The Efficiency in Welfare Expenditure and Economic Growth

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Abstract: This paper analyzes the various arguments that support or oppose expansion in social welfare spending. A critical concern is the fear that as welfare expenditure increases, at some point, economic development will decrease. However, increased welfare investment is essential for achieving a welfare state to ensure the optimal growth of the economy and social welfare. OECD (Organisation for Economic Co-operation and Development) countries with a particular welfare regime that efficiently invests welfare spending are regarded as a reference for Korea. In consideration of the environmental factors in each nation, the relative efficiency level of welfare spending is calculated with panel data. It is evident that Korea's investment in social welfare from 2003 to 2007 was inefficient. One way to achieve an appropriate balance between social welfare and economic growth is to lessen the inefficiency of welfare investment.

Keywords: inefficient welfare investment, Window Analysis, environmental variables, Stable Economic Growth model, Efficient Social Welfare model

INTRODUCTION

Critics of welfare state building argue that it is the main obstacle to national development and stable economic growth—that is, that rising social welfare investment may contribute to a decrease in the nation's economic growth (Atkinson, 1999). Building a Western-style welfare state is not always guaranteed to lead to continuous economic development in the form of higher GDP rate, larger societal utility, or, even better, a permanently growing country. It is apparent that the main barriers to investing in higher welfare spending may result from the negative perspective that an increase in welfare

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Manuscript received November 4, 2011; out for review November 8, 2011; review completed December 5, 2011; accepted December 14, 2011.

The Korean Journal of Policy Studies, Vol. 26, No. 3 (2011), pp. 129-146.

programs' size and revenue may decrease economic growth. In spite of this skepticism, there has been little research of ever-reaching agreements on the link between economic growth and welfare spending.

This paper explores the welfare-growth efficiency of member nations of the Organisation for Economic Co-operation and Development (OECD). Currently, welfare state building is a controversial subject in Korea due to its uncertainty and impossibility toward nation growth. Potential problems related to welfare investment could be the situation that country economy is a rapid expansion in the amount of spending might not assure the goal attainment of social welfare. Since Korea has not yet become a complete welfare state, a review of OECD member nations' experiences with investment in the welfare sector could suggest potential implications for Korea. While the Korean people understand that the construction and implementation of strengthened social protection is important and even urgent, they have reached no clear consensus on the current and future level of social welfare investment (Caruana, 2010).

Conventionally, developing countries or nearly advanced countries often tend to emphasize the "catching-up model" (Aiginger & Guger, 2006), which involves intensive investment in social welfare relative to comprehensive services. Accepting the model causes complex problems, which create controversy about the proper size of welfare investment and economic investment. Inherently, a highly developed welfare state is intended to correct market failures and the negative consequences of the unequal distribution of wealth. Over time, developing countries with increasing welfare expenditures have become skeptical about whether to invest further. They are concerned that such investments in welfare may yield conflicts between welfare and economic growth. To some degree, every OECD country has a selected share of welfare investment against GDP to facilitate wealth redistribution and social justice.

Given these concerns about the proper level of welfare spending, this paper tries to answer two questions: What countries have proved most efficient in improving social welfare and economic growth within its country-specific environment? And what country has found the optimum welfare regime to provide an efficient foundation for balancing social welfare and economic growth?

LITERATURE REVIEW AND STUDY MODEL

Relationships between Social Welfare and Economic Growth

Research on social welfare and growth can be divided into two categories. One group focuses on the positive or negative relationships between social welfare and

economic growth, and the other investigates efficiency in welfare sub-areas. First, many literatures analyze the efficiency of welfare spending, relative to the national economy, that invests in various social goods such as education, family destruction, and child welfare, in a context of scare resources. Previous research has found three strong arguments of welfare expenditures for and against nation growth. The empirical results of these studies have been quite diverse.

Whether economic growth is positively affected by welfare investment is a very controversial issue. Scholars addressing it could be divided into three groups. First, a variety of papers make an empirical analysis of the positive outcomes of welfare investment by applying a classic economic model to workforce increase and productivity (Atkinson, 1999; Brooks & Manza, 2006; McCallum & Blais, 1987; McDonald & Miller, 2009). Their general focus is on welfare subsystems such as poverty alleviation, employment, and workforce development.

Second, other scholars (Persson & Tabellini, 1994; Weede, 1991) argue that welfare state expenditure hinders national economic growth. The extent to which different social and governmental conditions obstruct a nation's development varies from nation to nation. Among many reasons that could explain the undesirable results of welfare investment, governmental spending decisions in a particular welfare area is a very prominent one (Rahn & Fox, 1996).

The welfare state is widely regarded as one of the factors accountable for lower economic growth (Lindbeck, Molander, Petersson, Sandmo, et al., 1993). Bergh (2006) argues that, given the complex and uncertain issue of "welfare state over-sizing" (Caruana, 2010, p. 77), a high level of social welfare and protection could prevent a national economy from improving. A lower rate of economic growth (Caruana, 2010), a decrease in total productivity (Baumol, 1984), political degradation (Ghate & Zak, 2002), a higher rate of tax (Atkinson & Werner-Sinn, 1999), and an unstable labor market (Hemerijck & Eichhorst, 2009) can slow economic growth.

Third, others (Wolfe, 1931) argue that there is no direct link between economic growth and welfare expenditure. Some researchers assert that the argument that the relationship between welfare investment and national economic growth is harmful to welfare growth is unclear (Hansson & Henrekson, 1994; Landau, 1985). They state that the economic consequences of welfare spending are either positive or negative. The effects of welfare investment on the national economy are not unidirectional (Atkinson, 1995). The ramifications of welfare spending are different both in the conditions for the growth structure of a nation (Fic & Ghate, 2004) and in the balance between socioeconomic change and social protection (Aidukaite, 2011).

In a separate body of literature, much research selects and studies a particular social field or functional area that is most conducive to increased welfare, and therefore

growth balance. Many scholars (Afonso, Schuknecht & Tanzi, 2003; Gupta & Verhoeven, 2001) have studied the efficiency of national education systems. Afonso et al. (2003) analyze the degree of educational efficiency by applying the public expenditure in 25 OECD countries to educational performance indicators. They find that inefficient countries could enhance their efficiency if they reinvest their resources (Afonso et al., 2003).

By re-employing Gouyette and Pestieau's (1999) method, Ravallion (2003) conducted an empirical study to test the relative efficiency of social spending and poverty reduction, and found that the cost savings resulting from actual efficiency improvement were huge: an average of 8.6 percent of gross domestic product (GDP).

There are some limitations in the previous studies. While a growing number of studies analyze the specific effects of welfare investment, the general effects of welfare spending on economic performance could not be firmly established (Beraldo, Montolio, & Turati, 2005). Previous studies have been relatively successful in isolating specific elements or subsystems of welfare investment that have an impact on economic performance, but the overall impact of welfare spending in a country is still only vaguely understood.

One solution to the measurement issues raised above is to incorporate the criticism into an empirical research design for international efficiency comparison, which can help to find the relative strengths of overall welfare investment in fostering national growth. The existing literature does not provide a comprehensive answer for a nation considering whether it should maintain or expand its welfare system in the face of slow economic growth and of concerns that welfare investment may adversely affect economic growth.

Another limitation of earlier studies is that the practical issues for national performance under a productivity-based welfare initiative and reform have not been adequately assessed as a product of a country's policy decisions. In many cases, the public share of welfare expenditure as a rate of GDP is higher than that of private expenditure. From this perspective, it is very important to note that governmental function has been upheld in every economic term as being a critical factor in the decision to increase welfare investments. The rationale behind this argument is rooted in the governmental role of the welfare state.

In light of the above argument, this study is based on the assumption that public and private investment coexist in various welfare areas, while government has the more substantial role. Governments strategically responded to economic growth both by redirecting resources among the sub-areas of the welfare system and by incorporating more or fewer resources into a particular sub-area and activity. Governmental spending patterns and welfare investment portfolios are very diverse. When a nation is

convinced that higher welfare investment and higher economic performance will be attained simultaneously, the inefficiency problem of welfare spending at the country level could be adequately solved. Therefore, governmental accountability for decision-making in social welfare investment and the resultant overall level of investment need to be modeled in the empirical research design for international comparison.

Theoretical Model

Until now, no country could be certain that its further investment in welfare will lead to economic and welfare improvement. To answer the question of the proper mix of welfare spending and investment in economic growth, this study developed two empirical solution models for comparison: the Stable Economic Growth (SEG) and Efficient Social Welfare (ESW) models. A key rationale for using the two models is that welfare investment affects both economic efficiency and social welfare.

To assist industrialized countries to meet economic growth goals, a higher level of welfare investment is the most necessary one, which requires OECD nations to implement the most effective policy for improving economic development indicators such as GDP. First, the SEG model was designed to test if a nation could achieve welfare spending reduction while keeping economic outcomes as high as possible for a long period. OECD nations have experienced highly diverse welfare input levels in terms of spending, intuition, and benefit levels for accomplishing sustained economic growth.

The SEG model is based on the concept that economic development is facilitated by properly investing welfare resources in the country's growth. Developed nations with high welfare costs for pursuing greater growth are likely to spend more money and to give the resultant higher burden to the national growth. If this situation goes on over a long period, even rich countries with high costs may be motivated to economize welfare inputs to boost economic development. Therefore, the SEG model hypothetically seems to fit the situation in which a country tries to achieve relative efficiency in welfare investment for the purpose of a stable and continuous rise in economic growth.

The ESW model was separately developed to test the notion that continuous welfare growth caused by rising welfare and economic expenditure might lead to a higher level of welfare institutions and outcomes. In reality, it is not clear that governmental decision-making on the level of welfare and economic investment will actually promote social welfare in a country. If there are inefficiencies in creation of welfare institutions, investment in social welfare should be lessened. The ESW model tries to provide a new solution for the unsettled perspectives of economic growth efficiency.

Because no empirical study has attempted to solve these two questions at the country level, this study used these two approaches to attempt to predict the relative efficiency of use of national resources. Given the complexity and uncertainty involved in choosing the proper mix of allocations to welfare and economic resources, there might be potential trade-offs between the objectives of economic growth and welfare expansion. The concerns about interaction between welfare spending and economic growth could be adequately answered if the OECD nations' rational decision-making regarding welfare investment and the appropriate social benefits for the public are combined in the most efficient way.

RESEARCH DESIGN

Analytical Framework

The purpose of this study is to identify and test the relationships between economic development and welfare investment. Its focus is on international comparison while adequately taking into consideration country-specific environments for welfare and growth. The empirical testing procedure has three stages.

In the first stage, Data Envelopment Analysis (DEA) with a technique of window analysis is employed in estimating relative efficiency for the sample OECD member countries. This stage aims at identifying stable growth mechanisms with regard to the ESW and SEG models. In the second stage, the Tobit panel regression model with the censored dependent variable of DEA scores for each sample is used to estimate relative efficiency and to calculate adjusted inefficiency. In the third stage, Cluster Analysis of the relative efficiency scores is used both to provide further evidence that a gap in welfare spending between Korea and other advanced countries may exist and to identify the international variation in efficient investment in welfare growth and economic growth.

The DEA approach developed by Farrell (1957) is very relevant to testing the rest OECD countries as well as Korea. There should be an opportunity to find an efficiency level to better fit the current welfare investment and refine the welfare initiatives so that long-term versus short-term ramifications are considered. The DEA approach is suitable to assess the relative efficiency of decision-making units, or OECD member countries, when they try to integrate the two seemingly conflicting national goals of social welfare growth and economic growth. This approach assumes that a member country can set an overall expenditure limit on welfare spending and design a welfare-spending-based institution that gives more flexibility and higher satisfaction to its

people. Whether the country as a decision-making unit utilizes public money above the average level of welfare spending and tries to find the least expensive means of satisfying its population is examined.

Scholars of social welfare and economics have long suspected that a country's welfare investment type leads to growth in both the national economy and welfare benefits. Theoretically, it is suspected that different types of welfare state (Esping-Andersen, 1990) - Liberalized, Conservative-Corporative, or Social Democratic - have significantly different effects on welfare productivity. However, nowadays welfare spending efficiency instead of welfare state type is becoming the focus in establishing the form of a national welfare system. Thus, Cluster Analysis of social welfare and national growth could provide an answer regarding which regime of welfare spending is more efficient.

Data and Variables

Data for empirical testing in this study were collected from various secondary information sources such as OECD revenue statistics, social security programs throughout the world, UNDESA, the World Bank, the IMF, and Freedom House. Data from Australia, Chile, and Estonia were eliminated, since these countries do not provide the information needed to test the study models. This analysis covered 87 OECD member countries for the period from 2003 to 2007.

Since the research model uses Ray's (1991) three-step procedure, two sets of variables are needed: input and output variables and dependent and independent variables. Variables for DEA are classified into two categories at the OECD country level: discretionary input and nondiscretionary variable or environmental variable.

In the first step of analysis, the DEA-window model to examine welfare expenditure is constructed with 11 variables that are the components of governmental decision-making. Mainly, data from OECD revenue statistics reports from 2003, 2005, and 2007 are used as the output variable. GDP is used for the SEG model, while reverse unemployment rate,[1] life expectancy, and the Welfare Institution Generosity Index[2] are used for the ESW model. GDP as an output variable in the SEG model should

1. A high efficiency in DEA analysis is achieved by maximizing higher levels of outputs with lower levels of inputs in production. Since the unadjusted unemployment rate wrongly shows that a higher unemployment rate is desirable for better outputs for the ESW, I use the reverse score.
2. Readers interested in a complete explanation of the Welfare Institution Generosity Index are invited to e-mail the author.

Table 1. Descriptive Statistics for OECD Countries (n = 87)

Variable	Mean	Standard deviation
Output		
For SEG model: GDP (in billion US dollars)	1,165.9	2,345.3
For ESW model: reverse unemployment rate (%)	93.4	3.4
For ESW model: expectancy (years)	81.6	2.0
For ESW model: Welfare Institution Generosity Index score (%)	0.66	0.08
Discretionary input (in millions)		
Governmental share of medical expenditure	2,216,929.1	7,710,996.3
Spending on social investment	218.0	390.3
Spending on education	58.2	124.6
Workforce in social welfare	1,592,576	3,185,134
Governmental contribution to social security	113.3	189.5
Social transfer by governments	254.4	452.5
Tax burden	351.6	633.5
Environmental variable		
Human Development Index score (%)	0.845	0.045
Total population (millions)	36.92	58.72
Population aged 65 or older (%)	14.46	3.24
Dependency rate (%)	48.66	5.03
Political Index score (%)	1.144	0.304

capture investment efficiency in social welfare. In contrast, the three welfare outputs in the ESW model are expected to detain investment efficiency in economic development. All the inputs and outputs used in the DEA-window analysis are discretionary variables controllable by the decision-making unit, an OECD country (see table 1).

In the second step, Tobit panel regression is used to purge the environmental effects to the output in the two models. The five nondiscretionary variables-Human Development Index (HDI) score, total population, proportion of the population aged 65 or older, dependency rate, and Political Index score are used as independent variables for new efficiency estimations in the regression. In the last step, Cluster Analysis is employed to classify inefficiency increase and decrease in growth and social welfare.

EMPIRICAL RESULTS

Efficiency with Environment

One of the purposes of welfare investment is to improve national economic growth using the same resource base. The first procedure to identify the different efficiency levels of welfare investment is DEA-window analysis with the input-oriented method. The output variable in the analysis is simply the score of relative efficiency analysis, or DEA calculated for an OECD country. Instead of using the traditional DEA estimation for the cross-sectional data, the study used window estimation by incorporating all the inputs from the panel sample. This is because efficiency scores calculated for a certain time period may not be the same in a different time period. Among the 29 OECD nations, a country with an efficiency score of 1 could be regarded as a best-practice nation irrespective of different time points. The unadjusted empirical results show that Korea's efficiency level is almost 1 across the study periods.

The efficiency scores from an analysis using the original DEA-window method are unlikely to be genuine, unless the influence of the country's environmental factors on the scores is taken into account (Ray, 1991; Ruggiero, 1996). Country-level efforts to invest in a certain field of welfare and economic development always operate under different conditions. The link between welfare investment and economic growth investment in an advanced nation may not always be coordinative, because quite different environmental factors, or fixed factors, exist (Ray, 1991). If the seemingly conflicting goals from the two different investments in a nation are not balanced, a proper mix of welfare growth and economic growth cannot be achieved for the country.

A Tobit panel regression of 29 OECD member countries for three years provides evidence that country-specific investment conditions make each efficiency score different. The use of the panel regression method helps find what could be the main factors in the different efficient groups. The dependent variable in this analysis is simply the efficiency scores from DEA-window measurement calculated for each country. Since the efficiency scores range from 0 to 100, Tobit regression is employed with the censored data.

The analysis shows that the influence of more than four fixed predictor variables is statistically significant ($p < 0.1$ or less) and substantively strong in the expected direction. In the SEG model, a Political Index score indicating a favorable political atmosphere and the size of the total population have a positive effect on the estimation of GDP. In contrast, the other three variables—HDI score and dependency rate—clearly are attributed to making GDP smaller.

The results from the SEG model show that three variables—HDI score, dependency rate, and Political Index score—have a negative effect, while total population has a negative effect on growth efficiency. A unit increase in each variable does lead to less efficient economic growth in OECD countries.

In contrast, in the ESW model, the effects of three variables—HDI score, total population, and share of the population aged 65 or older—are consistent due to the coherent sign of their negative coefficients on the welfare efficiency (see table 2). An increase in dependency rate and Political Index score (measured value in reverse order) contributes positively to welfare productivity. As compared to the efficiency scores on GDP, a country's environment measured by the three factors is negatively associated with welfare institution growth. Countries characterized by environmental severity are more likely to have lower efficiency scores in welfare and economic growth, and therefore it is necessary to further investigate the trend (Beraldo, 2009) of relative efficiency in both ESW and SEG models over time.

An issue with DEA estimates is that an increase or decrease in environmental favorableness is associated with the output efficiency regarding GDP or reverse unemployment rate, Welfare Institution Generosity Index score, and life expectancy.

Table 2. Effects of Fixed Variables on Efficiency

Element	SEG model	ESW model
Dependent variable	Efficiency score for GDP	Efficiency score for reverse unemployment rate, life expectancy, and Welfare Institution Generosity Index score
Independent variable		
Human Development Index score	-0.5067692*** (0.0797264)	-0.3328505 (*) (0.1772583)
Total population	-0.0015302*** (0.0000509)	0.0006318*** (0.0001099)
Population aged 65 or older	-0.0198271*** (0.0009129)	-0.0002742 (0.0019503)
Dependency rate	0.0014863* (0.0007114)	-0.0080608** (0.0013905)
Political Index score	-0.0258162* (0.0108451)	0.1060204*** (0.0322079)
Intercept	1.14566*** (0.075643)	1.377526*** (0.147027)
Probability > Chi^2	0.000***	0.000***
Log likelihood	56.01	91.07
N	87	87

Note: SEG = Stable Economic Growth model; ESW = Efficient Social Welfare model; Tobit Panel Regression (STATA 9.0).

According to Jahanshahloo, Lotfi, Shoja, and Abri (2010), whereas Ray's (1991) technical efficiency computation to cure the fixed effects is very useful, research analysis is explicitly dependent on the re-use of the DEA model with the environmental harshness variable. They suggest that a true efficiency measure could begin by building a comprehensive model of a decision-making unit with a complex environment.

By re-employing the methods of Jahanshahloo et al. (2010) and Ray (1991), the overall Environmental Severity Index is constructed as follows in this study. The analysis begins with the construction of the Environmental Severity Index by computing a predicted regression coefficient and residual for each predictor variable. Consequently, the adjusted hat value equals unadjusted hat plus maximum residual value (0.2101914—Ray, 1991). By purposely setting the maximum efficiency score for each nation in a given time period to 1, the adjusted efficiency values are finally computed.

The research formulates a more complex approach to inefficiency in providing welfare and economic investments. The difference between the actual efficiency score and the adjusted score in the two models is driven by the change in environmental harshness and strategy for each country. If the inefficiency score is high and increases, the national investment in welfare and the economy need to be limited in the future. The inefficiency gap, or change in inefficiency score from period 1 (2003-2005) to period 2 (2005-2007), is computed in an attempt at comparison. Based on the gap, an OECD member country may make strategic decisions to efficiently promote welfare growth and economic growth. If the current inefficiency for welfare growth is higher than the one for economic growth, it is apparent that the country has been experiencing some waste and obstacles to welfare growth.

A country's efficiency scores relative to those of other countries in the two periods are compared to identify the efficiency change. Previously shown in terms of technical investment efficiency, Korea's DEA score is almost 1 in both models. This score is very high, as compared to the other 28 OECD member countries.

However, the trend of the inefficiency scores varies between periods 1 and 2. The implications for DEA inefficiency scores over the two time periods are that inefficient investment in either welfare or economy is assumed as a failure in maximizing the inputs of a country. The results shown in table 3 below indicate that, since 24 OECD countries out of 29 experienced a decrease in inefficiency in economic investment (SEG model), they are less likely to waste their resources for national development. In contrast, 13 out of the 29 countries, including Korea, measured in the ESW model experienced a deterioration in efficiency (or increase in inefficiency) of welfare growth. As compared to other nations, the inefficiency of social investment in Korea was relatively high at the aggregate level of investment during the two different periods.

The trend of DEA inefficiency scores provides a valuable insight for the Korean

Table 3. Changes in Inefficiency

Country	Inefficiency in ESW model			Inefficiency in SEG model		
	Period 1 (2003-2005)	Period 2 (2005-2007)	Difference	Period 1 (2003-2005)	Period 2 (2005-2007)	Difference
Austria	2.63%	0.46%	-2.16%	-1.46%	-1.93%	-0.47%
Belgium	-0.14%	0.46%	0.60%	0.58%	-1.76%	-2.34%
Canada	0.20%	-1.91%	-2.10%	-5.58%	-2.05%	3.53%
Czech Republic	1.90%	-0.50%	-2.40%	5.01%	-1.84%	-6.84%
Denmark	0.70%	-3.10%	-3.80%	-1.85%	-2.52%	-0.67%
Finland	1.90%	-0.14%	-2.04%	1.15%	-3.30%	-4.45%
France	-2.27%	0.07%	2.34%	-1.25%	-0.15%	1.09%
Germany	-4.18%	-0.22%	3.95%	1.40%	2.58%	1.18%
Greece	6.70%	4.44%	-2.26%	1.61%	-1.61%	-3.22%
Hungary	-0.10%	0.20%	0.30%	8.07%	1.25%	-6.82%
Iceland	0.00%	0.00%	0.00%	19.74%	-0.40%	-20.14%
Ireland	7.20%	4.60%	-2.60%	0.00%	0.00%	0.00%
Israel	1.90%	-1.20%	-3.10%	-7.57%	-1.88%	5.69%
Italy	-3.75%	0.09%	3.84%	1.33%	1.00%	-0.32%
Japan	-4.83%	-4.60%	0.22%	0.00%	0.00%	0.00%
Korea	1.80%	2.53%	0.73%	0.00%	0.00%	0.00%
Mexico	1.60%	-0.10%	-1.70%	0.00%	0.00%	0.00%
Netherlands	0.80%	-0.40%	-1.20%	10.74%	0.63%	-10.11%
New Zealand	0.00%	3.74%	3.74%	0.00%	0.00%	0.00%
Norway	2.90%	0.50%	-2.40%	3.68%	-1.36%	-5.04%
Poland	-0.20%	0.60%	0.80%	1.75%	1.52%	-0.23%
Portugal	8.00%	1.90%	-6.10%	3.30%	-0.17%	-3.46%
Slovakia	0.00%	0.00%	0.00%	0.86%	-0.86%	-1.72%
Slovenia	0.10%	2.50%	2.40%	1.71%	-1.43%	-3.14%
Spain	-0.28%	-0.79%	-0.51%	0.00%	0.00%	0.00%
Sweden	0.14%	0.07%	-0.07%	0.17%	-3.58%	-3.75%
Switzerland	-1.13%	-0.86%	0.27%	1.09%	-7.52%	-8.61%
United Kingdom	-1.34%	-0.62%	0.72%	1.97%	-1.97%	-3.94%
United States	-2.77%	-0.39%	2.38%	0.00%	0.00%	0.00%
Average	0.60%	0.25%	-0.35%	1.60%	-0.94%	-2.54%
Inefficiency increase (number)	15	14	13	17	6	5

Note: Positive numbers represent an increase in inefficiency; negative numbers represent a decrease in inefficiency.

government. While Korea experienced no efficiency loss in economic investment, it experienced a productivity loss in welfare spending in periods 1 and 2. However, its inefficiency gap in the two periods widened from 1.80 percent to 2.53 percent, showing a 0.73 percent rise in inefficiency in welfare productivity measured for welfare institutions and outcomes.

Welfare State Type and Efficiency

The relative efficiency of welfare state types is of particular interest in ascertaining the ideal level of welfare investment. It is necessary to discover the best way to invest welfare spending or the type of welfare regime that is most conducive to productivity enhancement for most advanced countries. It is difficult not only to identify the effects of a country's decisions on welfare growth and economic growth but also to isolate which elements of the severe environment have an effect on that growth. In addition, special attention needs to be paid to performance outcomes that can be distinguished within either the different welfare regime types or relative efficiency levels or both.

To this end, Cluster Analysis with DEA inefficiency scores can be used to make clear whether a type of welfare regime matches with a group of efficient or inefficient countries. If calculated inefficiency scores may be associated with the regime type, a nation that does not achieve higher welfare investment should reconsider its investment productivity and should tightly manage the associated resources and factors. Consequently, the constructed method set up for the balance between welfare and economic growth.

The findings from the Cluster Analysis show that OECD member countries can be categorized into three different groups in alignment with their trends in welfare inefficiency and growth inefficiency. The procedure is the means of confirming whether or not Decision-Making Units' welfare resources were used in the most efficient way during the time periods. The Cluster Analysis focuses on the change patterns of inefficient investment in welfare and economic growth, since the type of regime has some degree of path-dependency for the investment (Nadin & Stead, 2008).

Findings from the two different model analyses indicate that the inefficiency decrease for most OECD countries (group 3 in table 4) does not have much variation. The measures for inefficiency change seem to cluster more around groups with varying degrees of inefficiency. Contrary to findings for group 3, 18 countries experienced increased inefficiency during the two periods (groups 1 and 2). Among them, 15 countries were not able to reduce welfare inefficiency in the ESW model (group 2). The deterioration of welfare efficiency and economic growth efficiency was greater in Korea than in the other nations.

Table 4. Trends in Inefficiency

Category	Increased inefficiency*		Decreased inefficiency*
Welfare inefficiency (ESW model)	Moderate (0.23%)	Severe (3.62%)	(-0.76%)
Economic growth inefficiency (SEG model)	Severe (12.85%)	Moderate (0.67%)	(-0.74%)
Classification	Group 1	Group 2	Group 3
	Hungary (P1; U) Iceland (P1; U) Netherlands (P1; S)	Ireland (L) New Zealand (P2; L) Korea (C) Mexico (P1; C) Finland (P1; C) Greece (C) Austria (P1; S) Norway (P1; S) Portugal (U) Slovenia (P2; U) Czech Republic (P1; U)	Remaining OECD countries
Number of countries	3	15	40

P1 = period 1 (2003-2005); P2 = period 2 (2005-2007).
L = Liberal; C = Conservative; S = Social Democratic; U = unclassified.
* Percentage scores in parentheses are inefficiency scores for a group center.

The Conservative welfare states and a similar type of welfare states such as Portugal, Slovenia, the Czech Republic, Hungary, and Iceland show poor efficiency in welfare investment. Portugal, Greece (Pierson & Castles, 2006), Mexico (Tomoko, 2004), and Finland are more likely to be classified as Conservative-Corporative welfare states. Even though Korea and other East Asian nations are classified as Confucian welfare state regimes (Jones, 1993), they are akin to Corporative welfare states (Bambra, 2007). In addition, welfare efficiency is deteriorating in Austria, Norway, and the Netherlands, which are considered Social Democratic welfare states. One should bear in mind that a maximized level of governmental investment and consumption may not guarantee a sustainably higher level of welfare and growth (Rahn & Fox, 1996).

These findings also suggest that liberal welfare regimes, characterized by minimal governmental intervention, generally attained a higher level of efficiency in the two models across both time periods. While liberal welfare government intervention in welfare growth is very weak, its role and accountability in making welfare investments is not reduced to a minimum. Thus, the Korea government needs to adopt a strategy for lessening welfare investment inefficiency like the liberal welfare regimes did, while expanding welfare expenditure to achieve a genuine welfare state.

CONCLUSION AND DICUSSION

This study examined the efficiency of welfare and economic spending over time. Several important points are worth discussing for Korea as it tries to establish a sustainable welfare state. The trend of change in environmental factors for social welfare and economic growth should not be overlooked in a country's decision-making on improving economic and welfare performance. In consideration of the appropriate relationship between social welfare and economic growth, this paper articulates two sets of theories of fundamental efficiency: the Stable Economic Growth model and the Efficient Social Welfare model. The difference between this study and previous studies is that the efficiency calculation and overall inefficiency estimation are based on these two models.

With these models, welfare spending is investigated as to whether the investment adversely affects productivity in both the economy and welfare at the same time. The key assumption in this research is that efficient investment in welfare and growth for OECD countries should be estimated with nondiscretionary variables. One of the most overlooked points of international comparison in the efficiency measurement literature for social welfare is the degree of environmental factors that disturb efficiency changes between welfare-prioritized countries and economic-growth-prioritized countries. Different statistical methods and designs for analyzing social welfare and economic growth are considered to prove variations in efficiency outcomes. The trend of efficiency scores is explained based on countries' decision-making on welfare growth.

The results of this study apparently show that the overall efficiency of welfare investment is relatively low, as compared to a high efficiency level in economic growth for OECD member countries overall. The efficiency gain from economic growth in the SEG model is the most recognized pattern for most OECD nations. The high social welfare inefficiency found for many countries in the ESW model could be eliminated in various ways.

In spite of the variation in inefficiency in each nation's welfare spending, this study found a welfare spending pattern. Korea's welfare expenditure became more inefficient from 2003 to 2007. This finding indicates that investment in welfare and economic growth for Korea was not quite successful.

The study also found that differences in welfare regime type contribute to differences in efficiency in economic and welfare investment. Corporative welfare states and Social Democratic welfare states considered in this study generally have low welfare efficiency. This finding suggests that the decision to promote welfare growth by the Korean government should be considered both without increasing investment inefficiency and without creating conflicts between welfare and economic growth, which

could not be completely resolved.

Based on what we have learned from the previous experiences of Liberal welfare states through international efficiency comparison, balancing welfare and economic growth could be a very challenging task for Korea. The lack of an effective governmental decision mechanism, under pressure to establish an appropriate mix of welfare and economic growth, creates uncertainties. This paper suggests that efficiency loss in welfare investment could be an even bigger problem than productivity gain. Therefore, it concludes that the goals of welfare and economic growth are likely to be achieved efficiently if the inefficiency problem affected by uncontrollable factors in welfare investment is solved.

REFERENCES

Afonso, A., Schuknecht, L., & Tanzi, V. 2003. Public sector efficiency: An international comparison. *Public Choice*, 123(3-4): 321-347.

Aiginger, K., & Guger, A. 2006. The ability to adapt: Why it differs between the Scandinavian and continental European models. *Intereconomics*, 14(1): 14-23.

Atkinson, A. B. 1995. Is the welfare state necessarily an obstacle to economic growth? *European Economic Review*, 39: 723-730.

Atkinson, A. B. 1999. *The economic consequences of rolling back the welfare state*. Cambridge, MA: MIT Press.

Atkinson, A., & Werner-Sinn, H. 1999. *The economic consequences of rolling back the welfare state*. CES Munich Lectures. Cambridge, MA: MIT Press.

Baumol, W. 1984. Productivity growth, convergence, and welfare: What the long run data show. *American Economic Review*, 76: 1072-1085.

Beraldo, S., Montolio, D., & Turati, G. 2005. *Healthy, educated and wealthy: Is the welfare state really harmful for growth?* Working Paper No. 127, Universitat de Barcelona.

Bergh, A. 2006. Work incentives and employment are the wrong explanation of Sweden's success. *Economic Journal Watch*, 3(3): 452-460.

Brooks, C., & Manza, J. 2006. Why do welfare states persist? *Journal of Politics*, 68(4): 816-827.

Caruana, C. 2010. Measuring the efficiency and effectiveness of the welfare state: A comparative study of the EU-27 member states. *Bank of Valletta Review*, 42(Autumn): 75-106.

Esping-Andersen, G. 1990. *The three worlds of welfare capitalism*. Cambridge: Polity Press.

Farrell, M. 1957. The measurement of productive efficiency. *Journal of the Royal Statistical Society, Series A*, 120(3): 253-290.

Fic, T., & Ghate, C. 2005. The welfare state, thresholds, and economic growth. *Economic Modelling*, 22: 571-598.

Ghate, C., & Zak, P. 2002. The growth of government and the politics of fiscal policy. *Structural Change and Economic Dynamics*, 13: 435-455.

Gouyette, C., & Pestieau, P. 1999. Efficiency of the welfare state. *Kyklos*, 52(4): 537-553.

Gupta, S., & Verhoeven, M. 2001. The efficiency of government expenditure-experiences from Africa. *Journal of Policy Modelling*, 23: 433-467.

Hansson, P., & Henrekson, M. 1994. A new framework for testing the effect of government spending on growth and productivity. *Public Choice*, 81(3-4): 381-401.

Hemerijck, A., & Eichhorst, W. 2009. Whatever happened to the Bismarckian welfare state?: From labor shedding to employment-friendly reforms. In B. Palier (ed.), *The politics of welfare reform in continental Europe*. Amsterdam: Amsterdam University Press.

Jahanshahloo, G. R., Lotfi, F. H., Shoja, N., & Abri, A. G. 2010. Proposing a new model on data envelopment analysis by considering non-discretionary factors and a review on previous models. *Mathematical and Computational Applications*, 15(3): 344-353.

Jones, C. 1993. *New perspectives on the welfare states in Europe*. London: Routledge.

Kahn, G. 1992. *Policies for long-run economic growth: A summary of the bank's 1992 symposium*. Kansas City, MO: Federal Reserve Bank of Kansas City.

Landau, D. 1985. Government expenditure and economic growth in the developed countries: 1952-1976. *Public Choice*, 47: 459-477.

Lindbeck, A., Molander, P., Petersson, O., Sandmo, A., et al. 1993. Options for economic and political reform in Sweden. *Economic Policy*, 17: 220-263.

McCallum, J., & Blais, A. 1987. Government, special interest groups and economic growth. *Public Choice*, 54: 2-18.

McDonald, B. D., & Miller, D. R. 2009. *So long and thanks for all the fish: The impact of social welfare programs on the state economy*. Paper presented at the annual meeting of the Midwest Political Science Association, Chicago, IL.

Nadin, V., & Stead, D. 2008. European spatial planning systems, social models and learning. *disP-Planning Review*, 44(1): 35-47.

Persson, T., Tabellini, G. 1994. Is inequality harmful for growth? *American Economic Review*, 84(3): 600-621.

Pierson, C., & Castles, F. G. 2006. *The welfare state reader* (2nd ed.). Cambridge: Polity Press.

Rahn, R., & Fox, H. 1996. *What is the optimum size of government?* Denver, CO:

Vernon K. Krieble Foundation.

Ravallion, M. 2003. Measuring aggregate welfare in developing countries: How well do national accounts and surveys agree? *Review of Economics and Statistics*, 85(3): 645-652.

Ray, S. C. 1991. Resource use efficiency in public schools: A study of Connecticut data. *Management Science*, 37: 1620-1628.

Ruggiero, J. 1996. Measuring technical efficiency in the public sector. *European Journal of Operational Research*, 90: 553-565.

Tomoko, M. 2004. The foundation of the Mexican welfare state and social security reform in the 1990s. *Developing Economies*, 42(2): 262-287.

Weede, E. 1991. The impact of state power on economic growth rates in OECD countries. *Quality and Quantity*, 25: 421-438.