



Effects of Socio-Economic Development Plans on Multidimensional Inequality in Iran

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Abstract:

The current study investigates the effect of implementing six development plans on multidimensional inequality in Iran. To this end, the multidimensional Gini Index of inequality by Assis Kumar Banerjee (2010) for dimensions such as welfare, education, housing, health, and social welfare (aggregation of other dimensions in household expenditure-income basket) calculated for years 1984-2021 and their performance was evaluated. The results of this study showed that the implementation of the development plans led to an inequality increase. Among these six plans, implementing the first plan had an incremental effect on the inequality value. The third and fifth socio-economic plans have a decremental impact on inequality at a significant level of 5%. Also, there was no difference between implementing and not implementing other plans on the inequality value. Also, the results indicated that given the comprehensiveness and multidimensionality of the development plans, inequality did not experience a constant trend and had mild fluctuations in the urban and rural areas and the whole country. Moreover, at the end of the sixth development plan, the inequality value (0.825) reached a value higher than the beginning of the first plan (0.771) in 1989.

1. Introduction

At first, economic development means the growth of major national indicators such as net gross product, national income, and other indicators. At the end of the 1960s, income distribution, and social justice were mentioned as development indicators. The modern approach to development is expressed in the form of freedom by Amartya Sen (1980) as a systemic approach emphasizing the active role of man as a goal and an end for development. This approach says that designing comprehensive development strategies in different political, economic, social, and cultural areas can meet the country's needs. In other words, he believes that the

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development process can create facilities for human freedom, and the goal of development should not be anything but achieving those freedoms (such as having economic facilities, social opportunities, political liberties, and so forth).

Moreover, people have different abilities for turning each specific resource into a particular achievement; thus, Sen argues that the development evaluation space must be a space of capabilities and achievements, which is inherently multidimensional. Accordingly, if we consider development as a socio-economic process, then, in addition to economic components such as economic growth, it is necessary to pay attention to the social aspect of development, such as health, education, housing, and transportation, and also to their relationship with inequality. In fact, we can say that socio-economic development and inequality interact with each other. This interaction is in such a way that the disposable income of the people increases with economic development. It reduces inequality, increasing economic productivity and economic, production, and income growth. Given the multidimensionality of development space and considering the comprehensiveness of both development plans, inequality, and interactions, - comprehensive attention to all dimensions of welfare is necessary for the household expenditure basket. Accordingly, in the current study, we tried to evaluate the performance of the development plans and income inequality simultaneously with implementing six socio-economic plans of income distribution in a multidimensional form in Iran.

This article is divided into five sections. The second part contains the research background. The third section contains the research method, that includes model specification and data collection, organization, and description. The fourth section presents the effect of Socio-economic Development Plans on multidimensional inequality. The fifth section is devoted to Summary, conclusion, and political suggestion.

2. Literature Review

Regarding investigating the effect of socio-economic development plans on inequality and poverty, several studies were carried out in the country as one-dimensional research on inequality. So far, no study has been carried out regarding the effects of socio-economic development on multidimensional inequality. Accordingly, all existing studies in this context related to inequality were single-dimensional.

For example, Vahid Mahmoudi (2004) investigated the income distribution in the first development plan from 1989-1994. His study showed that income inequality in Iran was relatively high and did not change during the first development plan. Fotros et al. (2006) investigated one of the crucial goals of the socio-economic development plans after the Islamic Republic of Iran's Revolution, which has been reducing deprivation of development and eliminating inequality between different regions. This study's results were carried out using 90 socio-economic indicators

and two techniques of factor analysis and numerical taxonomy in the period of 1994 and 2004. It showed that the development rate of country provinces increased by 250% on average during the given years, but inequality increased by 4.56% in those years. Abounoori et al. (2008) investigated the trend of the poverty line by separating urban and rural areas in Semnan province during the first to third development programs using the Linear Expenditure System and Iterative Seeming Unrelated Regression. The results showed that the poverty line in urban areas has always been higher than in rural areas, and poverty indicators in urban and rural areas of Semnan province increased during the first economic development program, but decreased relatively during the second and third economic development programs. Abounoori et al. (2007) analyzed income inequality distribution in Semnan Province in urban and rural areas during the years 1977-2002 and the level of economic inequality in 5-year first, second, and third development plans using the Gini coefficient for three groups of income. Results showed that the effect of implementing the first and second development plans on the economic inequality level is insignificant. The Gini coefficient during the implementation of the third plan decreased significantly, almost by 0.14. Abounoori et al. (2007) investigated the income distribution process of Hormozgan Province compared to whole-country inequality during the second and third development plans using variance analysis patterns in urban and rural areas. The results showed a lower average of inequality in urban and rural regions of Hormozgan province compared to those of urban and rural areas of the whole country, and implementation of the third plan significantly affected the reduction of inequality of Hormozgan, compared to the second plan. Sheyhaki Tash et al. (2008) calculated the indicators such as the Gini coefficient, the Tile, the first and tenth decile ratio, and the four higher and four lower concentration ratios, showing the status of the wealthy and the poor during civil plans of 1969-1979, 1979-1984 and development plan of 1989-2004. Different income distribution indicators showed that income distribution policies in development plans did not significantly reduce income inequality in Iran's economy after the Revolution in 1989-2004. Raghfar et al. (2015) investigated the impact of poverty elasticity growth compared to economic growth and inequality. The results showed that the effect of net growth on poverty was negative, but inequality had positive and negative fluctuations. Fotros et al. (2016) investigated the poverty and inequality status of rural areas of Iran. The results showed that inequality decreased in rural areas in the third development plan and the last year of the first plan. In the second and fourth plans, it had mild fluctuations. Moreover, poverty increased during the fourth plan. In the fifth development plan and after implementing the Cash Subsidies Act, income inequality increased during 2011 and 2012 compared to 2010 and increased again in 2013 and 2014.

Ebrahimi et al. (2017) calculated the income inequality among the provinces of Iran separating urban and rural areas during the implementation of the economic, social, and cultural development plan, using the Gini, Tile, Etkinson, and dispersion ratios and Sen's welfare indicators for the country and the entire provinces. The results showed that the indicators (Gini, Tile, Etkinson, and dispersion) changed in fluctuation form during 1990-2015, but generally, it had a descending trend. Ghaffari Fard (2019) investigated the inequality between regions in Reformist, Justice Seeking, and Moderate governments using Williamson indicators. The results showed that the inequality between provinces of the country during the third plan (Reformist government) had an invariable trend. Still, at the initiation of the fourth development plan (Justice-seeking government), the inequality trend between the provinces increased. It decreased during the last years of the tenth government in 2011.

Hangoma. (2017) explained the variances of inequality in children health at the turn of 2015, the millennia development goals in Zambia using data in the years 2007 and 2014, and multi-level models for two important indicators using Concentration Index (CI). The results showed that to prevent inequality increase in shortness of height and fever, these factors should be focused on: improvement and decrease of inequality levels in accessing pregnancy facilities, mother's feeding, supplemental nutrition, wealth, mother's education, and mother's care. Kavya et al. (2020) investigated the mutual economic and financial development relationship using an imbalanced dynamic panel from 1984 to 2014. The results showed that economic development and financial growth do not lead to income inequality.

Karimi et al. (2020) investigated the evolution of regional inequality for Iranian provinces in the fourth and fifth development plans using a new multidimensional development indicator using the TOPSIS Technique and Shannon Entropy. The results showed that development plans were ineffective in reducing gaps in provincial developments.

experts have different viewpoints regarding the economic development concept. For example, Brookfield believes development should be defined based on progress towards welfare goals such as reducing poverty, unemployment, and inequality. Gunnar Myrdal defines development as an upward-looking movement of the whole social system. It is a social system that considers economic and non-economic factors, such as the consumption of different people, levels of health and education facilities, power distribution in society, and more general economic, social, and political measures.

2-1. The goals of six development plans after the Islamic Revolution

The first socio-economic development plan (1989-1993)

The first economic development plan was passed by the Islamic Consultative Assembly in 1989 with 8189 billion rials, a year after The Imposed War and even in situations of insufficient information and statistics. The critical goals of the plan

are as follows: 1) reconstruction and enhancement of national defense capacities, reconstruction of production centers and damaged population during the Imposed War, 2) provision of economic growth with an emphasis on the self-sufficiency of farming strategic products and inflation inhibition, 3) Supplying the minor basic needs of all people and trying to establish Islamic-social justice, 4) determining and reforming consumption pattern and organization reform and executive and judicial management of the country. In this plan, economic and cultural growth was given attention through increased economic and cultural activities and social facilities.

The second socio-economic development plan (1995-1999)

The second socio-economic development plan was passed with a year stop after the end of the first plan with 105,029 billion rials construction credit. It started in 1995 and continued until 1999. The goals of the plan include: 1) trying to establish social justice, promote virtues, and enhance public social culture, 2) trying to increase productivity, 3) education of the required human force, 4) economic growth with a focus on agriculture, 5) development of non-oil export, 6) protecting the environment and optimal usage of natural resources of the country, 7) enhancing defense foundation of the country, 8) trying to pass the law and enhance public participation and provide balance in economic-cooperative, private and public sectors.

The third socio-economic development plan (2000-2004)

This plan was prepared with constructional reforms in the last year of the second plan, and it started at the end of the second plan and ended in 2004. In general, the third development plan is a complete (comprehensive) plan for regulating economic, social, and cultural development movements in line with meeting construction reforms goals. These goals are as follows: a decrease of government tenure and expansion of the private section and promoting people's participation in economic activities, social justice, decentralization, public access to information, protection of the environment, export development strategy, paying attention to the social developments, providing free health services, public access to the prepared food. In sum, in this development plan, all dimensions are considered.

The fourth socio-economic development plan (2005-2009)

Islamic Consultative Assembly passed the fourth economic, social, and cultural development in 2005 in 15 chapters with different sections. The goals of this plan include interaction with the world economy, expansion of privatization, and economic competitiveness, expansion of knowledge-oriented development, equality of educational opportunities, protection of the environment, food security, and public health, public access to health services, establishing justice, and reducing social inequalities, enhancement of social capital, human and citizenship rights, preserving and diagnosing Iranian history, tension-relieving regarding

international relations, women's affairs, national security, development of judicial affairs, and government renovation.

The fifth socio-economic development plan (2011-2015)

The fifth development plan was passed in 2010 in line with the goals of the 2025 Vision Document. It started in 2011 and ended in 2015. The general goal of the fifth development are as follows: 1) enhancement of knowledge, health and welfare level of the society, as much as possible, 2) fairer distribution of national income and paying particular attention to the rapid increase in the standard of living and welfare of low-income groups, 3) maintaining rapid and constant economic growth in line with relative stability of the prices and balance in foreign payments of the country 4) providing productive employment in all regions of the country in such a way that all newly entering people be fascinated to the employment market, and hidden and seasonal unemployment be reduced significantly, 5) Creating more balance between different regions of the country economically and socially, 6) complete use of production capacities generated in last civil plans and increasing efficiency of production and supplying goods and services in public and private regions, 7) enhancement of administrative system proportionate to greatness of national goals and ideals and strengthening the defense base of the country, 8) protection, restoration, and optimization of environment , 9) increasing share of Iran in international commerce and more presence of Iran in new world markets, given the expertises Iran acquired recently in industry.

The sixth socio-economic development plan (2017-2021)

The general policies of the sixth plan are based on three principles: resistive economy, leading in science and technology, and cultural excellence and resilience, passed in 2010. The goals of the plan are as follows, based on the priorities, 1) strategical goals including water and environment, 2) location-based topics including the development of beaches and urban outskirts, 3) topics in the field of economic advancement including mine and mineral industry, tourism, transit, and rail-based transportation, information and communication technology and energy. This plan was implemented in the years 2017-2021.

3. Methodology

3-1. Organization of statistics and data

In order to investigate the effects of economic-social development programs on inequality in Iran, the multidimensional Gini coefficient of Banerjee (2010) in the years of implementation and non-implementation of development programs for the welfare dimensions of food, clothing, housing, education, health and social welfare (Transportation and communication, services, recreation and entertainment and others) for urban, rural areas and the whole country are estimated based on the annual reports of the Statistics Center based on household income-expenditure, which cannot be presented in this research due to the large amount of data. Then, the effects of the six development programs along with two control variables of

inflation rate and unemployment rate on multidimensional inequality are estimated.

3.2. Research Methodology

The multidimensional Gini Index of Banerjee (2010) is calculated in two stages as follows:

$$S_{n \times m} = (s_{pj}) \rightarrow A_{n \times m} = \begin{pmatrix} s_{pj} \\ \mu_{0j} \end{pmatrix} \Rightarrow \tilde{A}_{m \times m} = A'_{m \times n} A_{n \times m} \quad (1)$$

S is the family expenditure in the welfare dimension, the elements of which for all of the households are $P = \{1, 2, 3, \dots, n\}$ and welfare dimensions are $j = \{1, 2, 3, \dots, m\}$ and μ_{0j} is the average of j dimension. $\tilde{A}_{m \times m}$ is a symmetrical matrix. The next stage is calculating the weight of each social welfare dimension using eigenvalues¹.

$$\tilde{A}x = \lambda x \rightarrow (\tilde{A} - \lambda I)x = 0$$

$$x \neq 0 \rightarrow (\tilde{A} - \lambda I) = 0 \Rightarrow |\tilde{A} - \lambda I| = 0 \quad (2)$$

Among specific values, the highest specific value is chosen, and its corresponding eigenvector is calculated as follows:

$$\tilde{A}_{m \times m} x_{m \times 1} = \lambda_{\max} x_{m \times 1} \Rightarrow x_{m \times 1} = \tilde{A}^{-1} \lambda_{\max} x \quad (3)$$

Using the eigenvector of matrixes $x_{m \times 1}$ and $A_{n \times m}$, the sum of the weight of society people's achievements showing the welfare distribution of people is calculated as follows:

$$y_{n \times 1} = A_{n \times m} x_{m \times 1} \quad (4)$$

And finally, the multidimensional Gini Index is calculated as follows:

$$G^*(S) = 1 - \left[\sum_{p=1}^n ((2r_p - 1) / n^2) \right] \times y_{n \times 1} \quad (5)$$

r_p is the rank non-increasing household in vector $y_{n \times 1}$, and n is the sample size.

The variability range of the above indicator fluctuates between zero (completely equal distribution) and one (completely unequal distribution).

¹. To calculate eigenvectors of each matrix such as $A_{n \times m}$, first we form the characteristic equation, then, determinant of the characteristic equation of $|A - \lambda I| = 0$ is considered as zero and roots of the characteristic equation is calculated. Moreover, finally we calculate specific matrix of $(A - \lambda I)$ by characteristic equation roots in the characteristic matrix of $A_{n \times m}$. Since the necessary condition for calculation of determinant of each matrix is its squareness, therefore, to calculate specific non-square matrix of $A_{n \times m}$, first matrix $A_{n \times m}$ is written as square. In addition, for converting a non-square (rectangular) matrix to a square one, it is suffice that the given matrix is multiplied in its transpose. Then, the given matrix is converted into square matrix and we can calculate its eigenvectors.

3-3. Model specification

In this study, the effect of six socio-economic development plans on multidimensional inequality in Iran is explained as follows in the form of a regression equation:

$$MGI_t = C + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \alpha_5 D_5 + \alpha_6 D_6 + \alpha_7 IFN_t + \alpha_8 UNM_t + U_t \quad (6)$$

In the above equation, MGI_t is multidimensional Gini coefficient, IFN_t is the inflation rate, UNM_t is the unemployment rate, and all cases of D_i , ($i = 1, 2, \dots, 6$) are defined as virtual variables for the first to the sixth socio-economic development plans that received values zero and one for implementation and non-implementation of the development plan, respectively. Next, for brevity, we use inequality instead of multidimensional inequality.

4. Inequality trend analysis in Iran

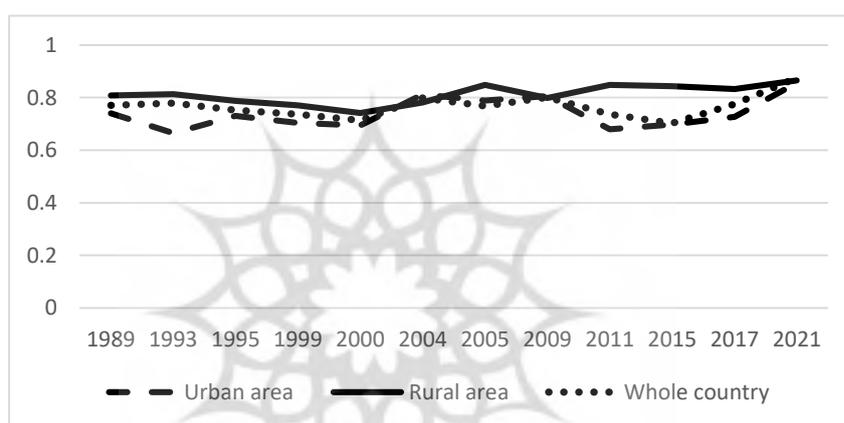
In table (1), inequality results are first calculated in 1984-1988 with no socio-economic development plans. Then, results of each plan's first and last years are provided to investigate the inequality trend simultaneous with the implementation of development plans.

Table (1). Inequality indicator separating urban and rural areas in Iran during six socio-economic development plans

Years before the implementation of the socio-economic development plans				
Year	Urban area	Rural area	Whole country	
1984	0.723	0.789	0.744	
1985	0.684	0.764	0.699	
1986	0.673	0.756	0.702	
1987	0.760	0.635	0.743	
1988	0.795	0.796	0.794	
Years during the implementation of the socio-economic development plans				
		Urban area	Rural area	Whole country
The first plan (1989-1993)	Beginning	0.740	0.808	0.771
	Ending	0.665	0.813	0.779
The second plan (1995-1999)	Beginning	0.731	0.788	0.752
	Ending	0.704	0.770	0.736
The third plan (2000-2004)	Beginning	0.694	0.741	0.714
	Ending	0.812	0.782	0.799
The fourth plan (2005-2009)	Beginning	0.789	0.848	0.768
	Ending	0.806	0.799	0.801
The fifth plan (2011-2015)	Beginning	0.679	0.848	0.737
	Ending	0.698	0.843	0.703
The sixth plan (2017-2021)	Beginning	0.727	0.832	0.775
	Ending	0.856	0.865	0.875

Source: these are calculated by R Studio 2022 using sub-data regarding household budget during the implementation of the plans.

The results provided in table (1) and fig (1) indicate that inequality decreases while implementing the first and second plans. At the end of the third development plan, inequality increases by 0.799 to more than that of the beginning of the development plans. Results also show that inequality in the fourth development plan not only did decrease but also increased in the fourth development plan. By initiating the fifth plan, inequality decreased and increased again at the beginning of the sixth plan. The implementation results of six plans in urban and rural areas indicate that their implementation increased inequality. The lowest value of inequality at the beginning of the third plan was 0.741, and its maximum value was 0.803, simultaneous with the beginning of the sixth development plan in the rural area. Also, the least and maximum values of inequality in the urban areas in the last years of the first and third plans were 0.665 and 0.712, respectively. Moreover, the gap in inequality distribution between urban and rural areas increased with the implementation of the plans in the welfare dimensions mentioned.



Source: Table (1)

fig (1) :Inequality during years of six development plans separating urban and rural areas.

4-1. Model estimation and interpretation of the results

This section evaluates the effects of development plans on income inequality. Due to the comprehensiveness of goals in development plans, implementing development plans is expected to decrease inequality in urban and rural areas and the whole country. The results of the model estimation are provided in table (3).

Table (3). Model estimation results concerning the effect of socio-economic development plans on inequality

Variable name	Abbreviation	Coefficient	t-statistics	Significant level
Years without plan	C	0.7650	9.1715	(0.000)
The first plan	D_1	0.0308	1.5760	(0.1267)
The second plan	D_2	-0.0271	-1.5449	(0.1340)
The third plan	D_3	-0.0618	-2.1799	(0.0424)
The fourth plan	D_4	-0.006	-0.0184	(0.9853)
The fifth plan	D_5	-0.0807	-2.1184	(0.0435)
The sixth plan	D_6	-0.0527	-1.0592	(0.2989)
Trend	Trend	0.0018	1.0831	(0.2883)
Inflation rate	INF	0.0005	0.7302	(0.4715)
Unemployment rate	UNM	-0.0030	-0.6321	(0.5326)
Model goodness-of-fit tests				
$R^2 = 0.52$ $\bar{R}^2 = 0.37$ $F - statistic = 2.3778$ $prob(F - statistic) = 0.0068$				
Diagnostic tests				
Serial Auto-correlation test			Durbin-Watson statistic = 2.3237	
Heteroskedasticity Test (ARCH)			F-statistic = 1.0595 Prob. F(1,32)=0.0112	
Normality			Jarque-Bera=1.2227 prob.Jarque-Bera=0.5426	

Source: Result of Eviwes 10 software based on the researcher's calculation.

The model estimation results suggest that although the effect of the implementation of the first, second, fourth, and sixth plans is not statistically significant, implementing them led to a decrease in inequality. Meanwhile, the first plan, which started exactly a year before the Imposed War, increased inequality due to a lesser focus on other dimensions. The most important goals in this plan were the reconstruction of production centers and revitalizing the damaged population during the Imposed War, supplying the minor needs of all people, and trying to establish social justice. The third and fifth plans have a significant and declining effect on inequality at a significant level of less than 5%. Also, years before the formulation of development plans in 1984-1988, the inequality value had an incremental trend.

The results of diagnostic tests indicate that the least significant level is higher than 5%. Thus, the null hypothesis is rejected, and the establishment of classic hypotheses (Heteroskedasticity, normality, and Serial Auto-correlation) is supported for the given model. Investigation of a goodness-of-fit criterion for the model, R^2 , \bar{R}^2 and F-statistic suggests an appropriate specification of the model.

5. Summary, conclusion, and political suggestion

While considering the goals of the development plan and the necessity of paying attention to other items of the household basket in the calculation of individual

welfare, In this study, we first calculate the Inequality Indicator in the study by Banerjee (2010) using welfare dimensions of education, housing, health, and social welfare in Iran in years 1984-2021. Then, its performance on inequality was evaluated. Then, having values of that trend, inequality changes separating urban and rural areas were estimated at the beginning and ending years of implementing the six 5-year development plans. Given the comprehensiveness and multidimensionality of the development plans during the implementation phase, the results indicated that inequality increased during the six socio-economic development plans with mild fluctuations in the urban and rural areas and the whole country. This inequality increase was in a way that its value was higher at the end of the sixth development plan than that at the beginning of the first plan in 1989. Also, inequality in urban areas was 0.740 at the beginning of the economic development plan, and it increased by 15% and reached 0.854 at the end of the sixth development plan. In the rural areas, it was 0.80 at the beginning of the first plan, increased by 7%, and reached 0.86 at the end of the sixth development plan. The significance of the inequality changes during the implementation of the development plans was tested using the indicator values of inequality. The results suggest that the inequality value has increased during the years without plans (1984-1988). Among the six development plans during 1989-2021, the first plan had an incremental effect on the inequality value. The third and fifth socio-economic development plans had a decremental and significant impact on inequality at a 5% significant level. Also, there is no difference between the implementation and non-implementation of the other plans on the inequality value. The results showed that inequality value did not decrease in the country, despite being comprehensive and multidimensional. One of the reasons why inequality did not decrease is its concept of multidimensionality. Thus, the emphasis on the decrease in inequality only in one dimension during the implementation of the plans led to an increase in other dimensions. As a result, it led to an inequality increase in development plans. Another reason for this increase was the increase in the inflation rate. Generally, the results suggest no comprehensive plan has been formulated for decreasing inequality in the country after 40 years. In other words, although in 5-year plans, policies regarding reducing inequality and social justice have always been referred to, these policies could not effectively decrease inequality in the country, and economic and political revolutions in Iran during recent years could somewhat explain this issue. Finally, it has led to the failure of the socio-economic development plans to meet the goal of social justice.

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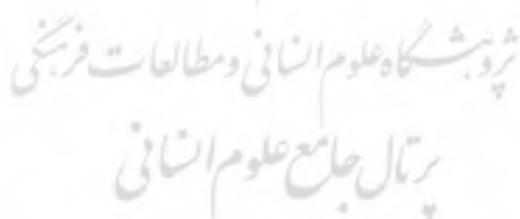
اثرات برنامه‌های توسعه اقتصادی – اجتماعی بر نابرابری چندبعدی در ایران

چکیده

در این مطالعه اثرات اجرای برنامه‌های شش‌گانه توسعه بر نابرابری چندبعدی در ایران بررسی می‌شود. بدین منظور شاخص نابرابری چندبعدی جینی اسسیس کومار برنجی^۱ (۲۰۱۰) برای ابعاد رفاهی آموزش، مسکن، بهداشت و رفاه اجتماعی (تجمیع سایر ابعاد در سبد هزینه – درآمد خانوار) برای سال‌های ۱۳۶۳-۱۴۰۰ محاسبه و عملکرد آن مورد ارزیابی قرار گرفت. نتایج این مطالعه نشان می‌دهد که اجرای برنامه‌های توسعه سبب افزایش نابرابری شده است و از بین برنامه‌های شش‌گانه توسعه، اجرای برنامه اول بر میزان نابرابری دارای اثر افزایشی و برنامه سوم و پنجم توسعه اقتصادی- اجتماعی دارای اثر کاهشی بر نابرابری در سطح معنای کمتر از ۵ درصد بوده‌اند و اختلافی بین اجرا و عدم اجرای سایر برنامه‌ها بر میزان نابرابری وجود ندارد. همچنین نتایج این مطالعه نشان می‌دهد که با توجه به جامعیت و چندجانبه بودن برنامه‌های توسعه، نابرابری در مناطق شهری، روستای و کل کشور روند ثابتی را تجربه نکرده و با نوسانات ملایم همراه بوده و در پایان برنامه ششم مقدار آن (۰/۸۲۵) به بیش از مقدار آغاز برنامه اول (۰/۷۷۱) در سال ۱۳۶۸ افزایش یافته است.

کلیدواژه: ایران، نابرابری چندبعدی، ضریب جینی چندبعدی، برنامه‌های توسعه اقتصادی- اجتماعی.

طبقه‌بندی JEL: D63, D01.



¹ Assis Kumar Banerjee