments on the provision of the capital market with informativeness (the synchronicity of the stock return). The research model here is based on Scroft and Santos (2009) and Sarto and Towox (2013).

- ✓ The variable ($FCO_{i,t}$) introduces firm financial leverage and the interactive impact of the firm i's financial leverage in the year t. It is an inversion of the main variable, and if the firm has issued securities derivative instruments a year after year t, value 1 is specified for it.

6. Research Findings

The first hypothesis of the study states:

The decrease in the synchronicity of the stock return for companies issued embedded equity put option was more than the companies that issued options contracts.

According to the estimation, F value probability maintains that the whole model is statistically significant (for F probability is lower than %5).

Moreover, the probability of t-test for embedded equity put options is smaller than %5; therefore, the estimated Coefficient of the above variable is statistically significant.

Nonetheless, the coefficient of options contracts variable in the same time era has had no impact.

Thereby, it can be said that the decrease in the synchronicity of the stock returnin t he companies that

issued embedded equity put options was higher than the companies that issued options contracts.

The analysis on the impact of year factor using the difference-in-difference method:

It should be noted that in Iran, derivative instruments were first issued in 2013, and a year later in 2014, they were started to be employed. Therefore, here 2013 was neglected in the test examining difference-in-difference. As mentioned above, only in 2015 and 2016 the highest level of impact by embedded equity put option on the synchronicity of the stock return was observed, and thus, it can be stated that in 2015 and 2016, decrease in the synchronicity of the stock of the companies that issued embedded equity sale option, compared to those having issued options contracts, was higher.

Table no. 2: the results of the Difference-in-Difference Method

Variables	Estimated Coefficient	Standard Error	T-test value	T-test probability
ssso	-0.0540084	0.0098593	-5.480	0.0000
sto	0 (omitted)			
Impact of year factor				
2014	-0.0067292	0.0098593	-0.680	0.495
2015	-0.0392745	0.0098593	-3.980	0.0000
2016	-0.0227393	0.0098593	-2.310	0.0210
2017	-0.0091821	0.0098593	-0.930	0.3520
2018	**Omitted by the software because of high correlation**			
Fixed coefficient	0.117636	0.0069716	16.870	0.0000
Fischer F Value	13.740	**Fischer F Probability**		0.000

The second hypothesis is as below:

The fall in the synchronicity of the stock return occurs in firms that more rapidly issued embedded equity put option and with higher trading leverage ratios

According to the results of the estimation results, F value probability shows that the whole model is statistically significant (for F probability is lower than %5).

Besides, the probability of the t-test for the variable of embedded equity put options in firms with higher financial leverage is lower than %5, thus, the estimated coefficient of the above variable is statistically significant.

The variable FCO (introducing firm financial leverage and the interactive impact of the firm I's financial leverage in the year t. It is an inversion of the main variable, and if the firm has issued derivative

instruments in the year after t, number 1 is specified for it) has negative impact; accordingly, the ratio of higher financial leverage in the companies issuing embedded equity put options increases the synchronicity of the stock return.

Therefore it can be said that fall in the synchronicity of the stock rs more rapidly return occu in companies that issued embedded equity put option and with higher trading leverage ratios.

The analysis of year factor's impact using the difference-in-difference method:

It should be noted that in Iran, derivative instruments were first issued in 2013, and a year late, they came to be used in 2014; therefore, 2013 was neglected by the test examining difference-in-difference. As mentioned above, in 2014 and 2017, the level of impact by embedded equity put options on the

synchronicity of stock return was observed in the companies with higher leverage ratio, so, it can be stated that in 2014 and 2017, decrease in the synchronicity of the stock occurred more rapidly in the companies that issued embedded equity put option, and with higher financial leverage,

Table no. 2: the results of Difference-in-Difference Method

Variables	Estimated Coefficient	Standard Error	T-test value	T-test probability
fco	-0.8749594	0.1251307	-6.990	0.0000
sto	-1.337334	0.111603	-11.980	0.0000
Impact of year factor				
2014	-1.302256	0.1289713	-10.1	0.0000
2015	-3.902816	0.1115551	-34.99	0.0000
2016	-0.8791976	0.1288139	-6.83	0.0000
2017	-0.0495138	0.0096785	-5.120	0.0000
2018	Omitted by the software because of high correlation			
Fixed coefficient	-6.914191	0.0733208	-94.300	0.0000
Khei Du Wald Value in GLS Regression	1435.700	Khei Du Wald probability in GLS Regression		0.000

The third hypothesis of the study:

The fall in the synchronicity of the stock return occurs more rapidly in firms issued options contract and with the higher financial leverage ratio.

According to the results of the estimation, F value probability shows that the whole model is statistically significant (for F probability is lower than %5).

Besides, the probability of t-test for the variable of options contracts in companies with higher financial Leverage is lower than %5, therefore, the estimated coefficient of the above variable is statistically significant.

The variable FCO (introducing firm financial leverage and the interactive impact of the firm I's financial leverage in the year t. It is an inversion of the main variable, and if the firm has issued derivative instruments in the year after t, number 1 is specified for it) has a negative impact, therefore, the ratio of higher financial leverage in the companies issuing embedded equity put options increases the stock synchronicity level.

Following what mentioned above, it can be said that fall in the synchronicity of the stock return occurs more rapidly in companies that issued embedded equity put option and with higher trading leverage ratios.

The analysis of year factor's impact using the difference-in-difference method:

It should be noted that in Iran, derivative instruments were first issued in 2013, and a year later, they came to be used in 2014. So, 2013 was neglected by the test analysing difference-in-difference. As mentioned above, in 2014 and 2017, the level of impact by options contract on the synchronicity of stock return was observed in the companies with higher leverage ratio, and it leads us to say that in 2014 and 2017, decrease in the synchronicity of the stock occurred more rapidly in the firms that issued options contracts, and with higher financial leverage,

Table no. 3: the results of Difference-in-Difference Method

Variables	Estimated Coefficient	Standard Error	T-test value	T-test probability
fco	-0.0189237	0.0058208	-3.250	0.0010
sssso	-1.337334	0.111603	-11.980	0.0000
Impact of year factor				
2014	-0.0328478	0.0097744	-3.360	0.0010
2015	-0.0501074	0.009548	-5.250	0.0000
2016	-0.062092	0.0094689	-6.560	0.0000
2017	-0.0350367	0.008758	-4.000	0.0000
2018	Omitted by the software because of high correlation			

Variables	Estimated Coefficient	Standard Error	T-test value	T-test probability
Fixed coefficient	-5.576857	0.0989653	-56.350	0.0000
Khei Du Wald Value in GLS Regression	1435.7	Khei Du Wald probability in GLS Regression		0.000

7. Discussion and Conclusion

Nowadays, stock exchange includes some different transactions bearing the economy of the state diverse effects. Trading of securities enhances the savings of the state and liquidity of the private sector so that they can financially supply long-run investment projects. The important and determining factor of the stock exchange has led to the development of this market across the world and the establishment of the great stock exchange in Europe, the US and the Far East. Today, stock exchange acts as the heart of the world economy; in a manner that a small disorder in economic affairs soon impacts stock exchanges and moves billions of Dollars, Euros and Yens according to the wills of people and institutions. The stock exchange is a new institution that has unprecedentedly developed in recent decades; being equipped with electronic facilities and using computer and internet systems, it does thousands of transaction in a short time among people in different points of the world. Muslim countries also gradually have entered the field of stock exchanges, and invested in stocks, bonds, etc. The introduction of new tools for conduction of "trading of goods with specified rates in the future " and the importance of oil in the 20th century have turned oil trading instruments into a highly significant stock. Tehran Stock Exchange, having survived the events of the Islamic Revolution, started again after the war with Iraq. In recent years, it has gradually developed its domain of transactions and trading (both stocks and bonds), and now it has expanded inside the Iranian economy.

Analyses show that following the recent developments in the market and fall of the stock price, the ratio of short-term investors in the market has increased compared to that of long-term, although the long-term approach to investment is a view that investors should be encouraged to, and indeed, the issuance of embedded equity put options provides the necessary equipment for encouraging long-term investors.

A highly critical factor (and a very important field in the financial and investment sciences) that investors pay specific attention to, those different provisions are made around which by policy-makers of the stock exchange, is the liquidity of securities. Determination of the factors capable of impacting and increasing the liquidity of the shares and other securities can utterly improve the efficiency of financial markets. The present study dealt with derivative financial instruments (options contracts and embedded equity put options) together with the synchronicity of the stock return in the Tehran Stock Exchange.

The results of the hypotheses tests showed:
1) The decrease in the **synchronicity of the stock return in companies that issued the embedded equity put option was** more than the companies that issued options contracts**.**
2) The fall in the synchronicity of the stock **return occurs more rapidly in companies that issued embedded equity put option and with higher trading leverage ;ratios**
3) The fall in the synchronicity of the stock **orreturn occurs m**e rapidly for companies that have issued **options contracts .and with the higher financial leverage ratio**

The results of the present study are similar to those of Julian Bye et al. (2017), who examined the impact of credit default swaps on the synchronicity of stock return in the Shanghai Stock Exchange. The results of their study showed that the issuance of swap financial instrument reduces the synchronicity of the stock return, and this fall of synchronicity is more for the companies with higher debt ratio. These results are in line with the ones attained by the present work.

Karjounapa and Afzal (2007) measured the impact of the *CNXIT* secondary market index futures on the synchronicity of the stock return. They found that with the start of issuing index futures, the fluctuations in the price of basic shares increase unexpectedly, and these results were contrary to those of our work and others'. Explaining this opposition, they found that the secondary index of the market has always had a contrary behaviour in the Indian Stock Exchange. As they had reached results different from those of others, they concluded that they ought to expand the domain

of their research to other main indices, moreover, they should increase their precision in choosing research samples and method.

The results of Rahimian et al. (2019) who dealt with the impact of stock return and fluctuations in the index of the Stock Exchange on the number of trading of embedded equity put options. According to the findings of these authors, when the return of the stock of these firms is good and positive, shareholders, due to the higher risks of investment, prefer to purchase embedded equity put options in Tehran Stock Exchange to insure their stocks against the risks caused by investment though expecting higher positive returns. However, large fluctuations in the Stock Exchange index is equal to big risks in the market, and in such a situation, shareholders prefer not to purchase embedded equity put options. These results are in line with those reached by the present work.

The main purpose of carrying out this research was the analysis of the impacts that derivative financial instruments (options contracts and embedded equity put options) can have on the synchronicity of firms ' share return.

Following the developments in the stock and the fall of stocks 'price, the ratio of short-term investors, compared to that of long-term ones have increased, however, the long-term view towards investment is an approach towards which investors should be encouraged. The issuance of embedded equity put options and options contracts in fact provide the necessary equipment for encouraging long-term investors (Fang, Hong and Wong, 2017).

The results attained from the [tests on] hypotheses of this study showed that the issuance of embedded equity put options and options contracts lowers the synchronicity of firms 'stock return; put it differently, shareholders of the company have traded firms 'stock with better confidence, and consequently, the fluctuations in the return of firms stock have increased, an event that is possibly a sign of the creation of a higher return compared to the era before the issuance of embedded equity options and options contracts; thus, once the stock enjoys a proper and positive return, the synchronicity of the stock return comes down, and shareholders will tend more to purchase embedded equity put options and options contracts.

Moreover, the results attained from the test of this research hypotheses through the difference-in-difference method showed:

1) The decrease in the synchronicity of the stock return for the companies that issued the embedded equity put option was more than the companies that issued options contracts.

As the results in section four demonstrate, only in 2015 and 2016 the highest level of impact by embedded equity put option on the synchronicity of the stock return was observed, therefore, it can be stated that in 2015 and 2016, decrease in the synchronicity of the stock of the companies that issued embedded equity options, compared to those having issued options contracts, was higher.

2) The fall in the synchronicity of the stock return occurs more rapidlyfor companies that have issued embedded equity put options and with .higher trading leverage ratios

As the results in section four demonstrate, in 2014 and 2017, the level of impact by embedded equity put options on the synchronicity of the stock return was observed in the companies with higher leverage ratio, so, it can be stated that in 2014 and 2017, decrease in the synchronicity of the stock return occurred more rapidly in the companies that issued stock embedded equity put options and with higher financial leverage,

3) The fall in the synchronicity of the stock return occurs more rapidly in companies that issued options contracts and with the higher .financial leverage ratio

As the results in section four demonstrate, in 2014 and 2017, the level of impact by options contracts on the synchronicity of the stock return was observed in the companies with higher leverage ratio, thus, it can be mentioned that in 2014 and 2017, decrease in the synchronicity of the stock occurred more rapidly in the companies that issued options contracts and with higher financial leverage.

As investors seek to reach the maximum return in stock exchanges, they prefer to invest in the stock that is the best in their eye, and they usually want to maintain this type of stock.

Embedded equity put options and options contracts are more attractive than those fixed income instruments like bonds. Different from bonds in which the maximum profit paid to the investor is defined, in embedded equity put options and options contracts, the minimum profit is guaranteed for the owner and not his/her maximum profit. Thus, if the price of the stock is higher than the price determined in instruments on the strike day, normally, the investor's return should

increase that much, and in this manner, the holders of embedded equity put options and options contracts would expect to gain a higher return. However, such an expectation doesn't exist for the owners of the bonds. As a result, any small fluctuations in the stock exchange don't make shareholders rush to sell their shares.

It is proposed to shareholders to at least purchase those shares whose embedded equity put options and options contracts exist in the market. By purchasing the basic share and holding the aforesaid instruments, the shareholder insures his share against the risks caused by investment and inconfidence concerning attaining a good profit, moreover, this action prevents the losses caused by investment. According to what mentioned, purchasers of the stock, making sure of reaching the minimum profit from the purchased instruments, can hope to attain more profits in the future.

As these two item act as an instrument for lowering risks, investors ought to benefit more from it when the fluctuations in the price of firms' stocks are higher, these price fluctuations bring in return fluctuations, and return fluctuations lead to the reductions in the synchronicity of return and consequently to the high systematic risk.

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Note

[1] These instruments were first issued on June 28, 2014 by Tehran Stock Exchange for Chadar Maloo Industrial & Mining Company.
[2] The synchronicity of the stock return is measure through logestic regression function, R^2 value of the company share together with market return.
[3] Subordinate securities sale option
[4] Stock trading option