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The Effect of Effective Governance and Quality of Regulations on Financial Development in the Current Economic Conditions of Iran

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ABSTRACT

The present study investigates effective governance and quality of regulations on financial development in Iran's current economic conditions. For this purpose, the model is estimated based on the annual data of 1996-2018 using Smooth Transition Autoregressive (STAR). The results of estimating the linear part of the model (first regime) show that the variables of GDP, role or the rule of law, quality of regulations, and government size have a significant and positive impact on Iran's financial development at 95% confidence level. Also, the variables of devaluation of the national currency and financial crises have a negative impact on financial development in the Iranian economy. Besides, the results of the non-linear part of the model (second regime) show the existence of a positive relationship between the variables of role or the rule of law and GDP with financial development. The sign of the variables of quality of regulations, government budget deficit, government effectiveness, devaluation of the national currency, nuclear sanctions, and financial crises are negative that is expected because Iran is developing and growing. The positive sign of the lag of the dependent variable of the financial development index shows the country's attention to financial development and the use of solutions and attention to infrastructure to increase financial development over time, which needs more attention from government officials.

1 Introduction

Today, effective governance and regulation quality are essential for a healthy and sustainable economy, which is very important for social scientists. According to studies conducted by the World Bank [5], one of the main reasons for developing countries' financial markets' slowness is unfavorable governance [16]. According to these studies, concepts such as good governance, quality of regulation, the rule of law can be attached to the confrontation with challenges of development, democracy, corruption, and other related categories. In general, state governance's inefficiency and ineffective governance are some of the significant obstacles to development.

Montesquieu believes that corruption can quickly turn a good and healthy political system into a harmful and unhealthy one. As a result, it can be said that the most important and perhaps the most fundamental reason for underdevelopment is administrative and economic corruption, which itself is rooted

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in the lack of effective governance and quality of regulation [22]. According to the World Bank [8], corruption is the misuse of government facilities for personal gain that disrupts society's regulation quality. In general, the root of corruption is in the context of economic activities because due to profit-seeking goals, there is always the expectation that individuals and groups try to achieve these profit-gaining goals in organized forms, whether formal or informal. According to Shahab and Pazhouhan [29], informal activities are organized in economic corruption. In order for organizations and groups that incite economic corruption to achieve their goals, they will seek to create various non-transparent activities. In this way, they can circumvent the legal framework and achieve their goals. Of course, in addition to these cases, the macroeconomic structure's inefficiency should not be overlooked, meaning that the existence of legal loopholes can be a burden for traders to bring this adventure game to their desires easily [21]. Based on what can be deduced from the research literature and theoretical foundations of this issue, regarding the consequences of economic corruption and phenomena such as law-breaking, the main reason can be considered as the absence of effective governance and quality of regulations. This is because if the executive body and the executive mechanisms of the administrative system, as well as the rules and regulations, can adapt to the mentioned phenomena and have the necessary flexibility and dynamism, reduction of the effects of these phenomena and also the desire of opportunists to form informal organizations can be expected [25].

In particular, if we attribute one of the leading causes of the last few years' financial crises to related phenomena, we have not gone astray; however, we should not ignore the uncontrollable and influential effects and consequences, such as sanctions. To what extent the effective governance and quality of the regulations confirm the mentioned propositions might be examined by empirical analysis at the level of different countries, and a comparative comparison of empirical analyses between different countries can be made [32]. One of the hallmarks of developed countries is rooted in indicators of good and effective governance and the quality of regulation. In other words, one of the fundamental reasons for financial development and optimal allocation of resources in the economic system of developed countries goes back to these essential determining factors [23]. By comparing developing countries with developed countries, there are several reasons for their underdevelopment. These factors include the statehood of a large part of these countries' economies, parallel structures, rent economy, the dominance of political behavior over economic behavior, and the lack of order in all economic areas, all examples of adequate governance quality of regulations. As a consequence of these two critical variables, financial development can explain why these countries are named developing countries.

Therefore, based on what has been stated so far, the present study investigates the impact of effective governance and the quality of regulations on developing Iran's financial markets for the specific circumstances of financial crises and the political effects of sanctions. Based on the results, the available variables will be examined to explain how economic development can be achieved [17]. Therefore, in the first part of the study, the existing literature on effective governance and the quality of financial development regulation will be first presented. In the second part, the literature, including theoretical foundations, is presented. A look at the local conditions of Iran’s economy and domestic and foreign studies in this field are presented. In the third part, an attempt is made to describe the method used and the pattern by which the share of independent variables of the government debt index and limited financial resources, the size of the government, the quality of regulation, the role or the rule of law, GDP, the devaluation of the national currency and the dummy variable of sanctions and financial crises is determined. In the fourth section, the experimental findings of the research are presented, and in the fifth section, the research results and summary are presented [11].

2 Literature Review

This section consists of two parts. In the first part, the theoretical foundations and the adaptation of these foundations to Iran's economic structure are reviewed. In the second part, several foreign and domestic studies are presented.

2.1 Effective Governance and Quality of Regulations

As social networks expose society and the social institution to all kinds of information and news every day, new phenomena are formed in this space, and these phenomena in themselves lead to demands, each with special effects and consequences. One of these demands is the expectation of transparency in all areas of the economy and administrative health. If people did not have access to information in the past, today, information is widely available in various forms and with different qualities. Now, suppose the information about corruption at the level of social networks is in line with the actual performance. In that case, this can also lead to a decrease in the legitimacy of political systems. As a result, effective governance and the quality of regulation, and the two's impact on development are essential in terms of what has been said [6].

To always have adequate governance and quality regulation and these two factors, achieving financial development requires correct diagnosis and treatment of the event before it occurs [26]. In other words, it requires a system in which, instead of fault detection, prevention, decision-making, and affairs' management are included. Therefore, having information and access to scientific findings can help correctly identify the boundaries and scope of economic corruption and people present in this field as actors, the mechanism of activities, and workflow related to economic corruption. Size and intensity of the effects and the type of interaction with the formal economy can play an essential and decisive role for effective and efficient decision-making and the optimal allocation of the country's resources. Although it is difficult to achieve all the cases mentioned in practice, due to the radius of the impact of economic corruption on various country parameters, it can be said that conducting studies and accurate and scientific research in this field is always important and will be very important [1]. Analysing the economic and social effects of economic corruption, law-breaking, and lack of regulation can open the door for researchers to understand these activities better. In this regard, the economic corruption activities, law-breaking, and lack of regulation affect governments' performance and social welfare, policy-making process, productivity, tax revenues, false employment, monetary exchange system, and general government budget deficit [24].

Therefore, to compensate for their budget deficit, governments increase tax rates, which in turn leads to an increase in corruption and, consequently, to a reduction in the amount of taxes received by the government, creating a vicious circle. Law-breaking is a phenomenon that exists in more or less all countries of the world. However, its type, form, amount, and extent are different in each country. Its results and consequences also differ according to the political and economic organization and the level of development. In any case, law-breaking degenerates, puts government policies at odds with the majority's interests, wastes national resources, reduces governments' effectiveness in conducting affairs, and, as a result, reduces public confidence in governmental and non-governmental institutions, increasing indifference, laziness, and inadequacy. Law-breaking and lack of regulation undermine society's beliefs, and moral values increase the cost of doing things and make it challenging to grow competitiveness. Law-breaking and lack of regulation hinder investment and impede the economy's growth and development with many obstacles and provide the ground for stagnation in all dimensions by leading talents and potential and actual human resources towards the wrong activities easy-access income [13].

On the other hand, wherever law-breaking and lack of regulation take root, it becomes more challenging to deal with, and its roots penetrate deeper and deeper into society. In recent decades, a group of economic thinkers has established a new school of thought in economics called "new institutionalism." New institutionalists believe that institutional change affects individuals' choices and, consequently, society's economic performance in the long run by changing their motivational structure. Consider a case that changes in societies' laws and regulations, how they are implemented, the quality of regulations, control of corruption, and the rule of law lead to general security for property owners and create a promising outlook.

The result of this is attracting domestic and foreign investment and increasing capital stock, increasing trade, and, of course, increasing economic growth. Among the many institutional factors that may affect the country's financial development, government sovereignty indicators, along with factors such as government budget deficits, financial crises, and the political effects of sanctions, appear to play a prominent role in the country's financial development process [7]. These indicators are essential because they include critical institutional issues such as property rights, freedom of business, freedom of trade, freedom of investment, and the like [10]. Government sovereignty is expected to provide the basis for financial growth and development and control the government budget deficit.

2.2 Examining Different Views on the Size of Government

The desired size of government and government intervention in the economy has been one of the topics discussed in various economic schools and by economic experts in different periods. These theories have been accepted and used in certain economic, social, and political conditions and periods. There is no consensus on the government's desired size between different schools and economic perspectives [27]. Governments can be seen in a wide range in terms of economic intervention, starting from the classical government and ending with a centralized planning government. Among these two are the legislature, the welfare state, the policy-making government, and the planning government. Policymakers and officials have always discussed the issue of the role, size of government and the quality of regulations and the rule of law in countries, and various solutions have been offered to overcome the bottlenecks caused by the enormous size of government, which have temporarily reduced some of the structural issues of the government. There are different perspectives for solving structural problems in macro-government organizations that can be classified into three groups. These views examine the role and size of government from three aspects [9]

2.2.1 The First View: Organization as a Control Tool

In this view, the government structure, the quality of regulations, and the rule of law are considered tools for control, and the government's desire for control reasons for its magnitude and breadth. From this perspective, the solution is to downsize and adjust the government's size by modifying its control and instilling a spirit of trust in the relationship between government and society. By examining the government's performance in the country's various ministries and agencies, it is possible to observe many unnecessary control tasks that do not lead to significant results and efficiency. In some cases, we also encounter double and multiple controls performed by two or more units in parallel, and of course, by removing them, a more agile and smaller structure can be created. Multiple controls by different units also disrupt and delay the process of doing things. Different units have to issue a regulatory comment on the subject [28].

2.2.2 The Second View: The Dominance of State Tenure Ship Over Its Main Tasks

Government tenure ship and failure to delegate affairs to the public, the private sector, and non-governmental organizations and entrepreneurs make the government large and inefficient. The drowning of government agencies in the exercise of tenure while undermining the government's core and sovereign role increases government size and reduces its agility. In such a situation, the government engages in matters that are not inherently the government's work. The government was not created and did not have the appropriate structure and tools to do them. Of course, government involvement in tenure ship prevents law enforcement and oversight of other sectors that operate in the same field. In this view, the solution is to abandon the government's caretaker attitude, strengthen and support non-governmental organizations, delegate affairs to the private sector, the people, and trust and rely on other sectors to do business, such as entrepreneurs.

Thus, in this view, the solution is to delegate tenureship to the people, the private sector, and the non-governmental sector. The government should delegate some of its duties to various councils, non-governmental organizations, the private sector, and cooperatives [30]. Currently, the increase in the concentration of affairs in the hands of the government and the government's lack of use of cooperation and assistance of people and entrepreneurs, and lack of mechanisms to use people's assistance in government, state, and the administrative system has led to continued separation of people from the administrative system. Under these circumstances, the non-governmental sector's participation, the private sector, and civil society institutions in the government are meager. The government is not as successful as it should have been in partnering with non-governmental institutions [2].

2.2.3 Third View: The Functional Macro-Structure of Government

The country's public sector structure, formed in various ministries, follows the functional organization, a fragmentary and reductionist organization. In these structures, each unit emphasizes its tasks and goals and ignores the general goals. To solve this problem, they often resort to coordinating structures and councils, which leads to the government's enlargement. The solution to these problems is to promote a culture of holism, avoid partiality, reform government structure from task to process, and create process structures at the end of the relevant ministries. If we want to consider a cultural solution to the problem, we must use all culture-building methods. Training programs, modelling, and valuing holistic thinking can replace the holistic culture with a partisan management culture. In this regard, the role of top managers and policymakers is of utmost importance in society. They must portray a kind of shared vision and ideal for all members of society and mobilize everyone to achieve it [14].

2.3 Institutional Quality as Growth Factor

The literature on political growth economy has always encountered the controversial question of whether political development is the basis of economic development or vice versa! It is worth mentioning that no definitive answer has been given to this question yet, and there are two approaches to it. The first approach emphasizes institutional preparation and begins with democracy, corruption control, and other controls over the government as the mechanism for securing property rights. Despite such political institutions, investment in physical, human, and economic capital can be achieved. The second approach emphasizes the necessity of economic development (accumulation of physical and human capital) to start the process, specifically considering it necessary for sustainable development and establishing some other institutions. Both approaches have broad rational basics. The neo-institutionalist economy

has emphasized the importance of institutionalizing and limiting government. More recently, the economic growth literature beginning with Knack and Keefer [4] addresses good institutions' economic development effects. The second approach refers to Lipset [10], whom himself attributes it to Aristotle. Lipset believes that only in affluent societies where corruption is controlled can citizens consciously be involved in politics. He also states that educated people resolve their disputes through dialogue and choice instead of complex conflicts. In this regard, Glasser indicates that high human capital leads to sound policies and more excellent political stability. The primary external outcome of human capital is not technological [33]. Still, it is political: As courts of the first approach have solid theoretical support and important empiric works have been performed to verify institutes' importance on economic development. Bennedsen [2] considers institutions as forming the economic environment in which companies and individuals operate. In particular, institutions provide incentives for businesses and individuals. In general, an economic activity, such as investing in manufacturing activity, is associated with two types of private and social returns. Private return is the net return on a broker committed to an activity, while social return is the total internal return on the economy. Today, institutions' importance on economic performance is almost accepted, but it seems essential to include institutions in economic analysis and know-how they affect them. Because most institutions' impact on growth is indirect and is performed through different channels, understanding these channels and the relationship between institutions is more important than the institutions themselves [3].

2.4 The Role and Importance of Financial Institutions

In the last two decades, extensive studies have been performed on the literature on the role and importance of financial markets in economic development. The advent of the first generation of endogenous growth models directs economists' attention to other factors creating economic growth without fear of its descending return. Boyd and Perry Scott [18], Diamond [31], Roemer [12] and [10], Lucas [4] are among the first researchers to propose the basis of the discussion. In this group of growth models, the role of financial markets is not explicitly emphasized to explain the real reason for endogenous growth, but in the second generation of endogenous growth models by Bensingaga and Smith [5], Greenwood and Juanovick [2]. Greenwood and Smith [6], King and Levin [5], etc., the financial markets and the importance of financial institutions in the process of economic development were modeled. Generally, these models address the need to create financial institutions considering the asymmetric information and uncertainty about productive investment returns and non-zero transaction costs. Fray raised this issue after explaining the theories of this generation of models:

"In the world in which information acquisition costs, exchanges, and control are favorable, finance and financial institutes are of great importance [12]. Today, one of the major concerns of investment and financial managers is optimal decision making at high speed and amid a large volume of information and data on stocks and capital markets [34]. Thus, restricting the country's financial development program to interest rate liberalization according to conventional classical models means ignoring the practical factors in determining the transaction costs and the necessary control and regulatory institutions in the market [15].

2.5 Research Background

Shinoda and Kwenda [21], in a study on 49 African countries, indicated the positive impact of institutional quality and governance on financial inclusion in the region. The results also showed a significant positive effect of the lagged value of financial inclusion and banking sector size on African countries' financial inclusion. However, rural the total population and natural resources had a negative impact on

financial inclusion in Africa. Asif Khan et al. [21], in a study, investigated the impact of institutional quality (IQ) on financial development (FD) and showed that openness, national culture, and economic growth significantly moderate financial development through their positive interaction with institutional quality. Kuray et al. [24], in a study, showed that corruption reduction was correlated with a high level of financial sector development. Fagbemi et al. [25], in a study, investigated the institutional quality and financial development in Nigeria. Two different financial development indicators (private credit and liquidity to GDP) were used for this purpose. [35]

Their study shows that institutional factors do not significantly affect financial development in the long run and the short run. In addition, empirical evidence suggests that regulatory quality and management systems (institutions) do not necessarily contribute to financial development in a weak institutional environment, particularly in Nigeria. Thus, their findings show that while weak institutions can increase the risk of limiting financial system functioning, good governance and strong institutions are essential financial development ingredients in Nigeria. As a result, policies aimed at strengthening institutions and management's quality should form the government's (policymakers) ' main approach. These can help improve the financial sector development in Nigeria. In Ruge's [24] research, "the effect of the quality of national public sector governance on the shadow economy," research limitations were investigated in 35 European countries (28 OECD countries). He performed this analysis with a set of 58 indicators using a structural equation model. The determining factors of the shadow economy include the development level, the administrative system, the value and validity of a law, social security and Taxation, complexity and control of Taxation, tax morale, labor market regulations, unemployment, and workers' rights. Analysis has shown that the size of the shadow economy is primarily related to its determinants. The general level of development of a country, the quality of overall governance, and the administrative system are practical factors, and policymakers should consider them. The slightest shadow economy size is in New Zealand with 1% of GDP and the highest in Romania and Latvia with 10%. Marro [7], in his study of two indicators of corruption and multivariate reduction in a sample of 106 countries, reveals that higher levels of corruption are associated with lower investment and lower GDP and per capita GDP. [19]

He explains that if a country's corruption index improves from 6 to 8, it can lead to a 4% increase in the annual investment rate and a 1.5% increase in GDP. Singh et al. [8] investigated the factors that create the underground economy by focusing on large companies' roles and the law in 100 countries. Variables such as tax burden, formal, informal political, social, and economic organizations, labor market limitations, increased informal employment, and companies and individuals' inability to access formal financial sectors are among the factors that create the underground economy. They used the ordinary least squares method in this research. The dependent variable was shadow economy, and its values were taken from Schneider et al.'s [15] study. Final income tax rate, actual and per capita GDP, and inflation rates are all interpretive variables. The results show that companies encountered a solid incentive to hide their underground economy activities when faced with strict rules, incompatible actions, and corruption. Also, empirical evidence indicates that companies are more critical in creating and developing the underground economy than the tax rate, and they are on their way to achieving their goal [28].

3 Methodology

Following the studies of Asif Khan et al. [16] and Fagabmi et al. [26], the purpose of this study is to investigate the effect of effective governance and quality of regulation on financial development in the Iranian economic conditions. Given that the dependent variable is financial development and the transition variables are effective governance and the quality of regulations, and the devaluation of the national currency, the general form of the LSTR model is as follows:

$$\Delta(lnFD)_t = \varphi(BD)_t + \acute{\theta}(MISSppp)_t F(\gamma, s_t, c) + u_t$$
$$= \{\varphi + \theta F(\gamma, s_t, \acute{c})(MISSppp)_t + u_t \qquad t = 1, \dots, T$$

Where the transition function F is equal to:

$$(\gamma, s_t, c) = (1 + MISSppp\{-\gamma(s_t - c)\})^{-1}, \qquad \gamma > 0$$

Estimating the financial development model according to the above pattern and after removing the redundant variables, results in the following Equation:

$$\Delta(lnFD)_t = -\mathrm{C} + \beta BD_t + \beta\Delta(MISppp)_t + \beta(GE)_t + \beta(RL)_t$$
$$+\beta RO_t + \beta GDP_t - \beta SAN_t - \beta FC_t$$

In the model estimated using Logistic Smooth Transition Autoregressive (LSTAR), it is attempted to evaluate the effect of effective governance and quality of regulation despite the devaluation of the national currency, financial crises, and the political effects of sanctions on the development of financial markets in terms of bank liquidity ratio to GDP as the real sector financial development index. The experimental model of the research is introduced as follows:

3.1 Research Model

$$FD_t = \mathrm{a}_0 + \mathrm{a}_1 FD_{t-1} + \mathrm{a}_2 BD_t + \mathrm{a}_3 MissPPP_t + \mathrm{a}_4 GE_t + \mathrm{a}_5 RL_t + \mathrm{a}_6 RO_t + \mathrm{a}_7 GDP_t + \mathrm{a}_8 SAN_t + \mathrm{a}_9 FC_t + U_t$$

Bank Deposits: The bank liquidity ratio to GDP as an indicator of financial development (FD) of the real sector of the economy

BD: Budget deficit as an indicator of government debt and limited financial resources

GE: Government effectiveness. The standard deviation of the government effectiveness index calculated by Transparency International is used.

RO: Regulation quality. The standard deviation of the regulation quality index calculated by Transparency International is used.

RL: the rule of law. The standard deviation of the rule of law index calculated by Transparency International is used.

GDP: Gross domestic production

FC: The dummy variable of financial crises is 1 for crisis years and 0 for the remaining years.

SAN: The dummy variable of nuclear embargo years is considered 1 for the years 2012 and 0 for the remaining years.

MissPPP: Devaluation of the national currency.

3.2 The Balassa-Samuelson Modified Model

In this study, the devaluation of the national currency index of enhanced purchasing power parity is used based on the standard purchasing power parity criterion and adjusted for the Balassa-Samuelson effect. In addition, the effect of strengthening the value of the national currency is separated from the national currency's devaluation so that only the effect of the devaluation of the national currency will be examined. The calculation of this index is as follows:

First, the real exchange rate at the level (RERt) or the ratio of the implicit GDP index is calculated as follows:

$$Log(RER_t) = \log(XRAT_t / PPP_t) = \log(Pusa / Pir) \qquad (1)$$

XRAT is the nominal exchange rate of the domestic currency against the US dollar, PPP is the exchange rate derived from the purchasing power parity theory. PUSA is the price level in the US, and Pir is the price level in Iran.

The above Equation provides the simplest version of the purchasing power parity index. If the Log (RERt) is positive, it indicates devaluation of the national currency, and if it is negative, it indicates overvaluation of the real exchange rate.

The second step involves setting this criterion for the Balassa-Samuelson effect, using the Colin and Williamson Enhanced Deviation Index. This is done by regressing on the RERt of the real GDP per capita (RGDPCHt), which is as follows:

$$Log(RER_t) = \alpha + \beta \log(RGDPCH_t) + \varepsilon_t \quad (2)$$

The beta coefficient tells us how much the country's real exchange rate tends to rise on average as the country gets richer (according to the Balassa-Samuelson findings). Then, we subtract the estimated values of Log (RERt) of Equation 2 from the values obtained from Model 2. This gives an improved purchasing power parity index, which is as follows:

$$MissPPP_t = \beta \log(RER_t) - Log(\hat{RET})$$

The positive values of this index indicate that the exchange rate is adjusted so that the level of prices inside is lower than the value predicted by the exchange rate index of purchasing power parity, and negative values indicate the opposite of the above. Also, the present study's period is quarterly data from 1996 to 2018, and all study data have been extracted from the World Bank and Transparency International website.

3.3 STAR Model

Due to linear models' limitations, many studies have suggested using different non-linear models to specify non-linear behavior in time series. In this study, to model the effect of effective governance and quality of regulation on financial development in Iran's economic conditions, the STAR model is used, developed by Teräsvirta & Anderson ([12]) and Teräsvirta ([17]). Unlike TAR models, which use the indicator function to control regime change, the STAR model uses exponential and logistic functions for this purpose. According to Van Dijk and Teräsvirta ([5]), these models are suitable for analyzing asymmetric cycles of variables. Many studies have shown that they fit the regime change mechanism well to study the non-linear dynamics of variables. The STAR model continuously models the non-linear relationship between the variables using the transition and slope parameter values. The STAR model of Teräsvirta is specified as the following general regression.

$$y_t = \pi' z_t + \theta' z_t + F(s_t, \gamma, c) + u_t \quad (3)$$

Where zt vector contains model exogenous variables; π is linear parameter vector; θ is non-linear parameters' vector of the model; ut is a residual component that is assumed to be uniformly distributed independently with a mean value of zero and constant variance of ($u_t \approx iid(0,\sigma^2)$). Also, the transfer function $F(s_t, \gamma, c)$ can be specified logistically or exponentially in the form of the following link.

$$F(s_t, \gamma, c) = \left[\frac{1}{1+\exp(-\gamma(s_t - c))} - \frac{1}{2}\right] \quad (4)$$

$$F(s_t, \gamma, c) = \left[1 - \exp\left(-\gamma(s_t - c)\right)^2\right] \quad (5)$$

Equation (4) represents the logistic transition function, and Equation (5) represents the exponential transition function. The above functions represent the transition variable; γ shows the slope parameter; c indicates regime change threshold or place. If the slope parameter γ, which indicates the transition

rate from one regime to another, tends to infinity, the STAR model becomes a threshold TAR model. That is, if the transition variable is greater than the threshold (c < st), the transition function becomes one (F = 1). On the other hand, if (c > st), the value of the transition function is equal to zero (F = 0). If the slope parameter's value tends to zero, the STAR model will become a linear model. Estimating the STAR model is such that the dynamic model or the number of optimal lags are selected in the first step. A non-linear relationship between the studied variables is tested, and the transition variable and the number of regime changes are selected accordingly. In the second step, using the Newton-Raphson algorithm and the maximum likelihood method, the selected STAR model is estimated, and finally, diagnostic tests are performed to ensure reliable results.

Although the linearity test in the STAR model can be performed with the null hypothesis test $H_0: \gamma = 0$, $H_0: \theta = 0$, the test statistics of both hypotheses are non-standard since the STAR model under the null hypothesis contains unknown nuisance parameters. To overcome this problem, Luukkonen ([28]) proposed using the Taylor approximation of the transfer function. For this purpose, the Taylor approximation of the third order of the transfer function is parameterized around the value. Accordingly, the regression equation (3) can be rewritten as follows:

$$y_t = \pi' z_t + \theta' z_t \gamma F_\gamma(s_t, \gamma = 0, c) + \theta' z_t \gamma^2 F_{\gamma\gamma}(s_t, \gamma = 0, c) + \theta' z_t \gamma^3 F_{\gamma\gamma\gamma}(s_t, \gamma = 0, c) + u_t \quad (6)$$

By inserting the value γ = 0 and simplifying the first to third-order derivatives of the transfer function, one of the following auxiliary regressions can be obtained, depending on whether the transfer variable st is part of the group of variables it or not:

If the transfer variable st is part of the group of zt variables, then the simplified form of Equation (6) would be as follows:

$$y_t = \beta_0' \tilde{z}_t + \beta_1' \tilde{z}_t s_t + \beta_2' \tilde{z}_t s_t^2 + \beta_3' \tilde{z}_t s_t^3 + \nu_{1t} \quad (7)$$

Where, $z_t = (1, \tilde{z}_t)'$ If the transfer variable st is not part of the group of zt variables, then the simplified form of Equation (6) would be as follows:

$$y_t = \beta_0' z_t + \beta_1' z_t s_t + \beta_2' z_t s_t^2 + \beta_3' z_t s_t^3 + \nu_{2t} \quad (8)$$

The null hypothesis of the linear relationship between the dependent variable and the explanatory variables can be tested in the form of the following coefficient test against the alternative hypothesis of the existence of a non-linear relationship between the variables:

$$H_{01}: \beta_1 = \beta_2 = \beta_3 = 0 \quad (9)$$

The above test statistic has an F distribution. If the relationship between the variables is non-linear, the appropriate non-linear model must be selected, as mentioned earlier. To select the appropriate model, three coefficient tests with the following null hypotheses are presented. The statistics of these tests have an F distribution.

$$H_{02}: \beta_1 = 0 | \quad \beta_2 = \beta_3 = 0$$

$$H_{03}: \beta_1 = 0 | \quad \beta_3 = 0$$

$$H_{04}: \beta_3 = 0$$

We show the statistics of the above tests with F2, F3, F4, respectively. Rejection of H03 means that the

optimal STAR model is logistic or the STAR model is exponential. By testing the hypothesis H0: c1 = c2, one of the 2LSTR and ESTR models can be chosen. Therefore, rejecting the null hypothesis of this test means that the optimal model is 2LSTR. On the other hand, rejecting the H02 and H04 hypotheses means that the optimal model is LSTR with one regime change (1LSTR). In order to select the appropriate transfer variable from among different and acceptable candidates for this variable, a variable is selected for which, finally, as mentioned before, the selected non-linear model is estimated based on the Newton-Raphson algorithm. Diagnostic tests are performed on the residues of this model after fitting the non-linear model. According to Malaga and Kim [10], in comparing linear models with instantaneous regime change models, the most important reasons for using the STAR model as a gradual regime change model are as follows.

If we assume a policy change occurs at time t, a change to a new regime does not have to occur at time t in practice. In other words, it does not have to be instantaneous change, and there are several reasons for this. Some economic agents may anticipate a policy change and adjust to it before it occurs. Alternatively, some may not believe in policy change or may need time to understand it. There will also be adjustment costs for delays. In addition, another limitation of the usual time series econometric methods, especially in discussions of the co-integration of variables, is the discussion of the unit root test in time series variables. So that the unit root test has become almost mandatory in applied economics. However, in many cases, this test is unnecessary or misleading. In his study of structural time series patterns, Harvey ([6]) points out that determining the integration degree of a time series variable is not necessarily critical in the context of structural patterns. Deleting a random trend pattern and turning it into a definite slope pattern is rare in a particular case. The above factors have suggested a pattern of gradual regime change. Smooth transition regression models are among the patterns of gradual systemic change. These patterns are called STAR models.

4 Results

4.1 Model Estimation Results

4.1.1 The Evaluation of Descriptive Statistics of the Leading Indicators of the Study

Table 1: Some Descriptive Statistics of the Leading Indicators of the Study

Iran	**FD**	**RO**	**RL**
Mean	49.33481	11.22600	27.00768
Max	91.32654	24.32653	38.65325
Min	35.23724	2.340061	13.94231

Source: Research Findings

The average financial development index using the ratio of bank liquidity to GDP is 49.33. Based on the chart trend of the financial development index, it can be seen that the average ratio of bank liquidity to GDP from 1996 to 2016 has an ascending trend every year. The average quality index of regulations is 11.22, which has a descending trend over the studied period, which indicates a decrease in the quality of regulations and effective governance. The role or the rule of law variable also has an average of 27

4.1.2 Results of Unit Root Tests

Table 2 presents the results of these tests for the time series of variables used in this research. According to the results, the variables of government debt index and limited financial resources, government effectiveness, quality of regulations, role or the rule of law, GDP, and devaluation of national currency

are not stationary. The absolute value of Dickie-Fuller statistic is greater than the absolute value of critical values at the probability level of 1%, 5%, and even 10%. However, once differentiated, these variables have become stationary; As a result, the variables are integrated and are of the first degree or I (1).

Table 2: Results of ADF Unit Root Test

Variable		**ADF statistics**		**Degree of integration**
		Coefficient	**Sig. level**	
Financial development	*FD*	-4.126588	0.0039	I(1)
The budget deficit or limited financial resources	BD	-4.891644	0.0007	I(1)
Government effectiveness	GE	-4.670875	0.0055	I(1)
Regulation quality	RO	-3.175871	0.0342	I(1)
The rule of law	RL	-5.072326	0.0023	I(1)
Gross domestic production	GDP	-5.830621	0.0004	I(1)
Devaluation of national currency	MissPPP	-4.728380	0.0049	I(1)

Reference: Research Findings

4.1.3 Co-Integration Tests

In order to check the results of the co-integration test, it is necessary to select an appropriate model regarding the presence or absence of time trend and intercept in the co-integration vector. There are five patterns in this regard: the first pattern, without intercept and time trend; the second pattern, with a constrained intercept and no time trend; the third pattern, with an unconstrained intercept and no time trend; the fourth pattern, with an unconstrained intercept and constrained time trend; and the fifth pattern, with an unconstrained intercept and unconstrained time trend.

These five patterns are estimated from the most constrained (first pattern) to the most unconstrained (fifth pattern) form for the variables. Then, the null hypothesis of the absence of a co-integration vector versus the existence of one co-integration vector and the hypothesis of a maximum of one co-integration vector against two vectors are tested. This test continues until n-1 (n number of variables) of the co-integration vector. The effect tests (λTrace) and the maximum eigenvalue (λMax) regarding the number of co-integration vectors based on the five patterns mentioned are presented in Table 2. As shown in Table 3, the null hypothesis of no co-integration vector versus the existence of five co-integration vectors between variables is rejected in all models, so there is at least one co-integration vector between the studied variables in the five models.

Table 3: Summary of the Results of the Number of Co-Integration Vectors

Model	**1st model**	**2nd model**	**3rd model**	**4th model**	**5th model**
Effect test	3	4	3	4	3
Maximum eigenvalue test	1	1	1	2	2

Reference: Research Findings

The results of model estimation and review of co-integration tests related to this model are reported in Table 4. According to the results, based on the effect test, the existence of 4 co-integration vectors, and based on the maximum eigenvalue test results, the existence of 2 co-integration vectors is confirmed at a 95% confidence level. As Johansson points out, in the event of a discrepancy between the results,

since the maximum eigenvalue test has a more robust alternative hypothesis, this test takes precedence over the effect test. Therefore, the existence of two co-integration vectors between model variables can be accepted.

Table 4: Co-Integration Test Results

H0	H1	Effect test statistics	Critical min. at 95%	Prob.	Max. eigenvalue test statistics	Critical min. at 95%	Prob.
None		0.948838	150.5585	0.0000	0.948838	50.59985	0.0000
r=0	r=1	0.865578	117.7082	0.0002	0.865578	44.49720	0.0109
r≤1	r=2	0.693177	88.80380	0.0132	0.693177	38.33101	0.3545
r≤2	r=3	0.652847	63.87610	0.0287	0.652847	32.11832	0.2102
r≤3	r=4	0.576199	42.91525	0.0912	0.576199	25.82321	0.1698
r≤4	r=5	0.454623	25.87211	0.2969	0.454623	19.38704	0.1853
r≤5	r=6	0.133257	12.51798	0.8023	0.133257	12.51798	0.8023

Reference: Research Findings

4.1.4 Linearity Test, Selection of Transfer Variable and Model Type

Estimating the STAR model, to select the transfer variable, all the variables in the model are tested. Any variable that most likely rejects the null hypothesis will be selected as the transfer variable from the tested variables. It should also be noted that the proposed model (STAR) is selected by the transfer variable as the optimal model to estimate the effect of effective governance and quality of regulation on financial development in the economic conditions of Iran. The results of Table 4 show that the transfer variable in the estimated model is the devaluation of the national currency, and the null hypothesis that the model is linear is rejected, and the first-order LSTR model is confirmed.

Table 5: Linearity Test, Selection of Transfer Variable and Model Type

Variable	F statistics	F2 statistics	F3 statistics	F4 statistics	Proposed model
MissPPP(t)	0.43651	0.47852	0.35625	0.28956	1LSTR

Reference: Research Findings

4.2 Model Estimation Results

In the next step, using a 1LSTR model in which the transfer variable is the devaluation of the national currency, the function of effective governance, and the quality of regulations on financial development in Iran's economic conditions will be modeled. For this purpose, the initial values for the threshold value of the transfer variable (C) and the slope parameter (γ) are selected. Using these initial values and using the Newton-Raphson algorithm, the maximum likelihood method estimates the model parameters. The results are reported in Table (6). Based on the linearity test results, the devaluation of the national currency has been selected as the transfer variable. Estimating the linear part of the model (first regime) shows that GDP, RL, RO, and GE are significant and positively affect financial development in Iran at a 95% confidence level. Also, the variables of MissPPP and FC have a negative impact on financial development in the Iranian economy. Also, estimating the non-linear part of the model (second regime) shows a positive relationship between RL and GDP variables with FD. The sign of the variables of RO, BD, GE, MissPPP, SAN, and FC is negative, and these results were expected as Iran is on its development and growth path. The positive sign of the lag of the dependent variable of the financial development index shows the country's attention to financial development and the use of solutions and attention to infrastructure to increase financial development over time, which needs more attention from government officials.

Most economic studies, especially those of neoclassical economists, point out that a completely free economy is likely to be superior to a highly restrained economy. Practical observations of foreign trade

openness and the development of financial markets can lead to theoretical insights into the type of economic policies that are the prerequisite of economic growth. Observations indicate that reducing quantitative restrictions, prudent macroeconomic policies, government policies, political stability, and controlling corruption play a decisive role in justifying the relationship between effective governance and the quality of regulation with financial development in an economy. It should be noted that economic studies do not agree on the relationship between effective governance and the quality of regulation and financial development, and there are still disagreements among economists about how international economic policies and the extent of development interact. Although several studies have used similar analytical frameworks to econometric methods and developed theoretical issues in growth theory through an inter-country data set, there is a reality. That is a disagreement that exists among economists on the reality of this relationship. Contrary to what traditional and static business theories emphasize, the business's efficiency in dynamic business theory focuses on the indirect benefits of financial development. On the other hand, in dynamic theory, financial development's emotional benefits arise from physical and human capital accumulation.

The study of applied research on the effect of effective governance and quality of regulation on the development of financial markets shows that it is limited to "degree of financial development" and "size of the growth." On the other hand, new and old theories of growth are to find different ways to calculate growth. Unfortunately, the determinants of financial development policies are such that they do not accurately capture all the concepts of the degree of financial development. Therefore, it can be concluded that international financial development is a growth factor in countries that their exchange goods can improve production capacity by attracting superior technology and foreign direct investment; otherwise, any contact with the outside world will reduce growth. Thus, according to theoretical expectations as well as model estimation results, RL strengthens financial development. On the other hand, a gradual increase in foreign investment can also accelerate growth.

What may be more critical than the inflow of foreign capital in a country is attracting and managing these investments in the country's economy. Proper management of foreign capital and leading them to profitable activities ensure the inflow of more and more foreign capital, which accelerates financial growth and development. Political stability through the channel of communication with the outside world also affects financial development, so that in countries where there is a possibility of coups, street riots, assassinations, and other forms of uncompromising change of power, the incentive to invest is low, and investors try to transfer their capital to safe places in such circumstances. In countries where power transfer takes place democratically and expediently and does not witness coups, assassinations, and revolutions, high financial development occurs. Some scholars have considered corruption control and governance indicators as the fuel for the bureaucracy and believe that corruption accelerates financial development in two ways: 1. corrupt activities such as bribery make avoiding administrative delays possible for people; 2. when the bribe is in the form of a wage rate, then the brokers work with more seriousness and motivation. However, [36] dismisses it as inaccurate and states that offering bribes to departments creates a procedure in which bureaucracy is delayed until bribes are paid to employees, creating a heavy bureaucracy for the economy as a whole, raising the cost of investment, and ultimately, undermining financial development. Also, the negative sign of the variable of quality of regulations, government effectiveness, and the budget deficit can be justified. The more accountable and efficient the government in a country, the greater the political stability, the lower the additional regulations and costs, the wider the rule of law, the smaller the size of the government, and the more limited the corruption, the more the financial development increases that require more attention from rulers and the government regarding accountability, obedience to the law, as well as the quality of regulations.

Table 6: Model Estimation Using LSTR

Linear part estimation			
Variable	**Coefficient**	**T-statistics**	**Probability**
CONSTANT	-0.167172	-6.706608	0.0000
FD (t-1)	-0.019701	-6.430291	0.0000
GDP	4.477946	2.257826	0.0265
BD	-0.134741	-0.782473	0.4361
MissPPP	-0.868406	-4.501283	0.0000
FC	-0.050737	-26.42795	0.0000
RL	0.387710	11.26978	0.0000
RO	0.236037	5.135497	0.0000
GE	0.918788	1.387571	0.1689
SAN	-0.055799	-0.722763	0.4718
Non-linear part estimation			
CONSTANT	-0.381731	-69.54754	0.0000
FD (t-1)	0.903839	5.973878	0.0000
GDP	0.436149	62.26827	0.0000
BD	-0.177326	-2.516070	0.0126
MissPPP	-0.144602	-16.25730	0.0000
FC	-0.066670	-3.959824	0.0001
RL	0.077839	3.944504	0.0001
RO	-0.069771	-3.135328	0.0020
GE	-0.250714	-4.295886	0.0000
SAN	-0.024821	-4.550370	0.0000
Threshold limit (c)	6.554846	70.49194	0.0000
Slope Parameter (γ)	0.154051	2.597524	0.0153
The adjusted coefficient of R = 0.87			

Reference: Research Findings

The comparison of coefficients in two different regimes is based on the transfer variable and its values. The value of the transfer variable can determine the transfer function and, therefore, the ruling regime. The greater or lower value transfer variable than the threshold can create two different regimes in the estimated function. In the above estimate, the transfer variable is the devaluation of the national currency. The estimated threshold value for this variable (2) was equal to 6.55. Based on the distance of the national currency's devaluation from the threshold, the model follows two different limit regimes. Comparing the model coefficients in two different regimes reveals that with the devaluation of the national currency exceeding the threshold (6.55), the market reaction to the changes of this variable has increased sharply, so that the greater the devaluation of the national currency, the more policymakers have tried to control the growth of the exchange rate and prevent it from rising by reacting more—meanwhile, the reaction to the deviations of the devaluation of the national currency decreases. Thus, in situations where the devaluation of the national currency experiences higher growth, policymakers seek to control the national currency's devaluation more and pay less attention to its deviations.

4.3 Diagnostic Tests

According to the estimation, there is no correlation error and heteroscedasticity in the 1LSTR estimation model. The no remaining nonlinearity test also shows that the 1LSTR model specifies all non-linear behaviors in the model. The results of the parameter constancy test in different regimes also show that the null hypothesis of the test that coefficients and model parameters are constant in two different regimes is rejected, and this result means that the coefficients of explanatory variables in two different

regimes are acceptable and asymmetric effect on the dependent of financial development is approved. Therefore, based on the estimated results of the model and diagnostic tests performed, it seems that the 1LSTR model is a suitable model to explain the effect of effective governance and quality of regulations on financial development in the Iranian economic conditions and the accuracy of the results of this model can be trusted.

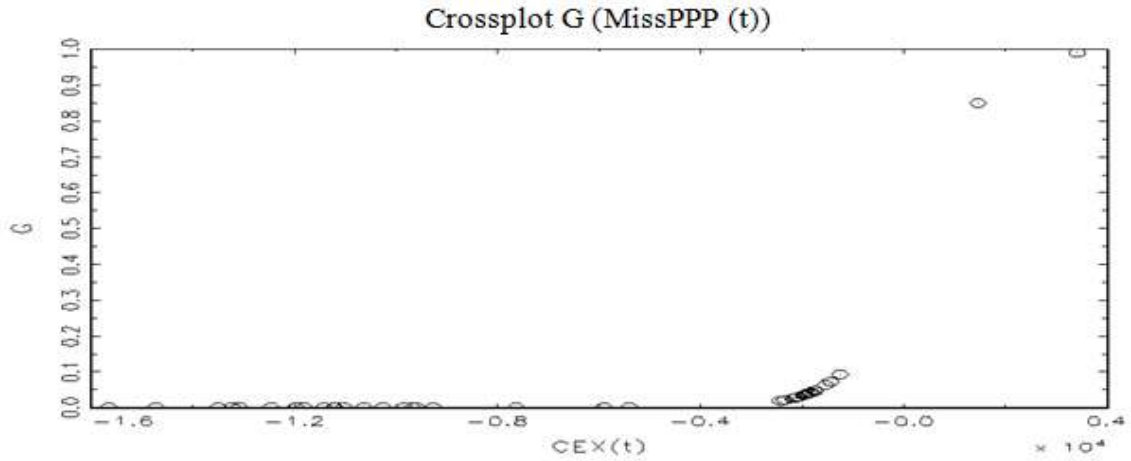

Fig. 1: The Relationship Between the Transfer Function and the Transfer Variable of the Devaluation of the National Currency

Table 7: Residuals' Serial Autocorrelation Test

Lag	F-value	Df1	Df2	P-value
1	0.7193	1	31	0.4029
2	1.3365	2	29	0.7170
3	1.3948	3	27	0.2658
4	1.0426	4	25	0.4051
5	1.0648	5	23	0.4052
6	0.9627	6	21	0.4737
7	0.8138	7	19	0.5871
8	0.6433	8	17	0.7318
Reference: research findings				

Table 8: Results of Diagnostic Tests

Test	F-value	P-value
ARCH LM-test	0.2831	0.9657
No remaining nonlinearity test	1.2367	0.3228
Parameters constancy test	1.6148	0.2652
		Reference: research findings

5 Discussion and Conclusion

In this paper, to estimate the effect of effective governance and quality of regulations on financial development in Iran's economic conditions, the threshold approach model was used based on quarterly data from 1996 to 2018. Estimating the linear part of the model (first regime) showed that the variables of GDP, role or the rule of law, quality of regulations, and government effectiveness have a significant and positive impact on Iran's financial development at a 95% confidence level. Also, the variables of

devaluation of the national currency and financial crises have a negative impact on financial development in the Iranian economy. Also, estimating the non-linear part of the model (second regime) showed the existence of a positive relationship between the variables of role or the rule of law and GDP with financial development. The sign of the variables of the quality of regulations, government budget deficit and government effectiveness, devaluation of the national currency, nuclear sanctions, and financial crises were negative, expected as Iran is developing and growing. Moreover, the positive sign of the lag of the dependent variable of the financial development index shows the country's attention to financial development and the use of solutions and attention to infrastructure to increase financial development over time, which needs more attention from the government officials. Therefore, suggestions are made for the model estimation results:

- Creating economic security and a safe environment for investment, expanding and diversifying markets and financial institutions (stock exchanges, investment companies, and private pension funds), moving towards an open economy and the use of foreign investment, creating changes in capital market regulations aimed at transparency and stability to increase savings and investment can pave the way for increased financial development. Also, financial and tax laws and regulations should be formulated in such a way as to create the necessary incentive for financial development.

The financial development channel's primary channel is increasing investment efficiency, quality of regulations, reducing economic sanctions, and governance indicators. Therefore, the liberalization of financial markets, weak management of the financial system, and the lack of cohesive financial markets. The benefit of regulation in the country can be considered the reasons for reducing investment efficiency through the inefficient allocation of resources country. As a result, more attention should be paid to the development and efficiency of financial markets in Iran, and as a result, more efficient allocation of resources and increase of the efficiency of investment.

- It is suggested that the government provide space for the private sector and foreign investment by shrinking its body. With the arrival of foreign direct investment and the development of financial markets, the government's foreign exchange earnings increase. As a result, with government foreign exchange earnings growth, the national currency's value also increases.

- The Iranian banking sector is suggested to try to optimize their activities to direct more credit to productive investment projects of the private sector, because with the prosperity of the private sector and increasing competition in the country, and the use of economic freedom policies, the development of financial markets is increased, leading to greater economic dynamism.

- All agencies and institutions using government budgets must submit annual performance reports to enlighten public opinion and clarify the organization's activities. Also, serious steps should be taken to simplify and clarify the laws, regulations, and instructions governing government departments and institutions. The organization and especially the management of organizations must be open, flexible, and transparent in processes, such as recruitment, employment, promotion, and, in general, in all human resources activities. Therefore, it is recommended that organizations prepare and transparently publish an annual performance report.

- Given that in budgets with a high share of revenues from the sale of natural resources, a significant part of these revenues are distributed in the form of hidden and non-hidden subsidies, and the result is widespread corruption, the direct and equal distribution of oil revenues among the people and Taxation, as well as the elimination of all direct and indirect subsidies, has a multilateral effect on governance indicators. On the one hand, reducing government expenses reduces the government size and thus increases its effectiveness and efficiency. On the other hand, it reduces widespread corruption caused by the rent of selling natural resources, which finally leads to extensive financial development.

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