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Political Influence Index and its Impact on the Development of Iranian Provinces

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Highlights

- **Introducing the Political Influence Index.**
- **Power rents have a great effect on the unbalanced development of regions.**
- **Development of Iranian provinces after the revolution.**

Abstract

The political influence coefficient is one of the critical factors in the development and imbalance of regional development, indicating the role of economic rent, power elites, and political lobbyists in decision-making centers. These people provide the conditions for the development of their hometown and province by lobbying to increase the budget and other influential factors on the macroeconomic indexes of these areas. Despite the importance of balanced regional development, this concept has received less attention in development literature. Thus, the political influence coefficient is introduced with 14 sub-indexes, and its influence on the regional development index is examined for 31 provinces of Iran in the third to twelfth governments during 1981-2017. Multiple-attribute decision-making, TOPSIS, and quantile regression for panel data and EViews were the models and software used. Three development indicators "political, educational and financial influence coefficient" were examined to investigate the impact on regional development. Iran's regional development was positively and significantly impacted by all three indicators. The political influence coefficient index as the main variable had the most impact, which was 2.35 and 3.11 times more than the control variables "education indicators" and "financial index" and had a role in the economic development of Iranian provinces. Due to the purposeful selection of the quantile panel regression model, different results were obtained for the impact of independent variables on the development of provinces in different deciles.

1. Introduction

The political influence coefficient is a new and considerably important concept due to its influence on unequal regional development within countries. Unequal regional development is one of the main dimensions of distributive justice and political, economic, and social challenges worldwide, particularly in

developing countries. Attention to development components from different dimensions is of utmost importance to structural planning by governments and regional development. The formation of self-esteem, wealth, freedom, income opportunities, and social values should be equally distributed throughout a country unless the unequal distribution of each/all of the above benefits the whole society (Rawls,1971). Distributive and social justice emphasizes fair allocation of resources and facilities to people with equal rights (Wilkinson, 2006). Elites, managers, and those with decision-making positions at the macro level in governments significantly contribute to the formation of inequalities and large rents for the benefit of their party, tribe, religion, race, province, region, and even themselves through extensive lobbying. People in public macro management are known as political elites, who are influential in the development of their countries (regions) (Obert, 2017). The term "elites" is very general and refers to a group of people or organizations that are influential at the national level through their political, military, or economic power (Doob, 2013; Vergara, 2013, Obert, 2017).

The development of regions, along with national development, has been of great importance in the 1960s and 1970s and has received much attention (pike et al., 2006). Each country has to consider the structural dimensions of the regions, including natural, geographical, and human force differences, to allocate development funds and budgets based on the existing potential of the region. In the process of development, it is necessary to take into account balanced regional development, in addition to national development, with an unbiased view of the distribution of material and spiritual resources (Azadi et al., 2021). Credit allocation and resource distribution to one or more specific areas with no consideration of the deprived regions would increase inequality (Todes, 2001), leading to numerous economic, social, and even political problems (Azadi et al., 2019) on a large scale worldwide (Lees, 2010).

Politics is one of the main influential factors in development, determining the conditions of institutional compatibility, power, and economic and political stability (Khan, 2010; Franz, 2018). Development should be based on the potential of each region, and it is imperative to minimize the influence of politics contrary to scientific and structural principles applied by politicians in the direction of development, although they make critical decisions for society (Fukuyama & Colby , 2011). In addition to natural resources, each region or province has human capital for development, who have a sense of belonging to their region and hometown when placed in a position of decision-making and power in the governments (Azadi et al, 2019). Hence, they direct the national resources to their regions or increase the budget share of their province through lobbying or power of influence. They may also affect the employment and development of the region by the placement of companies and factories and made-up advantages in their region. These lobbies, which are initially illegal and informal, will eventually become an official law for regional development. Therefore, it can be claimed that these people are the driving forces and growth machines of such regions due to their power rent, lobbying power, and political

influence. Accordingly, the present study has raised the question of whether political elites can lead to development inequalities in the regions. This discussion can be the basis for a balanced distribution of power in regions and countries because when power is in the hands of a particular group and faction, they dominate the economy and impose laws in their favor to influence other competitors (Paniagua & Vogler,2022). As a result, conditions of development inequality are formed and prevail in different areas, such as trade, where the preferences and biases in favor of a particular group and region lead to a gap in the matters related to the exporters and importers (Gourevitch, 1978; Rogowski, 1989; Frieden, 1992; Hiscox, 2002; Paniagua & Vogler, 2022). Therefore, governments need to understand the effects of the political influence coefficient index on the unbalanced distribution of development and focus on the balanced power distribution, which increases the abilities and power of certain groups to reduce the existing gaps (Lijphart 2012; Norris 2008; Strem et al., 2017).

Mills (1956) believes that power elites are those who simultaneously occupy the dominant positions in the institutional hierarchy at the highest levels of authority (see Also Denord et al., 2011; Larsen et al., 2017) and have high influence due to specific political conditions. Political power means the impact of certain individuals or groups who have more influence within political frameworks when there is a dispute over policy application (Acemoglu & Robinson, 2006b).

Each country and region has different definitions and categories for the power elites because of the institutional and structural differences of each region from others. Although there are four general strategies proposed to identify power elites at both local and national levels, including decision-making, reputation, local strategy, and relationship (Knoke, 1993), ultimately, power elites should be empirically determined (Knoke, 1993) because differences in influence and power lead to different expectations from them. Besides, although some of them will probably have proven strengths, they may never meet all the conditions for generalization (Larsen et al., 2017). Political elites include representatives of business associations, politicians, company leaders, high-ranking government employees, university presidents, and cultural elites who contribute significantly to political reforms and changes in economic conditions (Ibsen et al., 2021). Another challenging issue, in addition to the selection of elites, is the importance given to these people, which differs in various countries and regions based on the influence of different institutions. For example, high importance is given to people present at the Queen's 40th anniversary of the accession or royal events in Denmark because of their high political influence (Larsen et al., 2017).

This research was conducted on nine consecutive governments in Iran to define an index of the political elites, known as the political influence coefficient, and investigate its effects on regional development. Iran is a developing country with 31 provinces[1] and several ethnicities and religions, the leading of which is

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[1] There were fewer provinces in some periods under study.

Islam. Oil and gas are among the primary revenue sources of the country, which has a central government carrying out the fundamental planning and allocation of national and regional budgets. Besides the military, Iran has three central government bodies and institutions, including the judiciary, the executive, and the legislative, which are the main pillars of national planning and management (except for the influence of religious figures). Each of these powers has managers and leaders originally born in each province and region, where they have a significant impact on the development through changes in the planning decisions in the central government. As power elites with political influence, these individuals can lead to regional development inequalities. Thus, In this study, with the aim of investigating the effect of power rent on unbalanced development in the provinces of Iran, nd considering the importance of this index in regional development and also given the significant development gaps and inequalities in the provinces of this country, the current research initially introduces the political influence coefficient index and then: the question is raised: Do power rent and political influence coefficient create different conditions for the development of regions? The initial assumption is that any province with a higher influence coefficient also enjoys higher economic development. In general, the following parts of the research are allocated to the Theoretical and Empirical Literature, methodology, results, discussion, conclusions, and suggestions for next research.

2. Related Literature of Theoretical & Empirical

Power sharing follows the law of each country and is sometimes formulated within their constitution. This law was formed at different levels in the USA (at the time of its formation), Germany and India (1949), South Africa and Nigeria (1999), Colombia (1985), Lebanon (1943-1975), and Northern Ireland (1974) (Strøm et al, 2017; Horowitz, 1985; Roeder & Rothchild 2005). Power is influential in the executive process and international laws in societies, in addition to its contribution as a component of economic capacities (Franz,2018; Khan, 2010). The use of unbalanced methods formed by the unusual involvement of power elites to take possession of economic rents is due to the wrong structure of governments in developing countries (Robinson & Acemoglu, 2012).

Development is a multidimensional process that in addition to economic components includes social, environmental and institutional dimensions. In this study, three variables of education index, financial index and political influence coefficient index have been used to examine the impact on regions development. Education is one of the most important components used in various development indicators including the Human Development Index (HDI) which was used by Mahboob-ul-Haq (1990).

The financial index, as another important component in growth and development, also had a high impact in many studies in different countries. In a study conducted by Al-Jarrah et al., (2012), they found that financial index on economic growth was 65 percent. Also, many studies have examined the strong correlation between the growth of the financial index and economic development,

including: Beck & Levine (2004), Cetorelli & Gambera (2001), Fry (1978), Shaw (1973), McKinnon (1973), Goldsmith (1969), Gurley & Shaw (1955) and Schumpeter, (1911), Al-Jarrah; 2012. In this study, considering that education leads to strengthening social capital and reducing inequality, it has been used as social variable, also the financial index as economic variable and the political influence coefficient as a political variable, although the institutional dimension of the variables of education and political influence coefficient can be an important component for understanding regional development.

The agricultural elites were considerably influential in the pre-industrialization period (Ansell & Samuels 2014; Kuznets 1955). However, the capitalist elites took over the power in the society and challenged the agricultural elites after the industrial revolution, although these conflicts among the elites were over the general policies of the community (Boix 2011; Beramendi et al,2019; Justman & Gradstein 1999; Moore 1966). When there are limitations in power distribution across communities, political elites use unconventional lobbying to maintain the rents and customer-focused political power (Anderson et et.al, 2015; Baland & Robinson, 2008; Ferrez et al, 2020; Acemoglu & Robinson, 2006).

Research conducted so far in the field of political economy has mostly concentrated on the effect of elites in the formation of public institutions and organizations and economic systems (for example: Boix, 2003; Lizzeri& Persico, 2004; Acemoglu & Robinson, 2005; Congleton et al, 2010; Berkowitz & Clay, 2011; Ansell & Samuels, 2014; Albertus & Menaldo, 2018; Garfias, 2018; Beramendi, 2019; Garfias & Sellars, 2021; Paniagua & Vogler,2022). Some studies have also examined the significance of political contestation in influencing economic performance (Ferraz et al, 2020; Powell, 2000; Przeworski & Limongi, 1993; Wittman, 1989; Becker, 1983; Stigler, 1972; Becker, 1958), primarily reflected in public goods services provided for the whole society. There is also some research on the influence of economic elites on political conditions and elites, indicating that people with high economic status and power can set conditions for the rule of political people and affect political institutions (for example Paniagua & Vogler, 2022). Some studies assume that because the economic elites are homogeneous, the increase in their political power increases the conditions of inequality (Broockman et al, 2019). Democracy researchers were another group investigating the influence of social groups with power in governance to reduce the role of powerful political institutions in the government and ensure their interests (Paniagua & Vogler,2022: Lijphart, 1969, 1977; North & Weingast, 1989; Norris, 2008; Congleton, 2010). Therefore, the economic inequalities increase, subsequently increasing the political power of the economic elites, who then direct the policies and re-intensify the economic inequalities throughout the society, resulting in a vicious cycle (Broockman et al,2019). Political economy has proven the effects of inequality on development from various aspects in research as well as theoretical and empirical models. Hence, the resulting limitations on capital accumulation or job selection due to the political influence coefficient affect regional development negatively (Easterly,

2007; Persson & Tabellini, 1994; Alesina & Rodrik, 1994; Banerjee & Newman, 1993; Galor & Zeira, 1993).

The political influence coefficient as an institutional indicator has great importance in controlling unbalanced development. In institutionalist political economy, the concept was widespread that the economy cannot be separated from the political and social system which it is located. By separating institutional economics into two streams, old and new institutional economics (Snooks, 1993), different conditions were formed between the belief of institutionalists in the factors of growth and the views of neoclassicals. Unlike old institutional economics, which opposed neoclassical views, new institutional economics tried to resolving its deficiencies by publicly accepting their views (North, 1995). Therefore, in this regard, the role of elites and political institutions can show a new concept of development based on political institutions that can lead to a short-term and long-term increase in income inequality (The direct effect of political institutions also demonstrations that, in the short-term and long-term, they enhancement income inequality Timba et al., 2025). In general, it can be stated that the institutional environment determines a set of opportunities that create a more profitable rent position to find formal privileges and benefits (Baglıtas, 2024), also institutional & political mechanisms are effective in shaping economic efficiency in countries and regions (ut also on the standard of governance systems and institutions in a market that is very competitive (Banica et al., 2024; Acemoglu & Robinson, 2012; Perez, 1985; Olson, 1982). For this reason, efficient institutions can lead to equitable and sustainable economic outcomes (Valodia, et al, 2025).

Previous studies have used different methods to select political elites. Larsen et al. (2017) first categorized the people who had a high degree of social relations and then identified and weighted those who had more presence or membership as the core and highly powerful people. Razafindrakoto et al. (2021) categorized power into nine positions in Madagascar and interviewed a total of 1000 people considered to be part of the elites in at least one of the nine spheres covered. They also placed people in four separate categories, including quality, size, the strength of relationships, and variety of relationships, among which diversity had the highest importance.

Research conducted by Do et al., (2017) for the period 2000-2010 in Vietnam showed that the promotion of a local authority from domestic communes would lead to an average increase of 0.23 in the regional infrastructure after three years.

Caeyers & Dercon (2012) conducted a study in Ethiopia (2002), indicating that households with close relatives in formal positions were more than 12% more likely than households without close relatives to get free food items during drought.

Kashwan et al. (2019) found that a variety of varied local, national, and transnational actors with varying degrees of access to power negotiate institutional changes from above and below through promoting discourses, influencing agendas, and overtly imposing and resisting new regulations.

Beramendi et al. (2019) investigated the role of elites in fiscal development over the long run and found that an increase in intra-elite competition, along with one unit increase in the position of managers who sought fiscal development, would lead to a 1%-3.3% increase in tax revenues. Although the tax revenue was 20% for 31 countries during 1870-2010, taxes increased by 5%-17% due to intra-elite competition and the possession of high managerial positions.

Research conducted by Trinh et al. (2022) in Vietnam for the period 2012-2014 confirmed that one unit increase in political connections at the commune level increased the probability of receiving support in a post-shock period by approximately 30.7%. Overall, regardless of the days of doubt, these connections resulted in regional development.

Among the studies conducted, some have shown that political competition improves economic conditions in various fields (Ferraz et al, 2020; Martinez-Bravo et al., 2017; Acemoglu et al, 2014; Acemoglu et al, 2011; Besley et al, 2010), emphasizing the effects of politics on economic conditions from different perspectives. However, the current study has provided a new and different understanding of the definition of politics in the economy in Iran for the first time.

The quantile panel model is an advanced method in panel data analysis that can be used to examine the effect of independent variables on the dependent variable at different levels of distribution. This model can provide more information than standard regression models because it analyzes the behavior of the dependent variable at different points of the distribution (such as the lower, middle, and upper quantiles). For further study of the quantile model method, see the following studies (Bauerle & Putz (2020), Yu & Moyeed (2001), Koenker (2005), Galvao (2011), Melly & Saint-Pierre (2019), Bauerle & Putz (2020), Feng & Wang (2021), Aretz & Barassi (2022).

3. Methodology

The present descriptive and analytical research was conducted for 31 provinces of Iran during 1981-2017, using the two main models of TOPSIS and quantile regression for panel data, along with the respective tests of each. The data were extracted once every four years (t=9, n=31) because the presidential elections are held every four years in Iran, and the research aimed to investigate the performance of the states in terms of the effects of the political influence coefficient on the development of the regions.

Following the estimation of the first model (model-2), the political influence coefficient index was introduced and defined with 14 variables, in which the individuals were selected according to the greatest influence in decision-making and budget allocation to regions through a questionnaire. Then, each variable was weighted according to the degree of importance of the role of people in power (weights can change in each country based on the status and influence of each person) using the Delphi model and the experts' opinions. Different countries face empirical challenges in selecting power elites and assigning suitable people to this group (Laumann et al., 1983; Emirbayer, 1997). Those with the highest

governmental position (apart from religious authorities) were used as the main variables of the political influence coefficient index in Iran. The data were extracted from the official websites of the government, legislature, judiciary, and the statistics center of Iran. The birthplace of each individual was then determined using field studies, information from official sites, telephone, and e-mail, leading to first-hand data not provided or indexed consistently anywhere. Then each management position was scored and weighted according to the Delphi technique, followed by the ranking of 31 provinces of Iran in terms of the political influence coefficient index using the TOPSIS model. The obtained values formed the data of each government and were used as the critical variables of the second research model(model-3,4). In the next step, economic development was defined as the dependent variable, and political influence coefficient(independent variabl), education, and financial indexs were defined as control variables. Economic growth, the literacy level People with age of ≥ 10, and facilities formed the variables of development, education, and financial indexs, respectively.

3.1 Research Models

The study has used two models, including TOPSIS from multiple-criteria decision-making models and quantile regression for panel data, with Eviews software for its estimation. The aim of estimating the first model is to extract the coefficient of political influence of the provinces, after its estimation, this index is placed as an independent variable in the second model and its effect (along with other control variables) is investigated on development.

3.1.1 The First Research Model: Political Influence Coefficient Model

Multiple-criteria decision-making models (MCDM) consist of two parts, including multi-objective decision-making (MODM) and multi-attribute decision-making (MADM), and are used for ratings in different situations. The second type is further divided into compensatory and non-compensatory models, the first of which has been used in the current study. These models improve the quality of evaluations and decisions with their efficient, logical, and transparent structure (Wang & Triantaphyllou, 2008). The model evaluation process in TOPSIS software is primarily discussed before evaluating the multiple-attribute decision-making model (MADM).

3.1.1.1 TOPSIS Method

Wang & Yoon (1981) proposed the TOPSIS1 a method as one of the non-compensatory multiple-criteria decision-making methods (Zyoud & Fuchs-Hanusch, 2017). This method enables ranking and selecting the best alternative after forming a matrix with n alternatives and j criteria. Assuming that each criterion is incremental, TOPSIS is predicated on the assumption that the selected alternative should have the longest geometric distance from the negative ideal

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Technique for Order Preference by Similarity to Ideal Solution[1]

solution (A^-) and the lowest geometric distance from the positive ideal solution (A^+) (Ertugrul & Karakasoglu, 2007). Positive and negative solutions are the best and worst conditions, respectively (wang, 2008). All criteria are assigned different weights based on their importance, the sum of which equals one. This can be done through five weighting models, including entropy, Linmap, weighted least squares, eigenvector (sometimes called AHP), and Delphi methods. The current study has used the Delphi method for weighting, which is explained in more detail by (Lozano et al., 2016; Onat et al., 2016; Shih et al., 2007; Zyoud & Fuchs-Hanusch, 2017; Seyedmohammadi et al., 2018, wang, 2008).

The obtained matrix for the index and provinces of Iran is according to formula1.

$$Y_{it} = \sum w_{njt}.\mathrm{f}(x_{njt}) \tag{1}$$

Y_{it}, W, and x_{njt} indicate the political influence coefficient dependent variable, the weight of indexes of independent variables, and Influential factors and power rent generators of each region in the decision-making center, respectively. Besides, n, t, and j represent the province, time, and criterion (independent variables), which were n=31, t=9, and j=14 in the present study.

3.1.1.2 Political Influence Coefficient Index

The political influence coefficient is extracted as a dependent variable based on the TOPSIS model under the influence of independent variables to derive the political influence coefficient index, in which those with political influence, including 14 high positions in Iran, are defined as independent variables as follows:

Political influence coefficient index = President + Vice presidents + First Deputy of the President + Minister + Speaker of Parliament + Head of the Judiciary + Members of Parliament + Head of Broadcasting + Chairman of the Assembly of Experts + Head of the Expediency Discernment Council + Chief of the Supreme Court + Head of the Red Crescent + Attorney General + the Central Bank Governor

Algebraic model:

$$Y_{1t} = w_1 X_{1,1} + w_2 X_{1,2} + \cdots + w_{14} X_{14} \tag{2}$$

$$Y_{31t} = w_1 X_{31,1} + \alpha_2 X_{31,2} + \cdots + w_{n14} X_{31,14} \tag{3}$$

In which, w, X, t, and Y indicate the weight of each variable, variables (individuals with provincial influence coefficient), time, and the calculated number for the political influence coefficient of each province in each government, respectively.

Steps for the Formation of Political Influence Coefficient Index

- Investigating and collecting a large number of governmental posts that directly or indirectly affected national and regional decisions;
- Presenting a list of these posts to a group of academic experts in different social, political, and economic fields and receiving their opinions to

choose alternatives with a higher influence coefficient according to their weighting;

-   Categorizing the selected posts with high weights and re-submitting the second list to the experts to receive new comments;
-   Conducting several repetitions of this survey among experts and modifications to obtain 14 variables with high frequencies and weights of power rent among managerial posts;
-   Weighting each of the 14 selected variables based on the opinions of experts and according to the previous steps;
-   Investigating the identity of these individuals in different governments and determining their province and birthplace; and
-   Estimating the TOPSIS model with specified weights for 14 variables and 31 provinces in each government, obtaining the political influence coefficient for each province[1], and ranking the provinces in terms of this index.

3.2 The Second Research Model

Quantile regression models were first introduced by Koenker & Bassett (1978) and developed over time (Koenker and Hallock, 2001; Koenker & Machado,1999). This method has two advantages over ordinary least squares. First, these models are more efficient for outlier data in estimation and quantile regression results, while they also provide more explanation for the conditional distributions of the dependent variable (Aldieri & Vinci, 2017; Coad & Rao-Nicholson, 2011). The quantile model is more appropriate because most of the data usually have non-normal and outlier distribution (Lin & Xu, 2018), and the measurement error is also non-normal (Koenker & Hallock, 2001). They are also more robust than the ordinary least squares concerning variance homogeneity and do not require the calculation of classic OLS such as constant variance, zero mean, and normal distribution (Lin & Xu, 2018). This method uses the standard normal distribution in the asymptotic state and has no sensitivity to uniform transformations (Lin & Xu, 2018). More explanations on quantile regression for panel data are provided by (Vinci & Aldieri, 2017; Powell, 2016; Coad & Rao-Nicholson, 2011). The quantile regression for panel data was specified and estimated as follows to investigate the effect of the political influence coefficient on the development of 31 regions in Iran.

$\mathrm{Ld}nt = \gamma\theta x\_nt + \varepsilon\, nt$;$Quan\, t\, \theta\, (\mathrm{ld}nt \mid X\, nt) = \gamma\theta x\_nt$

$$q\,(\mathrm{ld}nt/\Omega t) = \theta 0t + \theta 1t\mathrm{PICI}t + \theta 2t\mathrm{fin}t + \theta 3t\mathrm{ein}t + \mu nt \qquad (4)$$

In the above relationship, $q(logdnt/\Omega t)$ is the conditional quantile of the logarithm of development for province n at time t, and Ωt includes the required information at time t. Besides, $PICIt$, $fint$, and $eint$ represent the political influence coefficient index, financial index (facilities), and education index of province n at time t, respectively. The independent variables are homogenized in

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[1] The differences in the number of provinces in some governments were due to different provincial divisions.

this model, the development is logarithmically entered into the equation, and the data are collected as a panel. According to investigations, the variables are expected to have coefficients according to Table 1.

Table 1. EXPECTED REGRESSION COEFFICIENTS

Expected Results	Variable
+	PICI
+	FI
+	EI

Source: *Research finding*

4. Findings
4.1 Variable descriptive statistics

The variables' descriptive statistics and the quantile regression for panel data are shown in Table 2, which was used due to the non-normality of data and the main model at the 1% level, as shown by the Jarque-Bera test.

Table 2. variable descriptive statistics and panel quantile model

Variable	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis	Jarque-Bera
LD	10.498	1.1828	8.462	15.00	1.0186	3.7287	48.18 (0.00)
PICI	0.1489	0.1402	0.000	0.598	1.1501	3.6836	59.26 (0.00)
EI	0.5931	0.3589	0.000	1.000	-0.592	1.5906	550.6 (0.00)
FI	0.1551	0.2081	0.000	1.000	2.3410	8.6200	34.91 (0.00)
Orginal model	0.1888	-1.399	3.706	1.78e-15	0.9211	1.1544	70.88 (0.00)

Source: *Research finding*

4.2 Unit Root Test & collinearity test

In quantile regression, there is no need for unit root and cointegration tests (look at Opoku & Aluko, 2021; Powell, 2020). Also, the unit root test in panel data has low power for small compared to large Ts (Baltagi, 2008). Some studies consider the large volume to be 25-30-100 (Fuller, 1976). Many studies indicate that there is no need for these tests in short periods (Greene,1997). However, the unit root test (Table 3) was performed, indicating that all independent variables were stationary according to Fisher PP, LLC, Fisher ADF, and IPS methods (the EI variable was not stationary according to Fisher ADF method only), and the dependent variable of development became stationary based on the Fisher ADF

and IPS tests by one differentiation. The null hypothesis of this test is generally defined as the presence of a unit root, according to which the alternative hypothesis is accepted if the significance level is $\leq 5\%$.

Table 3. Panel unit root test

	IPS	Fisher ADF	Fisher PP	LLC
	Level			
LD	11.0736(1.00)	0.58096(1.00)	0.00049(1.00)	27.3044(1.00)
PICI	-2.07016(0.01)**	87.2903(0.00)*	85.7730(0.00)*	-6.99077(0.00)*
EI	-6.15392(0.00)*	74.2793(0.10)	82.8849(0.02)**	-34.4276(0.00)*
FI	-6.65789(0.00)*	148.609(0.00)*	205.601(0.00)*	-19.2513(0.00)*
	First difference			
LD(-1)	-2.24150(0.01)**	80.9489(0.016)**	33.9656(0.99)	64.6802(1.00)

Significance at the level: 1%*, 5%**
***Source:** Research finding*

A position usual in the majority of regression applications is the presence of Strong correlations between predictors. The well-known issue of collinearity results from this. Quantile regression estimates are not affected by collinearity, in contrast to the well-studied effects on least squares estimates. Davino et al., (2022). To estimate the quantile model, there is not usually need for a collinearity test (significance of non-collinearity between variables). In quantile modeling, the focus is more on the conditional estimation of the dependent distribution of independent variables at different levels (quantiles). The article from Koenker (2005), explained that there is no need for a collinearity test. However, to investigate of collinearity from the VIF test according to the table, it was concluded that since the number corresponding to the VIF test is less than 10, there is no problem in terms of collinearity. For greater certainty, according to the correlation tests between the variables, since the significance level was more than 5 percent, there was no correlation that would lead to collinearity.

Table 4

Variables	Centered VIF
PICI	3.4524
FI	4.5240
EI	2.3249

***Source:** Research finding*

4.3 Cointegration Test

The cointegration test was performed (Table 5) to avoid differentiation and loss of data. Accordingly, the results of the ADF test confirmed the long-term relationship between the variables. The null hypothesis of this test was 'no cointegration' which was rejected at the level of 5%, subsequently confirming the alternative hypothesis of long-term relationship among variables.

Table5. Kao Residual Cointegration Test

	T-Statistic	Prob
ADF	-1.718073	*0.0429

Significance at the level: 5%*
***Source:** Research finding*

4.4 Quantile regression for panel data in the median mode

The results of panel data quantile regression in the median mode (Table 6) were examined for all variables without decimalization. As shown by the results, all independent variables affected the dependent variable positively at the 1% error level.

Table 6. Quantile Regression (Median)

Variable	Coefficient	Prob
PICI	2.683461	0.0000*
EI	1.141460	0.0000*
FI	0.868999	0.0092*
C	9.098547	0.0000*

Significance at the level: 1%*

***Source:** Research finding*

4.5 Statistical model specification

After the initial tests and ensuring the application of the quantile model based on the theoretical principles and research objectives, the model specification was carried out according to the (Ramsey) test and confirmed at the level of 5% (0.1180), considering the null hypothesis.

Table 7. Ramsey RESET Test

	Value	Df	Probability
QLR L-statistic	2.443649	1	0.1180
QLR Lambda-statistic	2.435716	1	0.1186

***Source:** Research finding*

4.6 The results of the effect of independent variables on the dependent variable

Finally, the main model was estimated in different deciles by performing all prerequisite tests of quantile regression for the panel data model (Table 8).

The political influence coefficient index (PICI) was significant in other deciles except for the last two (the seventh decile was significant at the 10% level, and other previous deciles were significant at the 1% level). The two intervening variables of education index (EI) and financial index (FI) and intercept affected the regional development in all deciles at the 1% error level positively and significantly (the FI variable was significant at the 5% level in the fourth decile).

Table 8. Quantile Process Estimates: The Effect of Variables of political influence, education, and finance on development.

Variables	10	20	30	40	50	60	70	80	90
PICI	1.72* (0. 00)	2.78* (0.00)	3.10* (0. 00)	2.94* (0.00)	2.68* (0.00)	2.29* (0. 00)	1.4*** (0.09)	-0.02 (0.9)	-0.12 (0.83)
EI	0.68* (0.00)	0.77* (0.00)	0.81* (0. 00)	0.88* (0.00)	1.14* (0.00)	1.18* (0. 00)	1.53* (0.00)	2.37* (0.00)	2.81* (0.00)
FI	1.30* (0.00)	1.08* (0.00)	0.78* (0.00)	0.78** (0.01)	0.86* (0.00)	1.04* (0.00)	1.32* (0.00)	1.22* (0.00)	1.42* (0.00)
Constant	8.66* (0.00)	8.73* (0.00)	8.92* (0.00)	9.04* (0.00)	9.09* (0.00)	9.23* (0.00)	9.41* (0.00)	9.69* (0.00)	9.78* (0.00)

Significance at level: 1%*, 5%**,10 %***
Source: *Research finding*

4.7 Symmetry and asymmetry test

The null hypothesis of this test is the symmetry of effects, in which the significance levels of >5% and <5% show symmetry and asymmetry, respectively. Symmetry means that as the dependent variable increases, the independent variable also increases. According to the Wald test, asymmetry was confirmed (Table 9), leading to the employment of the panel data quantile model. There are different conditions for each variable in different quantiles and intervals. The PICI, as the main variable of the model, is asymmetrical in the two initial and final intervals (0.9, 0.1-0.8, 0.2) and symmetrical in the two middle intervals (0.7, 0.3-0.6, 0.4). The EI variable was only symmetrical in the median interval (0.4, 0.6), and FI and C were symmetrical in all intervals.

Table 9. Symmetric Quantiles Test (Prob)

Test statistic compares all coefficients			
0.9-0.1	0.8-0.2	0.7-0.3	0.6-0.4
PICI 0.0001*	0.0037*	0.2277	0.7761
EI 0.0003*	0.0003*	0.0003*	0.1658
FI 0.1453	0.3074	0.3833	0.7717
C 0.2034	0.1464	0.2462	0.3279
Test Summary			
Chi-Sq. Statistic		Prob.	
51.514 Wald Test		0.0000*	

*Asymmetry In Quntiles and Regression Model
Source: *Research finding*

4.8 Equal slopes test

The null hypothesis in this test is the equality of slopes in different quantiles, which is accepted for the significance level of >5% and indicates unequal slopes for the significance level of <5%. The Wald Test (Table 10) shows (Prob=0.00)

that the OLS model cannot be used because there is a different slope for the variables in each quantile, leading to different interpretations.

Table 10. Quantile Slope Equality Test

				Test statistic compares all coefficients				
	0.1, 0.2	0.2, 0.3	0.3, 0.4	0.4, 0.5	0.5, 0.6	0.6, 0.7	0.7, 0.8	0.8, 0.9
Pici	0.0290	0.4669	0.5645	0.3861	0.2228	0.0592	0.0087	0.8494
EI	0.4749	0.6452	0.4552	0.0113	0.7188	0.0763	0.0001	0.0207
FI	0.4343	0.1894	0.9888	0.6519	0.3971	0.2248	0.7369	0.6086
Test Summary								
	Chi-Sq. Statistic			Chi-Sq. D.f		Prob.		
Wald Test	134.4417			24		0.000		

*Inequality Of Slopes In Quantiles And Regression Model
Source: *Research finding*

4.9 Comparative charts of variables

Chart 1 was drawn based on the coefficients of Table 7 for three independent variables in 3 stages first to third (A-B), third to seventh (B-C), and seventh to tenth (C onwards) deciles.
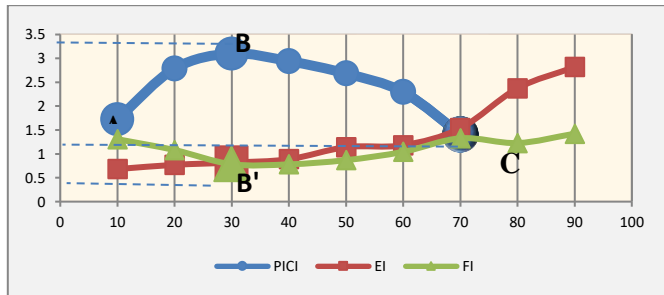

Figure 1. The Effect of Political Influence Index, Education Index, and Financial Index on Development
Source: *Research finding*

Chart 2 shows the relationship between the political influence coefficient index and other variables, including financial, education, and development indexs for the entire period under study, based on the primary data obtained from the TOPSIS model. The political influence coefficient index, as the research innovation, had a positive and long-term correlation with three macro indexs in Iran's economy.
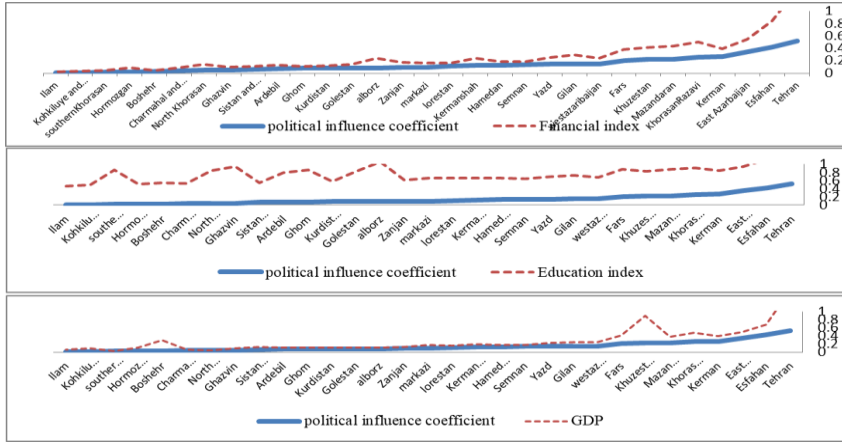
Figure 2. Investigating the Relationship Bitween The Index Of The Political Influence Coefficient With The Financial Index And The Development Index For The Years 1981-2017 In The Provinces Of Iran
Source: Research finding

5. Discussion

This study aimed to introduce and investigate the effect of the political influence coefficient index (PICI) on the economic development index of the regions(As one of the most important variables of the regions). According to the results, the research hypothesis was confirmed, while PICI had a more significant effect on the development than the intervening variables (EI and FI) (Tables 6 & 8). The political influence coefficient was the driving factor in different quantiles, shaping the path of other variables toward influencing development. Figure 1, obtained from the coefficients of the regression model (Table 8), separates three stages for the analysis and interpretation of the effect of variables on regional development. For the 9 investigated governments in Iran, the PICI had an inverted U shape similar to the Kuznets curve. In other words, with the increase of PICI from the lower to the higher deciles, the development has increased, and the effect of the political influence coefficient has decreased in the higher deciles. The upwards side of the first deciles indicates the lower influence coefficient for the respective province, which reflects the lack of high power to lobby and change the plans of the decision-making center toward provincial development. However, the same values had an exponential effect on the development of these provinces, and the increase in the PICI toward the middle deciles led to its maximum impact on the development in the third decile (Point B in Chart 1). Then, this impact followed a decreasing trend on the downward side of the curve. The absolute value of the slope of the first to third deciles was higher than the others, which means that initial increases in the political influence coefficient have led to regional development at a faster rate, while the rise in this coefficient in the last deciles of the model significance range has led to the regional development at a

slower rate. At high levels of development, as the provinces reach a high and specific limit of PIC in the center of power and decision-making, an intra-group competition is formed between the provinces with close PICs, preventing the excessive allocation of resources to them. On the other hand, the provinces at the lowest level of PICI have the least power rent and opportunity to compete in decision-making centers, leading to the allocation of much fewer resources, budgets, and facilities and consequently bringing about unequal conditions for regional development. Finally, it can be claimed that elites support policies that increase wealth and intensify inequality (Hacker & Pierson, 2017; Bartels, 2008). According to chart 1, the increasing and positive rate of development under the influence of PICI has been more than its decreasing and positive rate. In other words, the development increased by an increase in the PICI up to the first 3 deciles, after which this effect gradually declines with the decrease in PICI throughout the next 4 deciles. Finally, the impact of PICI on the development is indirect in the remaining deciles. Thus, the cumulative impact of the first 3 and the second 4 deciles of the political influence coefficient leads to continuous development for the last three deciles through the indirect impacts of PIC on education and financial indexs. From the 7th decade onwards, EI and FI are affected by the political influence coefficient intermittently and with an upward trend (Chart 1).

After the political influence coefficient, EI had the highest effect on development (Table 8 and Chart 1). The correlation between EI and regional development was positive and had an upward slope in all deciles. The education index had the least and the most influence on development in the first and last deciles, respectively, which reflects the positive and continuous role of education and knowledge in development and highlights its cumulative and exponential effects on the growth and development of communities and regions.

The financial index was nearly U-shaped (Table 8 and Chart 1) and had a positive effect on regional development in all deciles. The highest and lowest impacts of FI on development belonged to the first and third deciles, respectively, after which it followed an upward trend. The abundance of facilities and financial resources will not necessarily lead to development unless other components are taken into account. Although financial resources play a critical role in the establishment of infrastructures in the early stages of development, the downward but positive slope of the development in the first three deciles can be due to the influence of various factors, including inefficient management of resources, failure to properly direct the resources toward production with value-added, or inability to use new technologies for more productivity. One of the reasons that can justify the change in the slope of the FI at point B from negative to positive is the role of the growth of education and its related spillovers, which has been able to align the expansion of facilities and FI toward the development and exploit the ore-existing idle capacities.

Finally, the importance of the political influence coefficient on development will be more transparent by examining the status of all variables together in three

stages, according to Chart 1. The first stage is from point A to B, where the political influence coefficient affects the development at a much higher level than the other two variables, and the slope of the curve is much steeper. This stage, in which education and financial indexs had a positive but much less impact on development, covers the first three deciles of society. It seems that in the absence or equal effects of the PIC for all provinces in these three deciles, the improvement of the education and financial indexs would lead to balanced and equal impacts. However, different provinces will face different regional conditions with the creation and influence of people with power rents in the decision-making center, who lobby to attract resources and provide the necessary infrastructure in their provinces. The effects of the political influence coefficient on the development was greater than other indexs in the second stage (the third to seventh deciles, i.e. points B to C). The two intervening variables will have more effects on the development with the increase in the education and financial indexs under the influence of the increase in PIC. The political influence coefficient index has the largest distance from other indexs at the beginning of the second stage, at the end of which convergence occurs, and all the indexs seem to have almost equal influence on development in the seventh decile (point C). From the seventh decile onwards, the growth of education has an exponential effect on development, and the financial index has also an upward but smoother trand. Thus, from point C (seventh decile) onwards, the significance of the influence coefficient on development seems to decrease compared to other indexs, which is the reason for the intra-group competition between the elites. According to the general (median) quantile regression model for panel data (Table 6), the political influence coefficient has a positive and significant impact on development, which is 2.35 and 3.11 times the impact of the EI and FI, respectively. Given the higher impact of this index on development in the first to third deciles, policymakers have to focus on improving the PICI of the provinces with low political influence coefficient and development. Hence, competition with provinces that have a high influence coefficient will prevent the unbalanced allocation of resources while providing more hope and opportunities for balanced regional development.

The growth of the political influence coefficient index has led to the growth of development, education, and financial indexs during 9 governments in Iran (Chart 2), revealing a positive correlation between this index and others. In other words, the owners of political influence in all organizations and institutions of the country have entered into lobbying and consultation to attract resources for a particular area, all providing an understanding of regional development. Previous studies on the effect of rent and the influence of elites on regional factors (Section 2) are somehow confirmed by the present research.

It is noteworthy that taking advantage of rents and power, along with its misuse for regional development, is an anti-development factor, and the development formed through anti-development behaviors will challenge the concept of development. Thus, the increase in the PICI of deprived provinces does not mean that the competition in the decision-making and planning centers is

healthy and acceptable, but rather the goal is to put healthy goals into practice from the unhealthy competition. If the government increases the PICI of deprived areas through deliberate policy-making, it can be an effective measure against allocating excessive resources. This means the attraction of more resources by the deprived provinces, while the costs of inspection and control to fight corruption and lobbying are lowered. Therefore, healthy competition is formed in other indexes toward development, the unbalanced and factional competitions lead to balance, and conflict of interests will not be a challenge anymore (Paniagua & Vogler, 2022).

It's sometimes impossible to fight against political influence because the power rent increases in the form of friendly relations and soft lobbying, leading to the attraction of rent-tainted resources. Dealing with such corruption, known as money laundering, is very difficult and probably unsuccessful or considerably costly, necessitating the integration of a larger number of power holders consistently across different regions of the country. When all the stakeholders of the national resources get together and take their share, the effect of anti-development lobbies outside the group will be limited to some extent, providing conditions for balanced regional development through the balanced distribution of power elites. The elites of the power centers are responsible for guaranteeing the interests of their region in the development plans, which will result in the formation of long-term compromises toward commitment, power sharing, and stability (North & Weingast, 1989; Stasavage, 2002, Paniagua & Vogler,2022).

6. Conclusion

The political influence coefficient reflects the power rent and lobbying of influential people of regions and provinces in power and decision-making centers. According to the surveys conducted, the current study introduced this concept within an index with 14 sub-indexes and examined its effects on the development and inequalities of 31 provinces of Iran during 1981-2017. This index plays a vital role in society and forms the basis of balanced regional development. In the meantime, lobbying and significant rents hinder the understanding of the development, while this index should be improved through government planning for provinces that experience lower levels of development. This may happen when a new group with political influence and power in the decision-making centers competes with the more influential group to attract resources to their regions. This competition will prevent the unbalanced allocation of funds and resources in favor of a certain province, and the new group, although small, can attract resources for their regions, gradually eliminating or minimizing the development gap and imbalance between the regions and provinces in the long run and eventually resulting in an integrated development across regions.

Rent is not good at all because it disrupts the redistribution of resources and leads to economic inefficiency (Gordon, 2023). Sometimes this type of bias in resource distribution is not free from corruption and corruption is presented as a factor for capturing the state, whereby "powerful individuals, institutions or

groups, etc. use this type of bias to shape the policies, legal environment and economy of a country in favor of private - regional interests" (Martini, 2014; Nickson & Lambert, 2025). However, use of power rent in attracting resources to their provinces can be an anti-development behavior, and given that power rent is an undeniable fact and reality, instead of ignoring it, it should be given more attention and sensitivity as a tool to facilitate balanced development with full monitoring.

The model proposed in the present research included the effects of three variables of political influence, education, and financial (facilities) indexs, examined using the quantile regression for panel data. According to the interpretations conducted separately and continuously from the ten deciles in three stages, the political influence coefficient had 2.35 and 3.11 times more positive effects on development than the education and financial indexs, respectively. The first stage included the first to the third deciles, in which the political influence coefficient, as the main research variable, was more significant than the two control variables. This index is believed to play a vital role as the main driver of the competition for the development of the provinces, facilitating development through its improvement in the second stage and by influencing other independent variables. Capacities and infrastructure are formed by the influence of elites in the regions, and then the path of development is smoothed by the distribution of financial resources (FI) and the growth of the education index (EI) following the performance of the political influence coefficient in previous periods. Education had an upward slope and an increasing trend during the three mentioned stages and an exponential impact on development in the last deciles, which was similar to the effect of PICI on development in the first deciles. Unlike the political influence coefficient, FI was almost U-shaped, which may have been due to the lack of efficient management to use resources for productivity growth, higher added value, etc. The low level of EI (as a key factor in societies) was initially one of the factors behind the FI downward trend in the first three decades, turning into an upward trend in the second stage with the increase of the EI and the high effects of the political influence coefficient and indicating a positive logical growth rate in other deciles throughout the second and third stages. As shown by the present study and the model proposed for Iran, where the provinces are primarily affected by governmental decision-making in the power centers, regional development is unbalanced due to the power rents and unbalanced distribution of PICI. The political influence coefficient is one of the most critical drivers of regional development in Iran, indicating a positive and consistent correlation with financial, educational, provincial, and regional development indexs in this country (Chart 2). However, the role of this index in balanced regional development has been neglected in the development literature, despite its high importance.

7. Recommendations & Suggestions for future research

- Development has various dimensions, and the political influence coefficient index, as a variable introduced in this study, can play a negative and positive role in the development of provinces with unbalanced development, creating conditions for the convergence of the province on the path of development. Therefore, in the first stage, governments and elites should consider distributive justice with a national perspective in allocating budgets and resources, and in the second stage, in order to prevent unconventional influence in the unequal distribution of resources among the provinces, it is necessary to increase the political influence coefficient of deprived provinces.

- The current study has used critical variables in the power centers for the political influence coefficient in Iran. However, the research had limited access to transparent statistical data and databases to develop the variables of the political influence coefficient model, which might affect the number of variables found for this index. Thus, future researchers can redefine this index and examine the development conditions and other macro indexes for other countries and regions. It is also possible to redefine the influence coefficient index for international support organizations that aim to develop regions and countries, the results of which can show whether their assistance and programs in different countries have been based on justice or affected by the political influence coefficient. Besides, this index can be defined to examine the influence of lobbying power on the goals of member countries in the case of allies that have come together with the same goal and common policies, such as the regional policies of the European Union, etc. The sales changes can also be examined based on the political influence coefficient for member countries of global organizations or, more specifically, OPEC[1] member countries, which determine the share of countries in oil production and sales. In addition to temporary benefits, hosting international competitions and events brings long-term economic benefits for these countries, which can be investigated from the perspective of this index. Overall, any injustice formed in terms of spiritual or financial biased attention of micro and macro level managers and regional, national, and international institutions and organizations can be examined within the framework of the political influence coefficient index, which can provide opportunities for a wide range of future studies. Considering that the selection of the weights of the political influence index variables was based on the Delphi technique, and that the individuals interviewed were political, economic, and social elites, it is suggested that future researchers use other methods, including the following methods, in weighting the variables of the political influence index, so that the difference in this weighting and its effect on the development of the regions can be identified and compared. Analytic Hierarchy Process (AHP) method, as well as the use of OPSIS, VIKOR, and

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[1] Organization of the Petroleum Exporting Countries

ELECTRE methods, Fuzzy Weighting, Optimization Methods, and Quality Index Method.

- Given that regional development is very complex, encompasses various social, political, cultural, and economic dimensions, and environmental and geographical conditions (including climate, border location, proximity to the center, etc.) and the potential of regions (including the presence of oil, gas, and metal mines, etc.) make development in regions different. Therefore, it is suggested that in future studies, while considering the above, the role of uncontrolled migration and domestic and foreign investments in regional development should be examined.

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