Investigating the effect of economic policy uncertainty on the capital market development in Iran (Grigory-Hansen co-integrating approach in phase structural break)

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Abstract

Today, in all countries, the prosperity of the capital market is recognized as one of the indicators of economic dynamism. The extension of the capital market leads to an increase in the depth of this market and in the long run, will lead to financial development, such that this financial development ultimately will lead to stable economic growth. Therefore, the main purpose of this study is to investigate the effect of economic policy uncertainty on the ratio of current stock value to GDP as an indicator of the development of the Iran capital market during the years 1991-2018. To achieve this goal, first, using the Gregory-Hansen co-integration approach, the existence of a long-term relationship between the variables of the model was tested and then the experimental research model was estimated using the dynamic least squares method. The results of model estimation showed that there was a long-term equilibrium relationship between the variables, and the inflation rate and the uncertainty of economic policies have a negative impact. Also, other variables of the research, i.e., degree of economic openness, GDP, and private sector investment had a positive and significant effect on the Iran capital market development index during the study period.

Keywords: economic policy uncertainty, capital market development, structural break, Grigory-Hansen Co-integrating approach, dynamic ordinary least squares (DOLS)
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1 Introduction and preliminaries

Financial markets are considered to be the main pillar of an economic system. These markets not only affect the real sectors of the economy but also are influenced by other sectors and are considered an indicator of the economic prosperity of countries. An efficient financial sector directs resources to lead investment projects that have the highest economic returns, so in the financial markets, the proper evaluation of the positive performance of firms and a correct understanding of the project risk are very important. Due to the developments in financial markets, the concept of financial development has also been considered by many economists.

Financial development is a measure of a country's financial market strength [21]. Financial development, based on the Global Competitiveness Report, depends on such factors as access to financial services, financing services,

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financing through the local stock market, ease of access to loans, access to venture capitalists, capital flow restrictions, banks credit, exchange regulations, and the securities and legal index.

The success of the financial market in each society depends on its structure. The lack of confidence in the security and performance of the financial system is one of the major obstacles to the development of financial markets. Since the success and profitability of the financial system depends primarily on attracting new investors and retaining existing investors, building confidence and maintaining trust are important in the financial system. Economic policies are one of the most important factors in the development of financial markets. One of the goals of government policies is to create stability and confidence in the future. In fact, the stability of government policies builds confidence in the domestic economy, and financial investors make informed investment decisions easily [10]. Economic policy uncertainty (EPU) makes it difficult for investors to calculate the long-term return on their capital with sufficient certainty. Increased economic policy uncertainty provides an unstable environment for investment in financial markets, reducing investment levels and reducing financial market returns, and slowing down achieving sustainable economic growth [20].

Evidence shows that the financial market in Iran, as one of the determining elements in the competitiveness of the whole economy, is not in a favourable position compared to other competitive elements because sustainable growth and development require the simultaneous development of all elements. Even if the determinants of competitiveness are in a good condition, along with the lack of financial market efficiency, in practice, many investment capacities in the country will not be used well. Therefore, the development of financial markets should be one of the important priorities of government policymakers to increase the competitiveness of the national economy.

Numerous empirical studies have examined the financial development of the banking sector, but very little attention has been paid to the financial development of the capital market. The main purpose of this study is to investigate the effect of macroeconomic policy uncertainty on the financial development index of the capital market (ratio of current stock value to GDP) in Iran during the years 1397-1370.

To achieve this purpose, first, the economic policy uncertainty index is estimated using the GARCH-ARCH approach, then using the Gregory-Hansen co-integration approach, the existence of a long-term relationship between the model variables is tested and then the experimental research model using Dynamic Ordinary Least Squares (DOLS) will be estimated.

It is noteworthy that in this study, for the first time, in constructing the government economic policy uncertainty index of expenditures, tax revenue was used as an indicator of the management of the financial sector of the economy and the cash volume was used as an indicator of the monetary sector with exchange rate margin being an index of foreign currency policy.

The rest of the paper is organized as follows:
In the second part, the theoretical foundations and the research background are reviewed and in the third part, the model and the database as well as the statistical information are introduced. The fourth section is devoted to model estimation and the analysis of findings, and finally, in the fifth section, conclusions and research policy proposals are presented.

2 A review of theoretical literature and research history

This section presents the theoretical foundations of the relationship between the financial development of the capital market and that the uncertainty of economic policies from a theoretical perspective.

2.1 Financial development

Financial development entered the economic literature after examining the relationship between the real sector of the economy and the financial system.

Basically, financial development depends on the development and realization of at least three things: creating and expanding the legal and regulatory framework of the market, developing financial instruments, and developing financial institutions.
In the discussion of financial development, increasing efficiency is one of the most important issues. It needs more investment to be directed.

2.2 Economic Policies Uncertainty and Financial Development

The uncertainty of the government's economic policies is one of the most important factors affecting the development of the capital market [6]. Changes in government's economic policies have sometimes had a positive effect and

sometimes a negative effect on financial markets, but what is important is the unpredictable changes in these policies that have always had a negative effect on the sustainable development of the country. Empirical evidence has shown that increasing uncertainty in government economic policies reduces economic growth and development [23].

Investing in financial markets will be successful when sound macroeconomic policies are implemented in a safe and stable environment. Now, if the policies themselves cause instability and uncertainty due to poor management, this factor makes it difficult to predict profits not only in the money and capital markets but also in other commercial and non-commercial sectors [20].

Adjei [1] considered economic policy as an effect of regulatory, fiscal, and monetary policies that are potentially implemented by a country's central bank through government actions.

Economic policy plays an important role in shaping financial markets, and whenever there is a change in the economy, it needs to be adjusted frequently, and any uncertainty in these policies will ultimately reduce the process of financial development [18].

Yu et al [21] believe that economic policy uncertainty has a profound effect on the financial markets, as increasing economic policy uncertainty is associated with lower asset prices. Baker and Bloom and Davis [6] analyzed the effects of economic policy uncertainty on stock market fluctuations. Their findings showed a profound negative effect of economic policy uncertainty on financial markets.

Barrow [7] in their study showed that long-term fluctuations and correlation of capital markets are affected by economic policy uncertainty. Fang and Lee [9] in their study concluded that the risk of economic policy affects the economic activity of the country and uncertainty about the economic policy decisions, regardless of their origin, discourages the investors and corporate confidence in investment, resulting in a profound impact on the financial markets.

In previous studies, various indicators are used to measure the degree of uncertainty. In the present study, macroeconomic uncertainty, which indicates the performance of government management on the country's economy, is used as uncertainty in government economic policies. Also, government expenditures and tax revenue were used as an indicator of the management of the financial sector of the economy. Also, cash volume was used as an indicator of the monetary sector, with the exchange rate margin being an indicator of foreign exchange policy. These variables are controlled by the government, and their fluctuations and instability, through increasing uncertainty in society, disrupt the transparency of the economic environment required for investment and the development of financial markets and limit economic growth.

3 Research history

In this section, the most important foreign and domestic studies on the relationship between the variable of economic policy uncertainty and other variables used in the model with financial development are discussed.

3.1 Foreign studies

Fang [9], in his study entitled "the effect of economic policy uncertainty on the long-term correlation between US stocks and securities markets", examined the long-term correlation between the US stock and securities markets, and the economic policy uncertainty (EPU) index based on the modified DCC-MIDAS model payment. Taking into account the structural weaknesses of the 1997 Asian financial crisis and the 2008 financial crisis, he developed the model by combining fictitious variables to adjust long-term correlations over different periods. Experimental results showed that the modified model is more efficient than the basic model. In addition, Fang found that the EPU has a significant negative impact on long-term stock volatility.

Christo [8] in his article, examined the role of economic policy uncertainty in the capital market in six countries (Australia, Canada, China, Japan, Korea and the United States) in the period from January 1998 to December 2012 using the PVAR model. The main results indicate that stock market returns were negatively affected by the increasing level of policy uncertainty observed in the last decade. In addition, there was a significant negative relationship between smuggling market returns and US economic policy uncertainty shocks in all countries except Australia, which could be explained by favourable opportunities for investors to invest in this land commodity, after rising levels of economic policy uncertainty in the US.

Asef Khan et al. [5] in a study entitled "institutional quality and financial development: a case study of the United States", examined the effect of institutional quality on financial development. The findings of this study,

based on a holistic approach, conclusively confirm that institutional quality is an important precondition for financial development in the United States. In this study, the effect of economic policy uncertainty and trade openness and economic growth on financial development was investigated and the results indicated the negative effect of economic policy uncertainty on financial market development and the positive effect of economic growth and trade openness on financial development.

Yang et al. [23] in a study, examined the effect of economic policy uncertainty on the capital market. In this study, the economic policy uncertainty index developed by Baker was used. Findings showed that economic policy uncertainty had a significant negative effect on the performance of the capital market and showed that the high level of uncertainty of economic policies causes a significant reduction in the return on capital markets.

Asgharian & Christian Sen [4] This study examined the importance of economic policy uncertainty (EPU) for long-term US and UK stock market movements and that the US and UK stock markets are positively dependent on US economic policy uncertainty 6 shocks. The results showed that long-term US stock market fluctuations are significantly dependent on EPU shocks in the country.

yang et al. [24] in a study entitled "macroeconomic policy uncertainty in China and the United States and its effects on global markets", examined economic policy uncertainty as a measure of policy position in several international markets, That is, they paid special attention to stocks, credit, the energy market, and commodities. The results showed that concerns about China's competition with the United States in shaping the world order are likely to be driven more by political rather than economic motives.

Peng Liu and Dong [15] This study examined the impact of economic policy uncertainty (EPU) on trade credit for 16 countries during the period from 1995 to 2015. Data analysis was performed based on the econometric model of panel data with fixed effects and the findings indicated that there is a negative and very significant relationship between economic policy uncertainty and trade credit. This relationship for companies in countries with social high confidence levels is weaker. Also, the effects of EPU were more significant for industrial companies with more economic constraints.

3.2 Internal Studies

Amiri and Biranvand [3] in their article entitled "the effect of economic policy uncertainty on stock market returns using linear and nonlinear models (Markov switching)", examined the variables of economic growth rate, inflation rate, unemployment rate, real interest rate, economic policy uncertainty, and liquidity growth rate during 1360-1396. In the above study, the exchange rate index and government budget deficit were used to estimate the economic policy uncertainty. The findings of the article show that uncertainty in economic policies reduces stock returns. Also, the relationship between stock returns and the uncertainty of nonlinear economic policies and the effect of uncertainty on stock returns in a regime with high fluctuations is stronger and more stable. Therefore, the adoption of appropriate and sustainable economic policies by economic policymakers, especially in the field of monetary and financial is recommended.

Nanforosh and Dizaji [16] in a study entitled "the effect of government size and trade openness on the financial development of selected countries, investigated the effect of government size and trade openness on the financial development of 30 selected countries in the period 1998-2012. They adopted the panel data method. The results indicated that the size of government has a negative and significant effect on the financial development of the countries under study so due to the increase or decrease in the size of government, financial development decreases or increases. Also, trade openness, financial globalization, and the quality index of legal institutions had a positive impact on financial development.

Akbari Roshan and Shakeri [2] in a study investigated the effect of liquidity, government spending and market structure on the financial development of the stock market on quarterly data from 2001 to the third quarter of 2011 using the VAR autoregressive model. The results of the Granger causality test are based on a strong causal relationship between the stock market structure index and the financial development of the stock market. They also noticed that liquidity and growth in government spending do not have a significant effect on financial development.

Heidari et al. [14] in their study entitled "the effect of real exchange rate uncertainty on the total stock index in the stock market in the framework of the border test approach" investigated the effect of exchange rate uncertainty on the stock price index during 1373-1387 using To calculate the real exchange rate uncertainty index, the generalized autoregressive conditional heterogeneous variance exponential variance model was used, and the margin test approach was used to investigate the relationship between the real exchange rate uncertainty and the total stock price index. The results showed that the exchange rate had a negative and significant relationship with the stock price index both

in the long run and in the short run, but the exchange rate uncertainty variable has no significant relationship with the stock price index in the short run, but it had a negative effect on the stock price. In the long run, the relationship between the exchange rate uncertainty and the stock price index was negative and significant.

Examining the previous national studies, it was observed that in these studies, various indicators have been used to measure the degree of uncertainty. In the present study, for the first time, macroeconomic uncertainty, which indicates the performance of government management on the country's economy, was used as government economic policy uncertainty. In this study, government expenditures and tax revenue were used as an indicator of the management of the financial sector of the economy, and the volume of liquidity was used as an indicator of the monetary sector, with the exchange rate margin being an indicator of foreign exchange policy. These variables are controlled by the government, and fluctuations and instability in them, through increasing uncertainty in society, disrupt the transparency of the economic environment necessary for investment and development of financial markets and thus limit economic growth.

4 Research methodology and the statistical data of the research

Economic policy uncertainty is a qualitative variable and its measurement is complex, so we must first estimate the economic policy uncertainty index. Computing and estimating this index includes the following five steps:

4.1 Calculating the index of uncertainty in the economic policies of the government

A) LM-Test

Before estimating the ARCH and GARCH models, we must first perform the LM-Test to confirm the presence of ARCH effects. First, the mean equation for ARCH and GARCH models is estimated by the OLS method and then LM-Test is performed on the residuals of this equation. In this test, the null hypothesis states that the disorder sentences are not dependent, and if this hypothesis is rejected, there are ARCH effects in the pattern.

Table 1: Results of LM-Test for the probability of ARCH effect

LM- Test			
Variable	T- statistic	Probability	Conclusion
Tax revenues (ty)	F=9/80 $X^2 = 19/17$	P=0/0001 P= 0/0018	Error sentences have ARCH effects.
Volume of liquidity (m)	F=8/60 $X^2 = 11.55$	P=0/0016 P= 0/0031	Error sentences have ARCH effects.
government expenses (G)	F= 10/04 X^2=7/96	P=0/0041 P=0/0048	Error sentences have ARCH effects.
Exchange rate margin (E)	F=8/10 X^2=10/50	P=0/0011 P=0/0042	Error sentences have ARCH effects.

Source: Researcher's findings

According to the test statistics, in the above table, it can be seen that the correlation of the residual sentences of the equation of the mean of the policy variables cannot be ruled out, and therefore, there are ARCH effects for the variables.

B) Estimation of ARCH and GARCH pattern

After confirming the existence of ARCH effects or the dependence of the residual sentences in the above equations, we proceed to estimate the ARCH and GARCH patterns for these variables. An ARCH (1) model is considered for government expenditures, tax revenues, cash volume, and exchange rate margins. The results of estimating the mean and variance equations of these variables are shown in Table 2.

After estimating the appropriate ARCH and GARCH models for the Economic Policies Uncertainty variables and ensuring the significance of the coefficients as well as the appropriate fit 9 of the model, using the variance equation of each variable, we now extract the variance of these models, which is calculated with Excel software.

Table 2: Results of estimating the mean and variance equations related to government policy variables

Variable	Model used	Estimated model	Estimation results
G	ARCH(1)	Average	G = 6097.77180258 + 1.16193835361*G(-1)
		Variance	GARCH = 6.82E+08+ 0.828110*RESID$(-1)^2$
TY	ARCH(1)	Average	TY = 1835.68161523 + 1.21883407249*TY(-1)
		Variance	GARCH = 3020571.29779 + 1.30756016877*RESID$(-1)^2$
M	ARCH(1)	Average	M = 1100.64471187 + 1.22648660707*M(-1)
		Variance	GARCH = 37249248.7408 + 0.872670804924*RESID$(-1)^2$
E	ARCH(1)	Average	E = 1195.16410717 + 1.22548014725*E(-1)
		Variance	GARCH = 33467272.9494 + 0.926788497706*RESID$(-1)^2$

C) Determining the coefficient of the importance of each variable according to the effect of the variable on the dependent variable.

Due to the fact that the coefficient of the importance of the effect of fluctuations of the government policy variables on the development of the non-banking sector (capital market) is not the same, and in combining the variances, we cannot use the same weights for the variables the coefficient of the importance of each of these variables are estimated at this stage. For this purpose, the regression method of the rotational component was used.

First, the rotational component of each of the variables used in the construction of the composite index is separately entered into a regression with the rotational component of the variable for which the composite index is constructed to explain.

$$Y_t = \beta_0 + \beta_1 X_{j,t-k} + u_t \tag{4.1}$$

where Y_t is the rotational component for which the hybrid index is constructed to explain, X_j is the rotational component of the individual variable j, j is the number of individual variables that are combined to create an individual index and K is the index representing the interruption of the variable.

After each regression, the coefficient of determination is calculated and the weights associated with each individual variable are calculated as follows:

$$C_j = \frac{R_j^2}{\sum_{j=1}^4 R^2}. \tag{4.2}$$

In the present study, because the purpose of constructing the government economic policy uncertainty index is to use this index in the financial development model, so Y_t is considered in Equation (4.1) of the non-banking sector's financial development (capital market); Using the OLS method, we estimated the effect of variances obtained in the previous step with different intervals on the financial development of the non-banking sector and then, according to the available statistics, we chose the best equation. Similarly, four equations were obtained for the fourth variance of the variable. The ratio R2 of each equation to the sum of R2s is the weight of the corresponding time series.

D) Ranking the time series of the variables

In this stage of constructing the government economic policy uncertainty index, we rank the variances of the four variables of government policies between zero and one, that is, the largest variance is given to one and the smallest variance is given to zero. The following formula is used to perform this ranking:

$$\frac{X_t - Min(X_t)}{Max(X_t) - Min(X_t)}. \tag{4.3}$$

This method is an intermediate method that distributes four time series of variance in the distance of zero and one, or in other words, combines them.

E) Combining the time series of variances and constructing the index

The final step in constructing an index of government economic policy uncertainty is to combine the time series of variances according to the weight of each of them. To perform this step, by multiplying the coefficient of each variable

and their algebraic sum, the index of government economic policy uncertainty is obtained, which enters the research model under the name of the EPU variable.

It is noteworthy that data analysis is performed in Eviews10, 11 Stata and Excel software. The statistical population of the present study is Iran and the research period is 1991-2018. For data collection, library and documentary study methodologies were used. Data related to financial development, inflation, private sector investment and GDP were extracted from the database of the Central Bank and the Statistics Center of Iran. Also, trade openness and economic policy uncertainty were extracted from WDI World Bank. In order to investigate the effect of government economic policy uncertainty on the financial development of the capital market in Iran, the research model inspired by the model of Asif Khan et al. [5] was specified below:

$$FDt = c_0 + c_1 Y_t + c_2 Invt + c_3 Inft + c_4 EPUt + c_5 Trt + et.$$

FD: indicates the development of the non-banking sector (capital market), which is defined and considered as an indicator of the ratio of the current value of stocks to GDP.
Y: is the real gross domestic product (GDP) of the country,which indicates economic growth
Inv: is a private sector investment that is calculated as the ratio of private sector investment to GDP.
Inf: indicates the annual rate of inflation or the growth rate of the price index of consumer goods and services at a fixed price in 1390.
Tr: is the trade openness index, which is defined and calculated as the sum of exports and imports or the volume of trade to the country's GDP.
EPU: indicates the index of economic policies uncertainty.

4.2 Unit Root test of Zivot & Andrews

The investigation of changes and structural failure time is very important in time series data and if these structural changes are not considered, it may lead to biased results in the estimation. The structural changes in many time series analyzes can have several reasons such as changes or political and economic crises, changes in government regime, or changes in organizational institutional arrangements [12].

In this study, to find the endogenous time of structural change in the model variables, the Zivot -Andrews (1992) test, which is actually a generalized Peron test (1989), was used. In this test, the null hypothesis indicates the existence of a single root. (i.e., no structural failure entered the pattern) but the opposite hypothesis shows that the time series has a stable trend with a structural failure occurring at an unknown time [25].

4.3 Gregory-Hansen Co-integrating test

The Gregory-Hansen co-integration test is used to estimate the long-term equilibrium relationship with respect to structural failure in the research variables. The Gregory-Hansen [13] test is a technique based on performing statistical tests on residual sentences that estimates aggregate relationships despite potential structural failure. On this point, Hendry (1996) stated that "It is important to distinguish between failure in single variables and failure in aggregate vectors". Similarly, Konitomo (1996) argued that traditional cohesive tests that do not allow structural changes in the system may show a false cohesive relationship. Unlike conventional cohesive techniques such as the Granger parasite or the Johansen-Josilius method, which do not pay any attention to the potential for structural failure, or other methods such as Sikkenen and Lutkipol (2000), the Gregory-Hansen method determines the time of fracture endogenously. In the Gregory-Hansen test, the general form of co-integration is considered and the existence of a structural change in the co-integration vector is considered permissible. Gregory-Hansen used the following conventional aggregation regression to derive their test statistics [11]:

$$Y_{2t} = \mu + \alpha^T y_{2t} + et \qquad t = 1, 2, \cdots, n \qquad (4.4)$$

In this regression, y_{2t} is I (1) and et describes a variable I (0). In this test, different relationships are considered to change the direction of the structure as follows:

$$(c): y_{1t} = \mu_1 + \mu_2 \varnothing_{t\tau} + \alpha^T y_{2t} + et \qquad t = 1, 2, \cdots, n \qquad (4.5)$$

$$(c/T): y_{1t} = \mu_1 + \mu_2 \varnothing_{t\tau} + \beta_t + \alpha^T y_{2t} + et \qquad t = 1, 2, \cdots, n \qquad (4.6)$$

$$(c/s): y_{1t} = \mu_1 + \mu_2 \varnothing_{t\tau} + \beta_t + \alpha_1^T y_{2t} + \alpha_2^T y_{2t} \varnothing_{t\tau} + et \qquad t = 1, 2, \cdots, n \qquad (4.7)$$

In the above relations, equation (4.5) is called the Level Shift model and in equation (4.6), a trend is added to the Level Shift model, and finally equation (4.7) is called the Regime Shift model (structural direction change). $\varnothing_{t\tau}$ represents a virtual variable. If $t \leq [\tau n]$, its value is equal to zero and for other cases, it is taken as one.

To find an integration relationship with the probability of structural change and to estimate the breaking point of residuals, Gregory-Hansen used equations (4.5) to (4.7), and change the statistics of the Augmented Dickey-Fuller test (ADF), and the Phillips (1987) test. They proposed a new statistic as follows [11]: For each fracture point (τ), we estimate one of the patterns mentioned in equations (4.5) to (4.6) by the ordinary least squares (Ols) method (depending on the competitor hypothesis) and calculate its residual sentences ($\hat{e}_{t\tau}$) and based on the residual statements, we calculate the first-order sequential correlation coefficient as follows:

$$\hat{\rho}_t = \frac{\sum_{t=1}^{T-1} e_{t\tau} e_{(t+1)\tau}}{\sum_{t=1}^{T-1} \hat{e^2} t\tau}. \tag{4.8}$$

4.4 Dynamic least squares method (DOLS)

After examining the existence of a long-term relationship based on the Gregory-Hansen test, we use the Dynamic Ordinary Least Squares method to estimate the long-term relationship. Due to the weaknesses of OLS estimators, Stock and Watson [19] modified the ordinary least squares method and proposed a new method for estimating the relationship between randomly occurring variables, which is called the dynamic least squares (DOLS) method. Common squares are called generalized squares (GOLS). For this reason, it is called the dynamic method, in which the temporal pattern of a dependent variable's response to changes in an independent variable (or variables) is considered. In this method, which is in fact a modified version of the parasite-Granger method, the anterior, posterior, and current values of the first-order difference of the right variables are removed to eliminate asymptotic bias due to endogenous explanatory variables, or in other words, to eliminate the correlation between the regression error components and then the explanatory variables are added to the model [17].

An important point in the dynamic least squares estimation (DOLS) method is that this estimator can also be used when the sum of the explanatory variables is different. In addition, the DOLS estimator allows the estimation of convergence vectors containing collective variables with different collective orders.

Compared to other convergence vector estimators, the DOLS estimator has some features, some of which are mentioned below [17].

1. Estimating the pattern using this estimator is much easier than other estimators with asymptotic performance [19].

2. Long-term estimation of parameters is compatible with DOLS method.

3. The DOLS estimator, unlike other estimators such as the Granger parasite, has a normal asymptotic distribution.

4. Based on the Monte Carlo simulation, Stock and Watson found that DOLS had the least squared mean square error among all convergence vector regression estimators.

5. Stock and Watson (1993) considered the DOLS estimator to be a suitable method for correcting the problem of endogenousness and autocorrelation.

6. The residues obtained using the DOLS estimator are not correlated with any of the independent variables and can be considered completely exogenous.

7. In DOLS method, endogenous explanatory variables do not affect asymptotic properties, especially estimator consistency [11, 17].

5 Experimental results

Before estimating the model, to prevent the estimation regression from being false, a single root test is performed to check the reliability of the model variables. The Augmented Dickey Fuller test (ADF) root test is used for this purpose. The results of the reliability test of variables are presented in Table 3:

The results of the Augmented Dickey-Fuller test showed that once the differentiation was sustained, the variables of GDP, investment and inflation are at a stable level, and the trade openness index, the capital market development index, and the uncertainty index of government macroeconomic policies are at an unstable level.

Table 3: The results of the reliability test of variables using the Augmented Dickey Fuller test

Variable	Unit Root Test	T- statistic	Probability value	Result
FD	ADF	0/526785	0/7951	not permanent
D(FD)	ADF	-5/391213	0/0002	permanent- I(1)
Y	ADF	-3/332353	0/0139	permanent- I(0)
Inv	ADF	-3/541163	0/0079	permanent- I(0)
Inf	ADF	-3/031502	0/0314	permanent- I(0)
Tr	ADF	-1/923970	0/3220	not permanent
D(Tr)	ADF	-4/324475	0/0023	permanent- I(1)
EUP	ADF	0/531906	0/7414	not permanent
D(EUP)	ADF	-4/692068	0/0001	permanent- I(1)

Source: Researcher's findings

Next, the possibility of a structural break in the variable behaviour of government economic policy uncertainty should be tested. Peron believes that ignoring the issue of structural break can not only lead to invalid statistical results for the unit root test but can also distort the results of the collective test. To confirm this and to determine the endogenous of the break year, the root test of the structural break unit of Zivot Andrews was used, the results of which are shown in Table 4. In this test, hypothesis zero states that no structural break enters the model, while the opposite assumption shows that the time series has a stable trend with a structural break that occurred at the specified time.

Table 4: Results of the test unit root of the Andrews Ziwat for economic policy uncertainty

Variable name	Minimum value of T- statistic	Optimal interrupt	The year of break	Critical value at significant level 5%
EPU	-4/21	1	1390	-4/11

Source: Researcher's findings

The results of the above table show that the null hypothesis that there is no single root with respect to structural Break at a significant level of 5% is rejected and accordingly in 2011 structural break occurred in the uncertain behaviour of government macroeconomic policies.

Therefore, the use of aggregate tests without considering the structural break leads to biased results. To avoid this, the Gregory-Hansen coefficient test is used to test the presence or absence of a long-term relationship between variables, and if the long-term relationship is confirmed using the dynamic least squares approach, the long-term relationship between the variables is estimated.

Table 5: Results of the Gregory-Hansen Co-integrating test for the existence or non-existence of a long-term relationship in terms of structural Break

Model (C / S)				
Name of test statistic		ADF^*	$Z\alpha^*$	Zt^*
T-statistics		-7/49	-7/71	-39/33
The year of break		1390	1390	1390
Critical values at different levels		%1	%5	%10
Test statistics	ADF	-6/36	-5/73	-5/50
	Z_t	-6/36	-5/73	-5/50
	Z_α	-76/28	-65/44	-54/30

Source: Researcher's findings

The results of the test statistics show that there is a long-term equilibrium relationship between the financial development index and the explanatory variables of the model considering the structural Break and regime changes. Therefore, the null hypothesis that there is no long-term relationship at the above levels of significance is rejected and the existence of an equilibrium relationship in terms of structural failure between model variables at significant levels of 5 and 10% is confirmed. Due to the long-term equilibrium relationship between the variables, to estimate their long-term effect on the financial development index of the capital market, the dynamic least squares method was used, the results of which are shown in Table 6:

Table 6: Results of model estimation by dynamic Ordinary least squares method

variables	Coefficient	T- Statistics	Probability
C	0/49	2/9	0/009
Y	1/28	2/67	0/01
Inv	0/24	2/04	0/04
Tr	0/82	2/57	0/02
Inf	-0/02	-9/06	0/000
EPU	-0/41	-4/3	0/000

Source: Researcher's findings

The results of estimating the model by the dynamic least squares method show that the expected signs of explanatory variables are related to the dependent variable so that real GDP, degree of openness of the economy and private sector investment had a positive effect and the inflation rate and macroeconomic economic policies uncertainty had a negative but significant effect on the capital market development index (ratio of current stock value to GDP).

Regarding the positive effect of GDP variable (Y) on the capital development index of the capital market (current value of stocks to GDP), it can be said that with a one percent increase in GDP, the capital market development index increased by 1.28 percent. According to empirical evidence, as economic growth increases, the demand for the services provided by the financial markets increases, and at higher levels, the expansion of the financial sector is affected by economic growth. Also, as economic growth increases, financial markets become relatively more important. Increasing production capacity and its growth rate will lead to more investment in financial markets, especially the stock market, and the increase in the development of the capital market.

The trade openness variable (tr) had a positive and significant effect on the financial development index such that a unit increase in the ratio of trade to production, as an indicator of the degree of trade openness, leads to an increase in the financial development index by 0.82 units. It can be said that increasing the degree of openness of trade by increasing production and national income and directing it to the capital market leads to an increase in the capital market development index. In other words, the openness of trade by expanding the market of goods and services causes more efficiency of production factors and by transferring technology and knowledge, increasing domestic competition, creating a suitable environment for business, and improving resource allocation, the production process improves the investment increases, and this affects the economic growth.

The macroeconomic economic policy uncertainty (EPU) variable had a significant negative effect on the financial development index such that a unit increase in the economic policy uncertainty index reduces the financial development of the capital market by 0.41 units. Regarding the effectiveness of this variable, it can be said that according to the results of previous theories, when economic policies are more uncertain, economic agents replace high-risk assets with safe ones to prevent possible losses. the uncertainty of economic policies due to increasing economic fluctuations can reduce the optimal level of investment and production in the economy because the owners of capital cannot calculate the return on their capital with sufficient confidence. Also, this uncertainty also affects the decisions of investors such that they become distrustful and anxious, and since it is not relatively stable and is constantly fluctuating, it makes it difficult to predict profitability in the financial markets, resulting in private sector investors turning to unproductive economic sectors. Furthermore, assets that are less profitable than the capital market are sent out, and the decline in investment in the capital market delays the development process in the market, which in turn slows down the economic growth.

The private sector investment (Inv) variable has a positive and significant effect on financial development so that with one unit increase in private sector investment, capital market development increases by about 0.24 units. In this regard, we can argue that with the increase of the share of private sector investment in production, the amount of production and income increases and the continuous presence of investors in the financial markets and directing private sector investment to the capital market can lead to the development of the capital market.

The inflation rate (Inf) variable also has a negative and significant effect on the financial development of the capital market, so a unit increase in the inflation rate reduces the financial development of the capital market by 0.02 units. Regarding the negative impact of inflation on the development of the capital market, it can be inferred that according to previous theories, in the conditions of inflation, due to the increase in living costs, people's purchasing power decreases and there is no opportunity to save, and this leads to declining investment in financial markets. In other words, due to rising inflation, people prefer to spend their capital on housing and land instead of investing in the capital market, which will have a negative impact on the financial development of the capital market.

In the final part of the disorder diagnosis tests to ensure variance heterogeneity, autocorrelation, normalization of disorder sentence distribution, and appropriateness of the form of the specified pattern were tested, the results of which are reported in Table 7:

Table 7: Results of disorder sentence recognition tests

Test name	T- statistics	Probability
Autocorrelation between sentence disorder	6/88	0/14
Model subordinate form	0/89	0/76
Normality of disorder sentences	0/28	0/85
Heterogeneity of variance between disorder sentences	0/21	0/64

Source: Researcher's findings

The results of the disorder diagnosis tests and the consequential form of the model indicate that the null hypothesis is not rejected for all tests and there is no heterogeneity of variance and autocorrelation between the disorders. Also, the disorder sentences have a normal distribution and the specified subordinate form is also appropriate.

In the final section, using CUSUM and CUSUMSQ tests, the stability of the estimated coefficients in the long-run was investigated, the results of which are as follows:
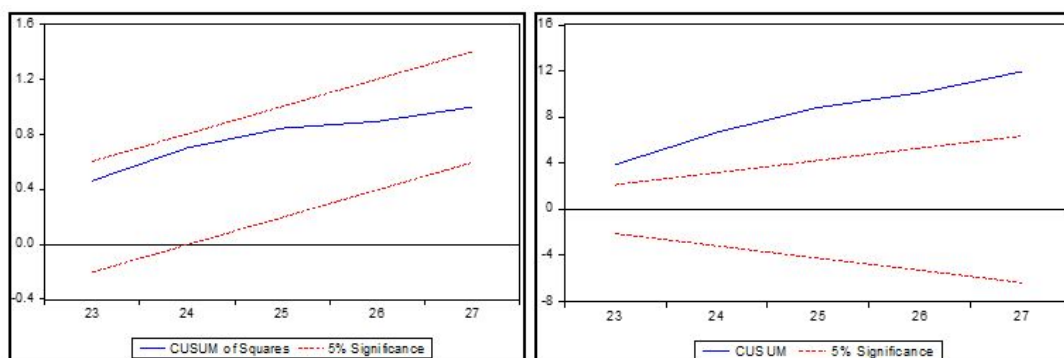
Source: Researcher's findings

Figure 1: Results the stability tests of coefficients

The results of the above graphs show that the value of the test statistic is smaller than the critical value of the table and the null hypothesis based on the stability of the estimated coefficients, in the long run, is not rejected therefore the estimated long-term coefficients are stable.

6 Concluding and presenting policy proposals

One of the characteristics of developed countries is the existence of efficient financial markets, which in addition to attracting capital, are also the basis for economic growth and development. The expansion of the capital market will gradually lead to an increase in the depth of this market and in the long run, will lead to financial development. The aim of this study was to investigate the effect of economic policy uncertainty on the capital market financial development index (ratio of current stock value to GDP) in Iran using Gregory-Hansen co-integration method and Dynamic Ordinary Least Squares (DOLS) method. The experimental model of the research was estimated during 1992-2018. The reason for using the Gregory-Hessen cohesive method was the existence of a structural Break in the uncertain behaviour of economic policies. In the present study, using the Gregory-Hansen convergent approach, the existence of a long-term relationship between the variables of the model was tested and then the experimental model of the research was estimated using the Dynamic Ordinary Least Squares (DOLS) method in 5 steps. The variables used to construct the economic policy uncertainty index included government expenditures, tax revenue, cash volume, and the exchange rate margin. After constructing the uncertainty index, adopting the Gregory-Hansen approach, the existence of a long-term relationship between the model variables was tested, and then the experimental research model of the study was estimated using the Dynamic Ordinary Least Squares method. The results of model estimation indicated that in the long run, such variables as inflation rate and the uncertainty of economic policies had

a negative impact whereas private sector investment, the degree of openness of the economy and the growth of real GDP have a positive and significant effect on the capital market development index. This conclusion is consistent with the theoretical foundations and framework and empirical background of the research. On the other hand, the results of estimation tests showed the appropriateness of the subordinate form of the model, the lack of autocorrelation, the heterogeneity of variance, as well as the normality of the disorder sentence distribution.

As was observed in the model estimation section, this index has a negative and significant effect on the financial development of the capital market. Therefore, the uncertainty of government policies is an obstacle to the financial development of the capital market in Iran, and the variables of government spending, taxes, liquidity and exchange rate margins, which are indicators of how the government manages monetary, fiscal and exchange rate policies have not been used efficiently.

According to the research findings, we conclude as follows:
Macroeconomic stability contributes to real economic growth by significantly reducing political uncertainty and advancing long-term planning. According to the market system, political uncertainty, in the long run, has a great impact on the stock returns of companies operating in the stock market. The increase of these uncertainties creates an unstable environment for investing in financial markets and weakens the development of the capital market. This inefficiency of the capital market slows down the achievement of sustained economic growth due to political uncertainty.

In a developing country like Iran, a stable and credible policy is of great importance. Political risks and sanctions are the most important deterrent to financial development in the short run. Poor macroeconomic management and the implementation of cross-cutting policies and the creation of a sick economic structure can create uncertain and unfavourable conditions for decision-making. It can exacerbate uncertainty. Adopting sound and stable economic policies is essential to prevent the negative effects of political uncertainty on the capital market. Therefore, economic policymakers must manage these uncertainties and fluctuations in the capital market with proper management and restore stability and transparency in the market.

Economic policymakers are expected to increase stability and provide a safe environment for economic activities by controlling the general level of prices, reducing inflation through the implementation of contractionary monetary policies, replacing financial stability with fiscal instability in the government budget, and eliminating fluctuations in government-controlled economic variables. The government must have an appropriate management policy in the economy in order to take appropriate measures to resolve crises in the face of shocks to the economy. On the other hand, by reducing the uncertainty of macroeconomic policies by implementing policies based on reducing exchange rate fluctuations and controlling the volume of liquidity to increase the prosperity of business and employment, they should improve production and national income, and finally provide the necessary context for financial development of the capital market.

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