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Public Size and Economic Development: Application in OECD Countries

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ABSTRACT

It is difficult to determine the optimal level of public expenditure volume which is one of the most important indicators of the extent of the state activity in the economy. Although the volume changes from one country to another, generally accepted opinion is to improve the productivity in public expenditures. The objective of the present study was to determine the effect of public expenditures and types of expenses on economic development in OECD countries. Human development index (HDI) was accepted as the indicator of economic development.

Spatial statistical methods were used to analyze dissimilarities between the nations in this study. We analyzed the countries using HDI level in two groups; countries with low HDI score and countries with high HDI score. The hypothesis was that the countries with low HDI levels have more public spending than the countries with high HDI levels. Especially, The United Kingdom, Italy, Chile and Turkey were the most obvious specimens.

INTRODUCTION

Impact of the size of the public sector on economy has been discussed extensively. State's intervention in the economy determines this size and its most significant indicator is the ratio of public expenditures to gross domestic product (GDP). Public sector size differs from one country to another and based on the needs.

General worldwide tendency in public expenditures demonstrates that this figure increased in the period between the World War I and 1980's. Starting from the 1980's, the common view was that excessive increase in these expenditures caused inefficiency. In fact, according to Armey curve, proposed by Richard Armey and used to determine the role of the state in economy, there is a negative correlation between public expenditures and GDP after a certain point (Afonso and Jalles, 2011: 6).

Economic growth and development are significant for all nations. It is difficult to determine economic development. Economic and social welfare reflects the economic development level of a country.Economic development also reflects social development in a country, including economic growth. Human development index (HDI) is considered as the most important indicator of economic development and widely used to determine economic development. This index reflects a long and healthy live, access to knowledge and education and a consistent living standard. Differences between the countries in welfare are also determined by this index.

While there are several studies on the impact of public expenditures on economic growth, there are only a few studies that scrutinized its effect on economic development. Thus, the present study aims to analyze the relationship between HDI and public expenditure compositions for OECD countries. For this analysis, we used spatial statistical techniques. As a result of this analysis, we determined which countries were similar in terms of the correlation between HDI and public expenditure compositions. We utilized HDI and health, education, transportation, defense and social security expenditure data for 2015.

In the initial section of the paper, information on the size of public sector and economic development are presented, and in the second section related literature was discussed. The third section emphasized the aim, obtained data and methodology, while the last section included conclusions.

1. Public Size and Economic Development

State affects economic development and growth by utilizing the existing resources in a country. The place and size of the state in an economy change from one nation to another. However, in situations where the state never intervenes in the economy, economic development is not possible and on the other hand, the state handling all economic activities is not a desired situation.

The most important indicator used for determination of the size of public sector is the share of public expenditures in GDP (Martins and Jose Veiga 2014: 581). Public expenditures need to be tolerated for the activities that are necessary for the perpetuity of the state. There are several reasons why societies need public spending and taxation. These reasons were explained by several economists such as Adam Smith, Pigou, Musgrave and Samuelson years ago. Public expenditures are realized due to reasons such as the existence of wholly public goods, externalities, and laws for protection of social institutions, individuals and commodities (Tanzi, 2005: 617-621).

The "Armey Curve" proposed by Richard Armey is used to determine the role of the state in an economy. According to Armey curve, there is a positive correlation between public expenditures and GDP up to a point, after which the correlation becomes negative. According to Friedman (1997), public expenditures should be between 15 – 50% of the GDP depending on the development level of the nations (Afonso and Jalles, 2011: 6).

Public expenditures had an increasing tendency worldwide between the World War I and 1980's. Especially in 1960's, due to the significance of the welfare state, public expenditures

increased, however this perception started to change during the 1980's. Decreasing self-sufficiency policies of the states caused increasing imports of the commodities not produced in specific countries from others. Policy makers started to think that excessive public spending caused high tax rates, which in turn resulted in inefficiency in expenditures. Financing the public expenditures with budget deficit could cause macroeconomic problems. Starting from that period, it became common view that the job of the state was to prevent the problems in the market and compensate for these problems without replacing the market (Schuchnect and Tanzi 2005: 8).

Size of the public sector in a country could increase based on changing requirements. The state should promote social development and economic growth. However, it is quite difficult to determine whether the state could positively affect economic performance by increasing public spending (Martins and Jose Veiga 2014: 579).

Economic growth and development are similar but different concepts despite the fact that they are usually confused for one another. Economic development includes social development while a country is conducting technological advances to cement its infrastructure in order to experience a qualitative change. On the other hand, economic growth is a quantitative concept expressed in the change in the GDP of a country. However, GDP and economic growth are used as indicators that determine economic development. Economic growth alone is not sufficient to achieve economic development. When there are people in a country who live under terrible conditions, it is not possible to talk about economic development although there is an increase income per capita. The richest countries may not be the most economically developed countries (Martins and Jose Veiga, 2014: 582). Individuals' income levels are significant for demonstrating the economic development potential. However, to achieve economic development, it is necessary to reduce poverty, unemployment and inequalities (Seers, 1969: 5).

Previously, the main purpose of development was considered as the economic growth worldwide. Recently, the primary goal became the removal of poverty (Paternostro, 2007: 47).Hunger, poverty, inequalities between the rich and the poor, differences in quality of life and physical inferiorities in physical life experienced in the world resulted in the increasing importance of human development (Sen, 2000: 21). Development theory of Sen is based on removal of obstacles between an individual and a healthy life, access to information and participation in the social life and maximizing lifelong achievements of the individual. These obstacles could be listed as ignorance, an unhealthy life, difficulties in accessing resources, and lack of civil and political freedoms (Fukuda and Parr, 2003: 302-303).

Although there is not a single criterion in determination of economic development, the most commonly used criterion is the human development index (HDI) initially mentioned in United Nations Development Report (UNDP) published in 1990. This index is frequently used by international organizations to determine the development levels of countries. In such a development, human capital is stressed. Human development reflects social subjects such as health prevention, availability of reliable and clean water, basic education, housing services, clean environment, etc. in addition to the necessity of economic performance and productivity. Publications on the subject by Amartya Sen and UNDP contributed significantly to international development field (Suescun, 2007: 4). HDI used to explain why certain countries with the same level of income per capita had higher levels of development was a politically favorite subject since it was proposed (Fukuada and Parr, 2003: 303).

Three main indicators are utilized in calculation of the index. These are, a long and healthy life, access to knowledge and education, and to have a consistent standard of living (Martins and Jose Veiga, 2014: 582). The differences in welfare between the nations are identified with this index. The main indicator used to determine income and fair distribution of income is income per capita. Healthy natality is used as an indicator of health. Literacy rate and rates of registration in primary, middle and higher education are used as the indicators of access to education (Jacobs, 2010: 68).

There is an ongoing problem of productivity worldwide. One of the most significant reason for this situation is the fact that increases in public expenditures do not occur in balance with HDI (Prasetyo and Pudjono, 2013: 496).

Improving the productivity in public sector is important but not that easy. For productivity, it is important to assess public resources actively and to use these resources for predetermined and transparent strategic goals (Angelopoulos et.al. 2008: 268.).

It is important to design public spending policies both to realize growth and reduce the poverty. On the other hand, it is difficult to determine the weight of required public expenditures to reach these goals. Although it is possible to determine an optimum taxation level, it is quite difficult to identify a similar level for public expenditures. Also, it might not be possible to determine the effects of public spending on its major goals of growth, equality and reduction of poverty due to the interactions between these goals. However, the recent tendency is the prioritization of expenditures to reduce poverty in poor countries and developing countries with high debt ratios. Especially education and health expenses are prioritized in these countries. In fact, economic welfare is only possible though economic growth that would improve the living conditions of a society. Education and health expenditures by the state are effective in the achievement of economic welfare. Also fair and equal distribution of income and the wealth in a society is important (Paternostro, 2007: 48-51; Jacobs, 2010: 65).

2. Related Literature

Although there are several studies on the effect of public expenditures on the economic growth, number of studies that scrutinized its effect on economic development are quite scarce. While certain studies focus on the effect of public expenditures on productivity, certain others aimed to determine the effects of composition of the expenditures.

Several studies were conducted on the effects of public composition one economic development and growth. According to some, public expenditures affect economic growth negatively due to factors such as inefficient utilization of resources, crowding-out effect, excessive tax burden, deformation in incentives and interventions to free market (Barro, 1991: 437;Bajo, Rubio, 2000: 83). Certain other studies argued that the expenditures should be productive by providing the same amount of services utilizing less resources (Afonso et al. 2005: 337; 2008: 29). On the other hand, Slemrod (1995) and Tanzi and Zeo (1997) reported that public expenditures had a negative effect after a certain level in their studies. However, public activities have positive effects such as positive externalities, reinforcing legal, administrative and economic infrastructure and removal of market failures (Ghali, 1998: 976; Dalagamas, 2000: 6).

At the end of the analysis Herrera and Pang (2005) conducted in 140 developing countries between 1996 and 2002, it was reported that productivity was low in countries with high public expenditures. Alfonso et al. (2010) attempted to measure public sector productivity in new EU members and emerging economies. They concluded that productivity was higher in countries where public expenditures did not exceed 30% of GDP .Also Angelopoulos et al. (2008) attempted to determine public sector productivity in 64 developed and developing countries. They found that fiscal volume did not have any effect on economic growth.

Rajkumar and Swaroop (2008) attempted to determine the correlation between public expenditures and administration and outcomes. However, they reported that public expenditures did not have the expected positive effect on outcomes and efficacy of public expenditures was related to the quality of administration.

Gupta and Verhoeven (2001) conducted a study to determine the productivity of education and health expenditures in 37 African countries, however, found that increase in expenditures did not have a positive impact on productivity. Hauner and Kyobe (2010) reported that productivity was low in 114 countries where the ratio of public education and health expenditures to GDP was high. St. Aubyn (2005) found that education and health expenditure did not have a positive effect on productivity in Portugal, and also Afonso and St.

Aubyn (2005) reported that high levels of public education and health expenditures in OECD countries did not result in high levels of productivity. Grigoli (2012) found that the recent increase in public education and health expenditures in Slovak Republic did not cause an increase in outcomes, while budgetary savings affected productivity positively.

On the other hand, the contribution of certain public expenditure types to the economic growth could not be denied. According to Adam and Bevan (2005), channeling public expenditures to productive investments would increase their productivity. Furthermore, the financing sources of these experiments are also important. Reducing less productive spending could reduce the increase in budget deficit.

Suescun (2007) reported that infrastructure investments have larger effects on growth performance, welfare, human and social development when compared to other expenditures (education, health and transfer expenditures for the poor). Also Acosto-Ormaechea and Morozumi (2013) reported in their study that education expenditures in 56 countries had positive impact on long-run growth.

Asghar et al. (2012) attempted to determine the effect of public expenditures on reducing poverty in Pakistan between 1972 and 2008. They found that public expenditures on education and law and order decreased poverty, however, they reported that spending towards budget deficit and economic and social services were the main reason of poverty in Pakistan. Tanzi and Schuknecht (1997) analyzed whether the increase in public expenditures in developed countries affected social welfare. They considered the effects of public expenditures on economic and social indicators such as GDP growth rate, capital accumulation, inflation rate, unemployment rate, public depth ratio, lifespan, stillbirth rate, education level and poverty. However, the findings showed that the increase in public expenditure had no positive impact on welfare. Tanzi and Schuknecht (2005) also reported that countries that reduced public expenditures by certain amounts for 20 years were not affected negatively based on the macroeconomic and socio-economic indicators. Furthermore, these countries demonstrated improvements in fiscal, economic, human development and institutional indicators.

In a study by Tanzi (2015), monetary and fiscal policies enforced in post-crisis countries were assessed. The findings of this study demonstrated that fiscal austerity policies implemented by these countries did not reflect the reality and public expenditures were sustained at high levels. Furthermore, the correlation between public expenditures and human development index (HDI) demonstrates that public expenditures were maintained at lower levels between 2007 and 2013 in countries with high HDI scores.

Martins and Jose Veiga (2014) found that public composition had a quadratic (inverted U-shaped) effect on HDI growth rate especially in developed and high income countries. In these countries, the very large public sector affects economic development negatively. An analysis of public spending composition showed that there is an inverted U-shaped correlation between defense, education and social security spending and economic development, and a U-shaped relationship between health and communication and transportation spending and economic development.

On the other hand, Fölster and Henrekson (2001) found that education, infrastructure and R&D subsidy expenditures corresponded to only one fifth of total expenditures in OECD countries, while the same expenditures amounted to more than half of total expenditures in less developed countries. This fact showed that almost 50% of the expenditures in OECD countries included spending that had no positive impact on growth. Furthermore, there is a common belief that most public programs have negative effects on savings and accumulation of capital.

3. Aim, Data and Methodology

This study aimed to analyze the relationship between HDI and public expenditure compositions in OECD countries. For this analysis, we used spatial statistical techniques. As a result of the analysis, we determined the similar countries in terms of correlation between

HDI and public expenditure compositions. We used HDI and health, education, transportation, defense and social security expenditure data for 2015. First, we explained LISA Maps and classified the countries for each expenditure composition. After we analyzed the bilateral correlations between expenditures and HDI using BILISA Map, we determined dissimilarities between the nations. We used databases procured from OECD, World Bank and United Nations official web sites.

3.1.Lisa and Bilisa Map

LISA Cluster maps show regions with significant local Moran statistics, classified in four groups of spatial correlation (high-high, low-low, high-low and low-high) (Annoni and Kozovska; 2010:23). In LISA map, spatial clusters are highlighted by bright colors. High-high regions are colored red. Hence, positive associations arise from own and neighboring high values of the attribute variable. Low-low regions are colored blue. Here, positive spatial autocorrelation emerges from own and neighboring low values of the related variable. LISA satisfies the two following requirements:

a. LISA for each observation gives an indication of the extent of significant spatial clustering of similar values around the observation;
b. The sum of LISAs for all observations is proportional to a global indicator of spatial association (Anselin, 1995: 2).

3.2.Spatial Statistics

It is common for statisticians to confine their attention to the description of data including exploratory analysis and induction, and the development of generalizations about a defined population on the basis of a sample drawn from that population. Map oriented researchers have long been interested in data description and induction, usually searching the statistical literature for ideas on how to extract as much information as possible from georeferenced data. Spatial statistics can be considered a distinct area of research. Traditional statistical theory bases its models on assumed independent observations (GIS).

Before 1960s, only a modest number of literature was developed in geography on perhaps the most challenging spatial question: in an unbiased way, how is one to account for the correlation in spatially distributed variables? The fundamental ideas concerning the measurement of and testing for spatial autocorrelation were spawned in geography by Robinson (1956) and Thomas (1960), who saw the difficulties in dealing with dependent unequally sized units. Through their work and of others, the modifiable areal unit problem was addressed and spatial residuals from regression were evaluated. It was during this period that statisticians Moran (1948) and Geary (1954) developed their measures of spatial autocorrelation. Building on the work of Moran (1948) and Krishna Iyer (1949), Dacey (1965) addressed the issue of the possible association among contiguous spatial units. These joined count statistics led to the work of Cliff and Ord, whose monograph “Spatial Autocorrelation” (1973) opened the door to a new era in spatial analysis.

In standard linear regression model, spatial dependence can be incorporated in two distinct ways: as an additional regressor in the form of a spatially lagged dependent variable, or in the error structure. This is interpreted as substantive spatial dependence in the sense of being directly related to a spatial model (Anselin, 2003: 316). Estimation of the spatial regression models proceeds on the basis of an iterative procedure that maximizes likelihood (LeSage, 1997: 87).

Figure 1: LISA Graph and Moran' I for Health Expenditure of OECD Countries

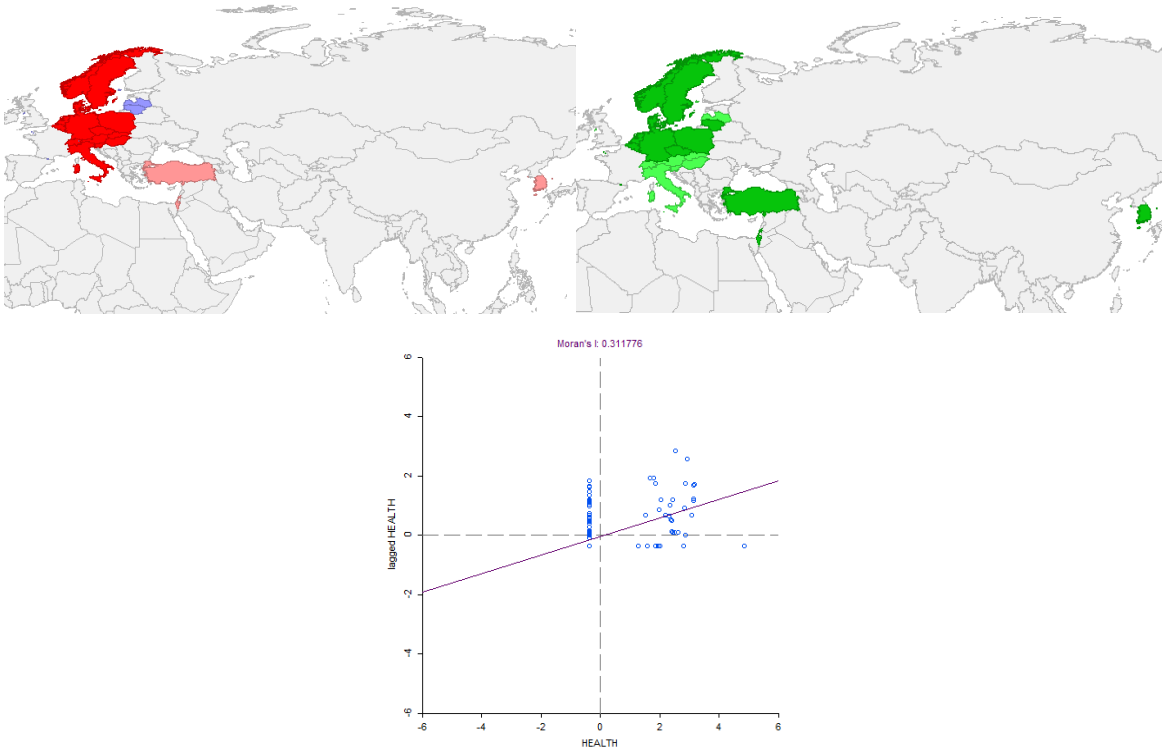
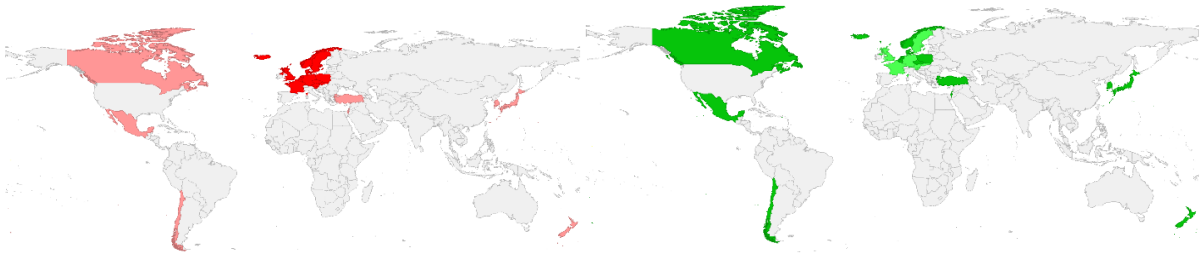


Figure 1 is the LISA Map for Health Expenditure. The map is significant at 5% significance level (This can be seen in the second map where all countries are green, this means the statistic is meaningful at 5% significance level). OECD countries and Yemen are colored in red. LISA map detect the locations of spatial patterns of health expenditure. Some OECD countries are replaced in High-high area (colored red). These countries are; ***Norway, Sweden, Germany, Czech Republic, Switzerland the United States*** and this means that countries with high health expenditure are surrounded by countries with high health expenditures. In other words, that countries with above average values also share boundaries with neighboring countries that have above average values. Some OECD countries are light-pink, this means that countries with high health expenditures are surrounded by countries with low health expenditure. These countries are; ***Korea, Israel and Turkey***. Turkey has a lower health expenditure than Korea and Israel. For OECD countries, positive correlation arises from own and neighboring countries' high values of health expenditures and Moran's I statistic is 0.312 which reflects a positive correlation.

Figure 2: LISA Graph and Moran's I for Education Expenditure of OECD Countries



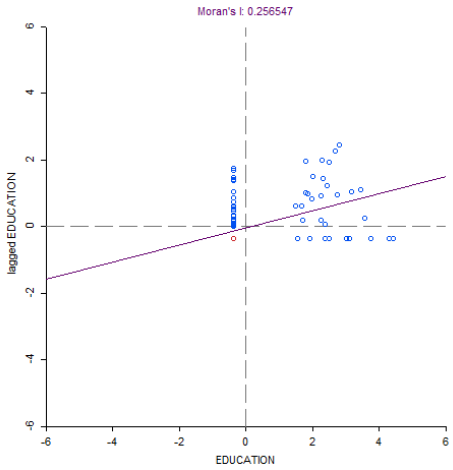
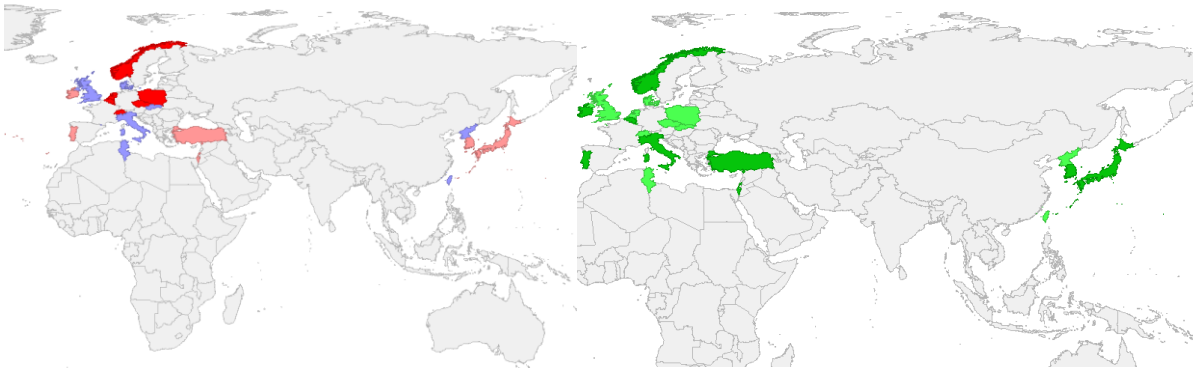


Figure 2 is LISA Map for Education Expenditure. The map is significant at 5% significance level (This can be seen in the second map, all countries are green, this means the statistic is meaningful at 5% significance level). OECD countries and Yemen are colored in red. LISA map detects the locations of spatial patterns of education expenditure. Some OECD countries are replaced in High-high area (colored red). These countries are; ***Iceland, the United Kingdom, France, Germany, Poland, Czech Republic, Austria and Slovakia.*** This means that countries with high education expenditure are surrounded by countries with high education expenditures. Some OECD countries are light-pink, this means that countries with high education expenditure are surrounded by countries with low education expenditure. These countries are; ***Canada, Chile, Mexico, Turkey, Japan and New Zealand***. Among these countries, Turkey has the lowest value and New Zealand has the highest value. For OECD countries, positive correlation arises from own and neighboring countries' high values of education expenditure and Moran's I statistic is 0.257 which means a positive correlation.

Figure 3: LISA Graph and Moran' I for Transportation Expenditure of OECD Countries



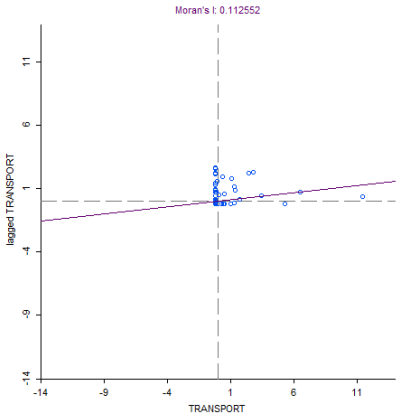


Figure 3 is LISA Map for Transportation Expenditure. The map is significant at 5% significance level (This can be seen in the second map, all countries are green, this means the statistic is meaningful at 5% significance level). OECD countries and Yemen are colored in red. LISA map detects the locations of spatial patterns of transportation expenditure. Some OECD countries are replaced in High-high area (colored red). These countries are; ***Norway, Poland, Czech Republic, Switzerland and Netherlands*** and this means that countries with high transportation expenditure are surrounded by countries with high transportation expenditures. Some OECD countries are light-pink, this means that countries with high transportation expenditure are surrounded by countries with low transportation expenditure. These countries are; ***Ireland, Turkey, Portugal, Israel, Japan and Korea.*** And finally, some OECD countries are light-blue, this means that countries with low transportation expenditure are surrounded by countries with low transportation expenditures. These countries are; ***Italy, Denmark, the United Kingdom and Slovakia***. For OECD countries, positive correlation arises from own and neighboring countries' high values of transportation expenditures and Moran's I statistic is 0.113 which means a positive correlation.

Figure 4: LISA Graph and Moran' I for Defense Expenditure of OECD Countries

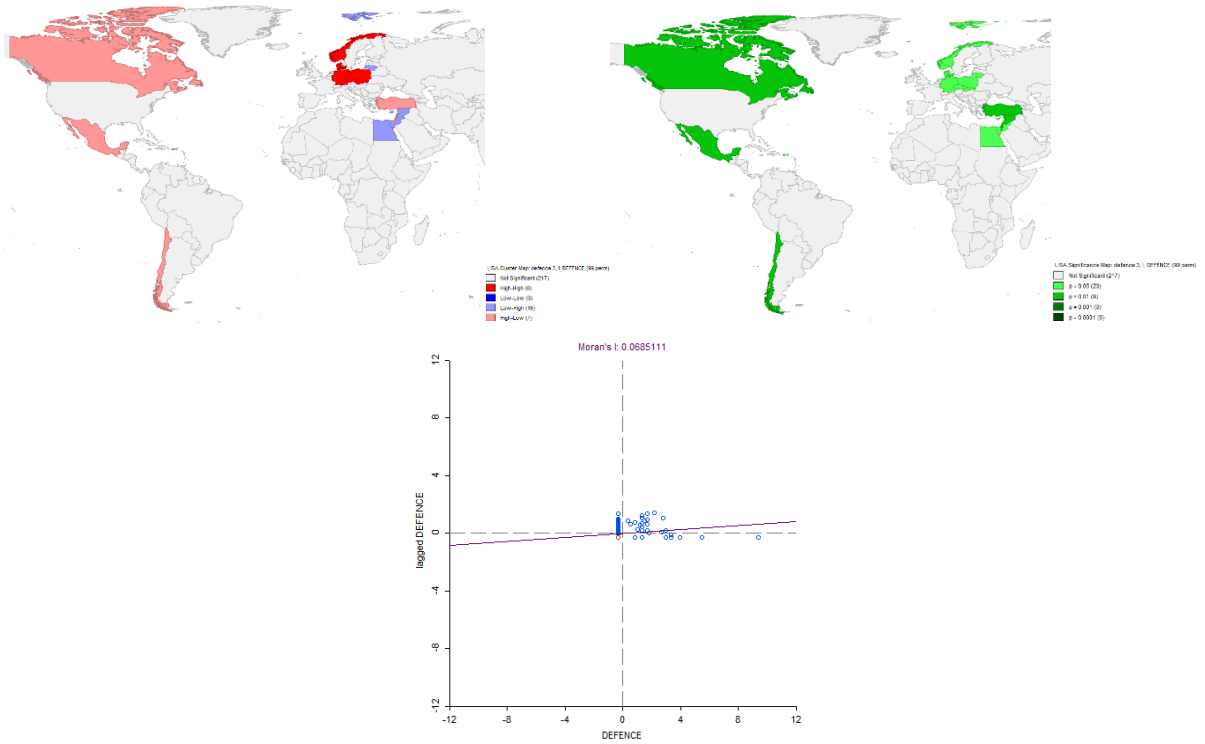


Figure 4 is LISA Map for Defense Expenditure. The map is significant at 5% significance level (This can be seen in second map, all countries are green, this means the statistic is

meaningful at 5% significance level). OECD countries and Yemen are colored in red. LISA map detects the locations of spatial patterns of defense expenditure. Some OECD countries are replaced in High-high area (colored red). These countries are; ***Czech Republic, Slovakia, Norway, Germany and Denmark*** and this means that countries with high defense expenditure are surrounded by countries with high defense expenditures. Some OECD countries are light-pink, this means that countries with high defense expenditure are surrounded by countries with low defense expenditures. These countries are; ***Canada, Turkey, Mexico and Chile.*** Some countries are light-blue, this means that countries with low defense expenditure are surrounded by countries with low defense expenditures. These countries are; ***Lithuania, Egypt, Svalbard and Syrian Arab Republic***. For OECD countries, positive correlation arises from own and neighboring countries' high values of defense expenditures and Moran's I statistic is 0.068 which means a positive correlation.

Figure 5: LISA Graph and Moran' I for Social Security Expenditure of OECD Countries

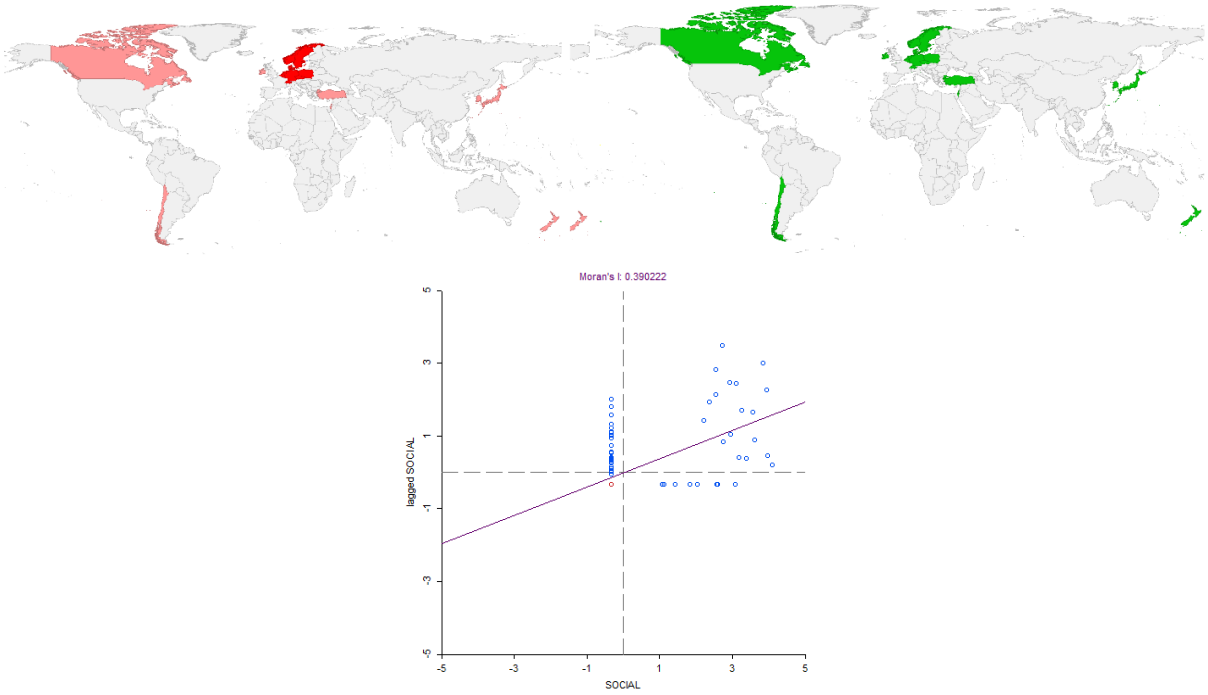
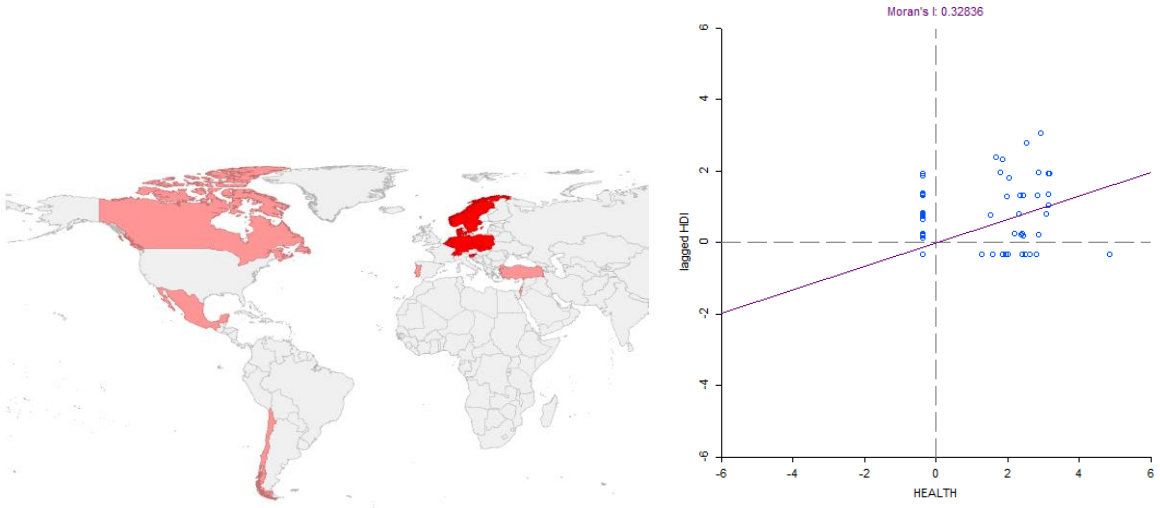


Figure 5 is LISA Map for Social Security Expenditure. The map is significant at 5% significance level (This can be seen in the second map, all countries are green, this means the statistic is meaningful at 5% significance level). OECD countries and Yemen are colored in red. LISA map detects the locations of spatial patterns of social security expenditure. Some OECD countries are replaced in High-high area (colored red). These countries are; ***Norway, Sweden, Germany, Denmark, Switzerland, Belgium and Netherlands*** and this means that countries with high social security expenditure are surrounded by countries with high social security expenditures. Some OECD countries are light-pink, this means that countries with high social security expenditure are surrounded by countries with low social security expenditures. These countries are; ***Canada, Chile, Turkey, New Zealand, Israel, Ireland and Japan***. For OECD countries, positive correlation arises from own and neighboring countries' high values of social security expenditure and Moran's I statistic is 0.390 which means a positive correlation.

After LISA Map analysis, we use BILISA Maps to detect bilateral correlations between HDI and the other variables for each country.

Graph 1: BILISA Map between HDI and Health Expenditure



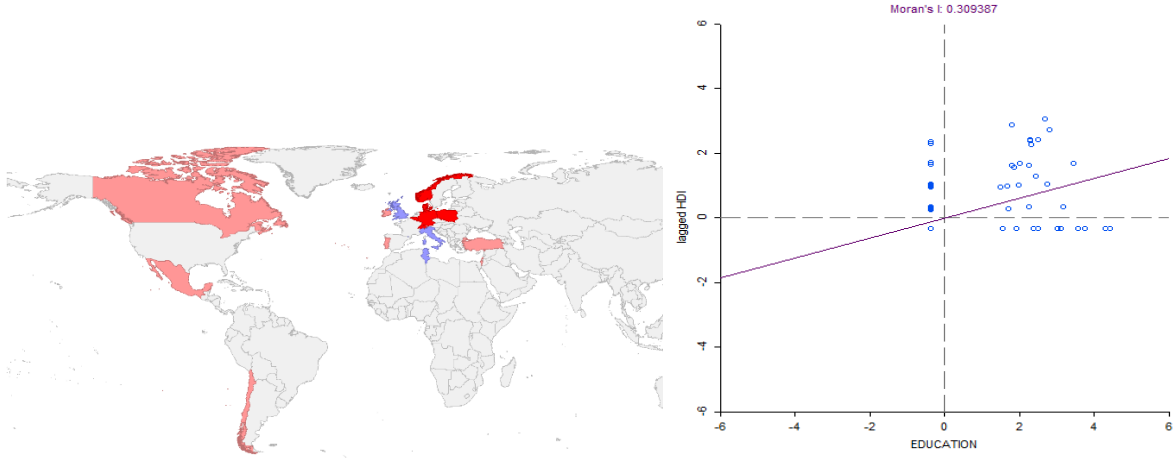
Map 1 shows us the relation between HDI and Health expenditure in OECD countries. This map gives the spatial correlation between HDI and health expenditure. In BILISA map, the colors have the same meaning as LISA maps. Red color means that countries have high health expenditure with high HDI level. Pink color means that countries have high health expenditure with low HDI. With this map, we can classify the countries as it is given in Table 1:

Table 1. Country Classification for Health Expenditure

BILISA Map Areas	Countries
High-High area (Red color)	Norway, Sweden, Denmark, Germany, Poland, Switzerland, Belgium
High-Low area (Pink color)	Canada, Chile, Turkey, Israel, Portugal

As a result of classification, it could be observed that Canada, Chile, Turkey, Israel and Portugal are similar; these countries have low HDI levels with high health expenditure. In addition, Norway, Sweden, Denmark, Germany, Poland, Switzerland and Belgium are similar: these countries have high HDI levels with high health expenditure.

Graph 2. BILISA Map between HDI-Education Expenditure



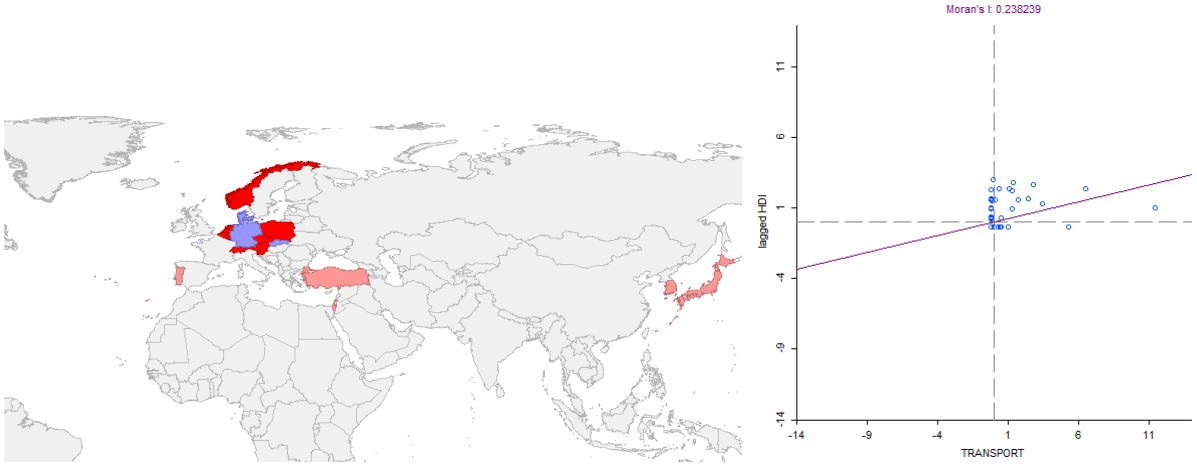
Map 2 shows us the relation between HDI and Education expenditure in OECD countries. This map gives the spatial correlation between the HDI and education expenditure. Red color means that countries have high education expenditure with high HDI level. Pink color means that countries have high education expenditure with low HDI. Light blue color means that countries have low education expenditure with high HDI. With this map, we can classify the countries as it is given in Table 2:

Table 2: Country Classification for Education Expenditure

BILISA Map Areas	Countries
High-High area (Red color)	Norway, Germany, Poland, Denmark, Switzerland, Belgium
High-Low area (Pink color)	Canada, Mexico, Chile, Turkey, Israel, Portugal
Low-High area (Light Blue color)	Italy, United Kingdom

The results in Table 2 demonstrate that Canada, Mexico, Chile, Turkey, Israel and Portugal are similar; these countries have low HDI level with high education expenditure. In addition, Norway, Germany, Poland, Denmark, Switzerland and Belgium are similar: these countries have high HDI level with high education expenditure. And finally, Italy and the United Kingdom are similar with high HDI level and low education expenditure.

Graph 3. BILISA Map between HDI-Transportation Expenditure



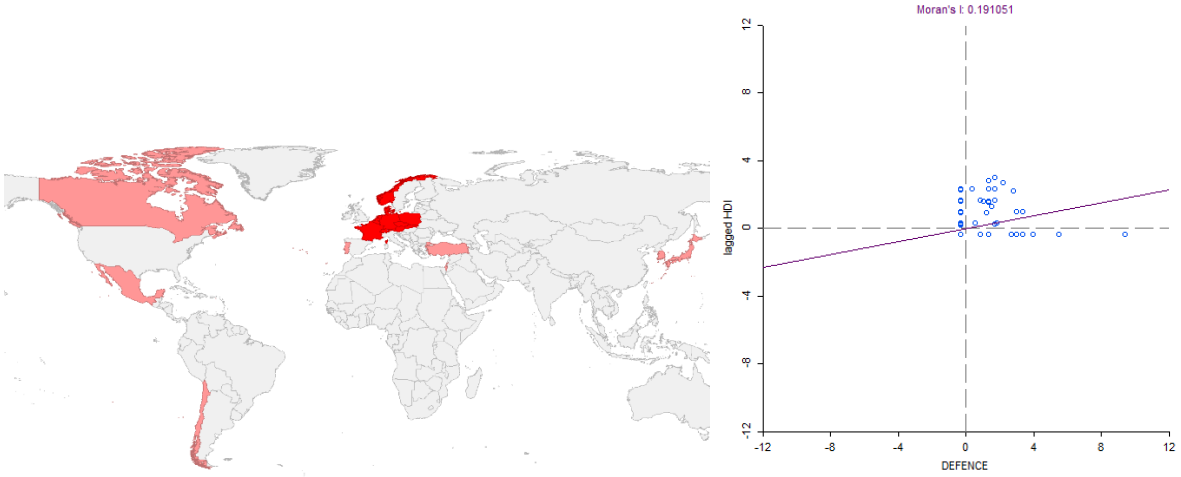
Map 3 shows us the relation between HDI and Transportation expenditure in OECD countries. This map gives the spatial correlation between HDI and transportation expenditure. Red color means that countries have high transportation expenditure with high HDI level. Pink color means that countries have high transportation expenditure with low HDI. Light blue color means that countries have low transportation expenditure with high HDI. With this map, we can classify the countries as it is presented in Table 3:

Table 3: Country Classification for Transportation Expenditure

BILISA Map Areas	Countries
High-High area (Red color)	Norway, Poland, Czech Republic, Austria, Switzerland, Slovenia
High-Low area (Pink color)	Turkey, Japan, Portugal, Israel
Low-High area (Light Blue color)	Germany, Slovakia, Denmark

The results in Table 3 demonstrate that Turkey, Japan, Portugal and Israel are similar and these countries have low HDI level with high transportation expenditure. Norway, Poland, Czech Republic, Austria, Switzerland and Slovenia are similar; these countries have high HDI level with high transportation expenditure. And finally, Germany, Slovakia and Denmark are similar with high HDI level and low transportation expenditure.

Graph 4. BILISA Map between HDI-Defense Expenditure

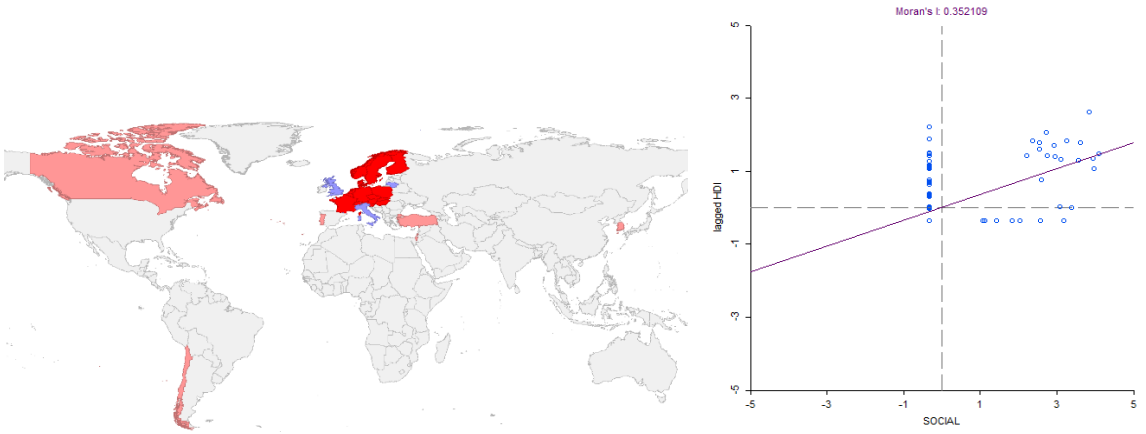


Map 4 shows us the relation between HDI and Defense expenditure in OECD countries. This map gives the spatial correlation between the HDI and defense expenditure. Red color means that countries have high defense expenditure with high HDI level. Pink color means that countries have high defense expenditure with low HDI. With this map, we can classify the countries as it is presented in Table 4:

Table 4: Country Classification for Defense Expenditure

BILISA Map Areas	Countries
High-High area (Red color)	Norway, Germany, Denmark, Poland, Czech Republic, Austria, Slovakia
High-Low area (Pink color)	Canada, Chile, Mexico, Turkey, Israel, Japan

The results in Table 4 show that Canada, Chile, Mexico, Turkey, Japan and Israel are similar and these countries have low HDI level with high defense expenditure. Norway, Germany, Denmark, Poland, Czech Republic, Austria and Slovakia are similar; these countries have high HDI level with high defense expenditure.



Graph 5. BILISA Map between HDI-Social Security Expenditure

Map 5 shows us the relation between HDI and Social Security expenditure in OECD countries. This map gives the spatial correlation between the HDI and social security expenditure. Red color means that countries have high social security expenditure with high HDI level. Pink color means that countries have high social security expenditure with low HDI. Light blue color means that countries have low social security expenditure with high HDI. With this map, we can classify the countries as it is presented in Table 5:

Table 5: Country Classification for Social Security Expenditure

BILISA Map Areas	Countries
High-High area (Red color)	Norway, Sweden, Finland, Germany, Poland, France, Czech Republic, Slovenia, Hungary, Austria, Slovakia
High-Low area (Pink color)	Canada, Chile, Turkey, Israel, Portugal
Low-High area (Light Blue color)	Italy, United Kingdom

The results in Table 5 show that Canada, Chile, Turkey, Israel and Portugal are similar, and these countries have low HDI level with high social security expenditure. Norway, Sweden, Finland, Germany, Poland, France, Czech Republic, Slovenia, Hungary, Austria and Slovakia are similar, these countries have high HDI level with high social security expenditure. And finally, Italy and the United Kingdom are similar with high HDI level and low transportation expenditure.

Although the countries look like similar in terms of HDI level, there are some differences between them. As can be seen in Table 6, countries depicted in italics support the aim of the present study. The United Kingdom and Italy have high HDI levels with low education and security expenditure. Among OECD countries with high HDI level, the most effective public expenditure composition is social security expenditure, the marginal effect on HDI is approximately 0.957.

Table 6: Country Similarity Comparison

	COUNTRIES WITH HIGH HDI LEVEL		**COUNTRIES WITH LOW HDI LEVEL**	
	BILISA Map	**Marginal Effect on HDI**	**BILISA Map**	**Coefficient**
Low Health Expenditure	-	-	-	-
Low Education Expenditure	*United Kingdom, Italy*	0,951	-	-
Low Transportation Expenditure	*Germany, Denmark*	0,887	-	-
Low Defense Expenditure	-	-	-	-
Low Social Security Expenditure	*United Kingdom, Italy*	***0,957***	-	-
	COUNTRIES WITH HIGH HDI LEVEL		**COUNTRIES WITH LOW HDI LEVEL**	
	BILISA Map	**Coefficient**	**BILISA Map**	**Coefficient**
High Health Expenditure	Norway, Sweden	0,841	*Chile, Turkey*	0,874
High Education Expenditure	Norway, Belgium	0,813	*Chile, Turkey, Mexico*	0,889
High Transportation Expenditure	Norway, Austria	0,806	*Israel, Turkey*	0,820
High Defense Expenditure	Norway, Denmark	0,863	*Chile, Turkey*	***0,914***
High Social Security Expenditure	Norway, Finland	0,844	*Chile, Turkey*	0,902

Furthermore, among the countries with low HDI level, Chile and Turkey are similar in terms of health, defense and social security expenditures. Especially for Chile and Turkey, health, defense and social security expenditures are higher than the other countries with a low HDI level. Among OECD countries with low HDI level, the most effective public expenditure composition is defense expenditure, the marginal effect on HDI is approximately 0.914.

CONCLUSION

The debate on the role of the state in economy dates back to many number of years. Despite this fact, no consensus has been reached, even today. When the role of the state in reliable operation of the economy and economic growth and development is considered, an environment where the state would not intervene in the economy would cause a big chaos.

However, the vital question is the magnitude of the state's role. Especially during recent years, the focus is on the significance of productivity within the context of state's intervention in the economy via public expenditures. Literature review would demonstrate that most of the studies stressed the improvement of productivity in expenditures rather than increase in public expenditures.

It is extremely important for a nation to achieve economic growth and development. Achieving only economic growth is not sufficient to realize economic development. Previously, it was considered that economic growth was the main condition to achieve economic development, however currently, reduction of poverty is also considered important. The criterion most frequently used to determine economic development is HDI. This index is used to determine the level of development of the nations. In the present study, it was aimed to determine the effect of public expenditures and expenditure composition on economic development including economic growth, social improvement and welfare (based on HDI) in OECD countries. For this analysis, spatial statistical techniques were utilized. As a result of this analysis, we concluded which countries were similar in terms of correlation between HDI and public expenditure compositions. We used HDI and health, education, transportation, defense and social security expenditure data for 2015. First, we explained LISA Maps and classified the countries for each expenditure composition. After we analyzed bilateral correlations between expenditures and HDI using BILISA Map, we determined the dissimilarities between the countries.

It could be argued that as the share of public expenditures in GDP increase in OECD countries, HDI is negatively affected. However, when the same case is analyzed based on public expenditure composition, differences among nations could be observed.

The United Kingdom and Italy have high HDI levels with low education and security expenditures. Among OECD countries with a high HDI level, the most effective public expenditure composition is social security expenditure, the marginal effect on HDI is approximately 0.957. In addition, among the countries with low HDI levels, Chile and Turkey are similar in terms of health, defense and social security expenditures. Especially for Chile and Turkey, health, defense and social security expenditures are higher than other countries with low HDI levels. Among the OECD countries with low HDI level, the most effective public expenditure composition is defense expenditure.

It is important to increase the share of social security expenditure, which is one of the most significant expenditure compositions that affect the development of nations. Based on the findings of the present study, among the countries with the prominent HDI scores Norway was similar to Sweden based on health expenditures, similar to Belgium based on education expenditures, similar to Austria based on transportation expenditures, similar to Denmark based on defense expenditures, and similar to Finland based on social security expenditures. It was found that also among the countries with higher HDI scores, the United Kingdom, Germany, Denmark and Italy had lower public expenditure levels when compared to other countries with high HDI levels and these countries were in spatial interaction, in other words, they demonstrated homogeneity based on public spending compositions. Similarly, among the countries with lower HDI status, Turkey was prominent with respect to public expenditures. Another finding of the present study was the fact that Turkey and Chile demonstrated spatial similarity in public expenditures and HDI correlation and low HDI, high public spending levels.

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