INDUSTRIAL RELATIONS SYSTEMS AND WELL-BEING IN OECD COUNTRIES: ANTECEDENT FACTORS OF WELL-BEING AND HOW THEY DIFFER ACROSS NATIONS

Dong-One Kim
Dean and Professor, Korea University Business School and
Graduate School of Labor Studies,
Korea University Anam-Dong, Seongbuk-Gu, Seoul
South Korea

Email: dokim@korea.ac.kr

and

Yoon Ho Kim
Adjunct Professor
Korea University of Technology and Education, School of Industrial Management
Cheonan, Chungnam
South Korea

Email: youno@kut.ac.kr, yhkim.alberto@gmail.com

March 2015

INDUSTRIAL RELATIONS SYSTEMS AND WELL-BEING IN OECD COUNTRIES: ANTECEDENT FACTORS OF WELL-BEING AND HOW THEY DIFFER ACROSS NATIONS

Dong-One Kim, Korea University Business School
Yoon-Ho Kim, Korea University of Technology and Education

Abstract

This study explains international variations in objective and subjective well-being with a two-dimensional industrial relations systems approach. The current study examines two ultimate goals of industrial relations, efficiency and equity, to understand international differences in industrial relations systems. We collected empirical data for our quantitative study from various international organizations, such as the Organisation for Economic Co-operation and Development (OECD) and the United Nations (UN). Our dataset consists of data from 30 OECD countries and from 1991 to 2013. We selected GDP per capita to objectively represent well-being, whereas subjective well-being was measured with the overall life satisfaction index and suicide rates. In order to compute the indices for efficiency and equity of each national industrial relations system, we used nine efficiency indicators and 15 equity indicators. We estimated cross-sectional and time-series regression models from two to four waves of our longitudinal dataset, including some control variables.

The results showed that the efficiency and/or equity dimensions of industrial relations systems significantly affected three kinds of well-being indicators: first, the efficiency index had a significant positive effect on GDP per capita, whereas the equity index and GDP per capita were not related; second, the efficiency index and suicide rates were positively related, while the equity index and suicide rates were not related; finally, both the efficiency and equity dimensions of industrial relations systems had positive effects on life satisfaction. From the perspective of balancing efficiency and equity, life satisfaction was enhanced significantly when both the level of efficiency and that of equity in industrial relations were high, suggesting an interaction effect between them.

INTRODUCTION

Previous studies have found that people's level of well-being can be a valuable indicator of constructing government policies (Stiglitz, Sen and Fitoussi, 2010; OECD, 2013), and measuring people's level of well-being at the national-level of analysis and investigating antecedent factors has been widely researched (e.g. Name, YEAR; Name, YEAR). The stream of research moving toward finding antecedent factors of people's happiness and well-being seems reasonable since most political and ideological debates are ultimately focused on the construction of appropriate policies and the enhancement of people's quality of life.

This study supplements the studies previously mentioned by explaining international variations in objective and subjective well-being with a two-dimensional industrial relations systems approach. Previous studies considered the economic, social and political antecedents of well-being (Bjornskov, Fischer and Dreher, 2008; Dolan, Peasgood and White, 2008; Haller and Hadler, 2006); however, a national-level study examining the relationship between characteristics of industrial relations systems and well-being is also needed. Industrial relations systems, as subsystems of a national system, are an important factor that influence a nation's quality of life and economic conditions, including income distribution, hours worked per day or week, and employment stability. Therefore, the characteristics of an industrial relations system may be a considerable antecedent of various types of well-being.

This study examines two ultimate goals of industrial relations, efficiency and equity (Kim, Kim, Voos, Suzuki and Kim, 2014), to understand international differences in industrial relations systems. The second section of this paper explains concepts of well-being and industrial relations in our study, the third section reports our data and measurement strategy, and the fourth section presents the results. Our conclusion briefly suggests implications and limitations that will be interesting to both policy makers and researchers.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Objective and subjective well-being

The general term "well-being" means "the state of being well, happy, or prosperous" (Webster's New World Dictionary, YEAR). Since the term is a multi-dimensional construct, it has been considered difficult to measure, with no clear methodology having been suggested in the literature. Nonetheless, we found that researchers have classified and designed their study of well-being in various ways. Considering this, we chose the classification methods of objective well-being (OWB) and subjective well-being (SWB) for our measurement. OWB is an index measurement of material well-being tied to financial and economic status. Economists, namely Mankiw (1998), have traditionally believed that a financial index such as GDP per capita is the best indicator of measuring level of well-being. Moreover, since GDP per capita represents an average person's income and expenditure capacity, economic well-being can be defined according to GDP per capita because it represents people's general desire to maximize their income and expenditure, which enables them to enhance their opportunities and experience. According to this school of thought, GDP satisfies the necessary precondition of living a valuable life, and it provides the ability to do so. Significantly as well, GDP is highly correlated with other aspects of quality of life (Name, YEAR).

On the other hand, SWB measures track how people perceive happiness, and SWB represents a non-material well-being index of the "state of mind" of an economic actor (Skidelsky & Skidelsky, 2012). According to happiness researchers who argue that SWB is a valid alternative quality of life index, GDP is only an indicator of market production which does not reliably represent people's quality of life. In particular, SWB advocates argue that recent changes in economic structures quite obviously raise the question of whether GDP is a reasonable measure of something as subjective as "happiness." Notably, recent studies such as Frey and Stuzer (2002) have found reliable and valid ways of measuring quality of life directly from respondents across various countries and cultures, and comparative or cross-cultural studies identifying and measuring the antecedents of SWB have been gaining wide attention, arguably the most famous study being Name, YEAR.

In the same vein as research on SWB, there are numerous rather specific studies that have attempted to identify factors of influence on well-being (e.g. Dolan, Peasggod, and White, 2008). For

example, a country's economic condition and political structure have been considered to influence people's well-being. In fact, the lion's share of this research demonstrates how numerous factors enhance or weaken humans' level of well-being: unemployment rate, inflation rate, macroeconomic indicators such as income inequality, political decentralization level, democratic maturity, government policy efficiency—these factors and others have been proven to make a difference. In terms of industrial relations, specifically, the characteristics of labor unions and collective bargaining (Aidt and Tzannatos, 2008) or the type of industrial relation system, such as corporatism (Traxler, Blaschke, and Kitell, 2001), have been suggested as determinant factors for a country's level of well-being.

Despite all the knowledge that has been generated by SWB-inspired research, a comparison of countries' industrial relations that takes an integrated approach on how such policies and practices may affect well-being has not been published to date. Therefore, we took on this challenge, investigating industrial relations and well-being with a two-dimensional approach that is examined in more detail below.

Two-dimensional approach of industrial relations

For this study, we adapted Kim et al. (2014)'s methodology and assumed that a country's state of industrial relations can be assessed with a two dimensional index of efficiency and equity. This methodology sees industrial relations' two core objectives as efficiency and equity (Barbash, 1984; Budd 2004; Meltz, 1989), so we indexed measurable variables of industrial relations in these terms. Although Budd (2004) famously classified the objectives of industrial relations into efficiency, equity and voice, the concept of voice was defined as procedural justice, and we believe it can be comprehended as equity, meaning fairness or justice in the way people are treated. Moreover, we believe efficiency refers to maximizing output with a minimum amount of input, and that it is normally an important objective pursued by employers. More specifically, we are reminded that a vast number of studies, notably Name (YEAR), conclude that efficiency of workers and labor unions is crucial to maintain a company's profitability and sustainability. An organization, industry or country with high efficiency in industrial relations can be summarized as free to utilize human resources

efficiently, with workers circulating freely and labor unions supporting the minimization of human resources transaction costs. For this kind of system to function equitably, it is clear that human dignity and rights have to be protected. In this context, high degree of equity means the satisfaction of both procedural justice regarding the production process and distributive justice regarding the production result. It follows that equity is or ought to be a main concern for both workers and labor unions, with sustainability of equity being a necessary component for efficiency in the long run, often requiring employers to share such an interest. A country with a high level of equity in industrial relations can be summarized as enjoying a high level of social consultation on labor rights and human dignity, and a system of distributive justice that is solidly institutionalized between labor unions and the state. Furthermore, we believe there exist interaction effects on economic actors' efforts to achieve procedural and distributive justice, and to guarantee a minimum level working condition and fair distribution.

There has been a normative consensus that efficiency and equity in industrial relations are complements, not alternatives. According to Meltz (1989), unlimited pursuit of efficiency does not guarantee human dignity and distributive justice because the market mechanism is not stable, but pursuit of equity can enhance efficiency in the long run. Therefore, efficiency and equity maintain a complementary relationship. This perspective seeks a balance between a high level of efficiency and equity in industrial relations.

Concluding our argument above, we designed our quantitative analysis with the following research questions in mind:

- Research Question 1: How does a country's level of equity and efficiency in industrial relations affect its residents' objective well-being and subjective well-being?
- Research Question 2: How do the interaction effects of equity and efficiency in industrial relations affect the objective and subjective well-being of a country's residents? In other words, should a country pursue these two dimensions together to increase its residents' level of well-being?

METHODS

Sample

We collected empirical data for our quantitative study from various international organizations, such as the Organisation for Economic Co-operation and Development (OECD) and the United Nations (UN). Our dataset consists of data from 30 OECD countries and from 1991 to 2013. You should explain why you chose these sources, for example: We selected these datasets because they are considered quite reliable (Name, YEAR) and are widely used in industrial relations research.

We developed our data by calculating the average value of each five-year interval since 1991. In other words we studied four waves (1991-1995, 1997-2001, 2003-2007, 2009-2013).

There are two reasons why we studied OECD countries exclusively. First, the OECD provides abundant data for each of its member countries, including data on economic and societal phenomena. In particular, the independent variable used in this study, efficiency and equity, is actually two composite indexes, composed of different variables that would be quite difficult to collect by any organization other than one as prominent as the OECD. Second, we sought to minimize the problem of containing outliers, which might cause bias, and we did so by studying countries that share a great deal in common, as the OECD member countries generally do.

Measurements

We selected GDP per capita to objectively represent well-being, as explained in the introduction, and we measured subjective well-being with the overall life satisfaction index and suicide rates of OECD countries. In order to compute the indices for efficiency and equity of each national industrial relations system, we used nine efficiency indicators (e.g. freedom of dismissal, cooperative labor-employer relations, growth rates of labor productivity, and reciprocal scores of strikes and lockouts) and 15 equity indicators (e.g. union density, public social expenditures, collective bargaining coverage, annual hours actually worked per person, and income distribution). We also employed four control variables, such as alcohol consumption, political freedom, portion of a

nation's population in rural regions, and percentage of the population over 65 years of age. We summarized our measurement criterion, time, and sources of dependent and control variables in Table 1. The process of calculating the efficiency and equity indexes as independent variables is shown in Table 2 and Table 3, and the detailed process of how this was done was published in Kim et al. (2004). Descriptive statistics of all research variables are shown in Table 4.

Results

We estimated cross-sectional and time-series regression models from two to four waves of our longitudinal dataset, including four control variables. The results showed that the efficiency and/or equity dimensions of industrial relations systems significantly affected three kinds of well-being indicators. First, the efficiency index had a significant positive effect on GDP per capita, whereas the equity index and GDP per capita were not related (see Table 5); second, the efficiency index and suicide rates were positively related, while the equity index and suicide rates were not related (see Table 6); finally, both the efficiency and equity dimensions of industrial relations systems had positive effects on life satisfaction (see Table 7).

Our hypothesis regarding efficiency and equity assumed that there is a balance between the two, and our results showed that a high level in both dimensions of industrial relations significantly increased life satisfaction compared to a low level. Therefore, we could conclude that efficiency and equity have an interaction effect (see Table 7 and Figure 1).

CONCLUSION

We can draw two important implications from the results of this study. First, efficiency in industrial relations increases objective well-being among residents in a country, as measured by GDP per capita, but it also increases a country's suicide rate, which is a component of subjective well-being. This result implies that a country-level effort to increase efficiency has a double-edged sword effect. Therefore, when pursuing efficiency, both employers—and their advocates—and employees—and their advocates—ought to cooperate to minimize negative side-effects of policy that promotes

efficiency. The more efficiency is pursued, the more suicide—the representative factor studied here—tends to increase.

Our second implication stems from the result showing that level or degree of equity did not have a significant effect on GDP per capita and suicide rate. On the other hand, life satisfaction, another subjective factor of well-being, had a positive effect on both efficiency and equity, which shows interaction between them according to a two-dimensional analysis. Our hypothesis that efficiency and equity maintain a balance in industrial relations was supported, given that efficiency and equity have at least a high degree of co-efficiency of determination. It is very notable that our evidence confirms a previously-untested but assumed relation between industrial relations systems and objective and subjective well-being.

Limitations and Further Research

The level of analysis of this study was limited to the national level; however, well-being, especially subjective well-being which is measured through a direct survey administered to a population, is an individual-level concept. To estimate the variation of subjective well-being (e.g. happiness) exactly, we need to employ a multi-level modeling approach that includes individual, household and regional-level variables simultaneously (e.g. Ballas and Tranmer, 2012; Helliwell and Putnam, 2004). In future research we may be able to use a multi-level dataset by integrating some individual- and national-level datasets (e.g. the World Values Survey, WVS). The present study does a fine job of measuring and determining implications from the dataset we studied, but if we broaden the dataset obviously it is yet to be determined whether our conclusions will stand.

Perhaps more importantly, our empirical model had only four control variables. This raises the question of omitted variable bias, which could be addressed by adding control variables. As we have yet to add such variables or widen our dataset, as explained above, we must conclude that the results of this study are tentative and exploratory.

REFERENCES

Aidt, T. S. and Z. Tzannatos (2008) 'Trade Unions, collective bargaining and macroeconomic performance', *Industrial Relations Journal* 39(4): 258-95.

Ballas, D., & Tranmer, M. (2012). Happy people or happy places? A multilevel modeling approach to the analysis of happiness and well-being. *International Regional Science Review*, 35(1):70-102.

Barbash, J. (1984). *The Elements of Industrial Relations*. Madison, WI: University of Wisconsin Press.

Budd, J. (2004). *Employment with a Human Face: Balancing Efficiency, Equity, and Voice*. Ithaca, NY: Cornell University Press.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29, 94e122.

Frey, Bruno S, and Alois Stuzer. "What Can Economists Learn from Happiness Research?" *Journal of Economic Literature* 40:2 (2002), 402–435.

Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being.*Philosophical transactions-royal society of London series B biological sciences*, 1435-1446.

Kim, D.-O., Kim, Y.-H., Voos, P., Suzuki, H. and Kim, Y. D. (2014), Evaluating Industrial Relations Systems of OECD Countries from 1993 to 2005: A Two-Dimensional Approach. *British Journal of Industrial Relations*. doi: 10.1111/bjir.12092

Mankiw, N. G. (1998). *Principles of Economics*. Mason, Ohio : Thomson/South-Western.

Meltz, N. M. (1989). 'Industrial relations: balancing efficiency and equity'. In J. Barbash and K. Barbash (eds.), *Theories and Concepts in Comparative Industrial Relations*. Columbia, SC: University of South Carolina Press, pp. 109–13.

OECD. (2013). Chapter2. Economic Well-being. OECD Framework for Statistics on the Distribution of Household Income, Consumption and Wealth.

Skidelsky, R., & Skidelsky, E. (2012). *How much is enough?: The love of money, and the case for the good life*. Penguin UK.

Stiglitz, J. E., Sen, A., & Fitoussi, J. P. (2010). *Mismeasuring our lives: Why GDP doesn't add up*. The New Press.

Traxler, F., Sabine Blaschke, and Bernhard Kittel (2001). *National Labor Relations in Internationalized Markets: A comparative study of institutions, change, and performance*. Oxford, Oxford University Press.

Table 1 Measurements and Sources

	Variables	measurements	time	sources
Dependent variables	GDP per capita	Gross domestic product: Per head, US $, current prices, current PPPs	ave.1991-1995, ave.1997-2001, ave.2003-2007, ave.2009-2013	OECD Stat
	suicide rate	Intentional self-harm: Deaths per 100 000 population (standardised rates)	ave.1991-1995, ave.1997-2001, ave.2003-2007, ave.2009-2013	OECD Stat
	life satisfaction	"How satisfied are you with the life you lead? - very satisfied - fairly satisfied - not very satisfied - not at all satisfied very = 4 ..... not at all = 1"	2005, 2011	http://worlddatabaseofhappiness.eur.nl/
Independent variables	efficient index	See Table 2	1991-1995, 1997-2001, 2003-2007, 2009-2013	Based on Kim et al.(2014)
	equity index	See Table 2	1991-1995, 1997-2001, 2003-2007, 2009-2013	Based on Kim et al.(2014)
Control variables	alcohol consumption	Liters per capita (15+)	ave.1991-1995, ave.1997-2001, ave.2003-2007, ave.2009-2013	OECD Stat
	political constraint	Freedom in the World Country Ratings by the Freedomhouse	ave.1991-1995, ave.1997-2001, ave.2003-2007, ave.2009-2013	http://www.freedomhouse.org
	rural population	percentage of rural population	1995, 2000, 2005, 2010	UNDP
	age65 population	percentage of age 65+ population (15+)	1995, 2000, 2005, 2011	UNDP

Table 2 Measurements and Sources: Independent variables

	Variables	wave	definition	NEW Source	Measures
Efficiency-Input	Freedom of dismissal	annual with interpolation	Strictness of employment protection – individual and collective dismissals (regular contracts)	OECD.Stat	*OECD Iindex
	Freedom to employ temporary workers	annual with interpolation	Strictness of employment protection – temporary contracts	OECD.Stat	*OECD Index
	Literacy rate	1993, 1999, 2005, 2011		CIA Factbook, World Development Indicators	(%)
Equity-Input	Union density	annual	Union density	OECD.Stat	(%)
	Ratification status of ILO fundamental conventions	1993, 1999, 2005, 2011	Ratification status of ILO fundamental conventions	ILOLEX(http://www.ilo.org/ilolex/)	Number of ratified fundamental conventions
	Expenditure on ALMP	annual	Public expenditure of LMP	OECD.Stat	(% of GDP)
	Public social expenditures	annual	Public social expenditure	OECD.Stat	(% of GDP)
	Centralization of wage-setting institution	annual	Centralization of wage-setting	ICTWSS 4.0	1~5
	Coordination of wage-setting institution	annual	Coordination of wage setting	ICTWSS 4.0	1~6
Efficiency-Process	Industrial relations	annual		IMD	hostile ↔ productive (IMD executive opinion survey)
	Labor-employer relations	annual	In your country, how would you characterize labor-employer relations?	WEF	confrontational ↔ cooperative (WEF Executive Opinion Survey): 1-7
Equity-Process	Collective bargaining coverage	annual with interpolation	Collective bargaining coverage	ICTWSS 4.0	1-100%
	Wage bargaining level		The predominant level(s) at which wage bargaining takes place		5 = bargaining predominantly takes place at central or cross-industry level and there are centrally determined binding norms or ceilings to be respected by agreements

					negotiated at lower levels; ~ 1 = bargaining predominantly takes place at the local or company level
	Trade union rights index	annual	Right of Association, market sector	ICTWSS 4.0	3 = yes 2= yes, with minor restrictions (e.g. recognition procedures, workplace elections, thresholds) 1= yes, with major restrictions (e.g. monopoly union, groups excluded) 0 = no
Efficiency-Output	Labor productivity growth rate	annual	GDP per hour worked	OECD.Stat	Growth rate(%)
	Economic growth rates	annual	Growth domestic Product	OECD.Stat	Growth rate(%)
	Strikes and lockouts*	annual		ILOSTAT	Frequency
	Workers involved*	annual		ILOSTAT	1,000 Workers
Equity-Output	Injuries: deaths*	annual with interpolation	Cases of fatal occupational injury	ILOSTAT	(Per 100,000 Workers)
	Average hours worked per person*	annual	Annual hours actually worked per person*	Key Indicators of the Labour Market (7th)	Hour
	Gini coefficient*	annual with interpolation		OECD.Stat	
	Income distribution	annual	Labor income share	OECD.Stat	%
	Employment rates	annual	Employment to pupulation ratio(age group 15+)	Key Indicators of the Labour Market (8th)	%
	Unemployment replacement rates	2001, 2005, 2011	the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment.	OECD, Tax-Benefit Models.	%

Table 3 Results of factor analyses

Input	Variables		
		Factor1	Fator2
Efficiency	Freedom of dismissal		.614
	Freedom to employ temporary workers		.804
	Literacy rate		.792
Equity	Union density	.669	
	Ratification status of ILO fundamental conventions	.653	
	Expenditure on ALMP	.808	
	Public social expenditures	.797	
	Centralization of wage-setting institution	.781	
	Coordination of wage-setting institution	.674	
Eigen value		3.58	2.14
Proportion of variance accounted for		39.77	23.77
Process	Variables		
		Factor1	Fator2
Efficiency	Industrial relations	.905	
	Labor‐employer relations	.875	
Equity-	Collective bargaining coverage		.822
	Wage bargaining level		.843
	Trade union rights index		.465
Eigen value		1.96	1.88
Proportion of variance accounted for		38.26	37.52
Output	Variables		
		Factor1	Fator2
Efficieny	Labor productivity growth rate		.407
	Economic growth rates		.688
	Strikes and lockouts*		.755
	Workers involved*		.771
Equity	Injuries: deaths*	.545	
	Average hours worked per person*	.750	
	Gini coefficient*	.735	
	Income distribution	.447	
	Employment rates	.691	
	Unemployment replacement rates	.680	
Eigen value		2.83	2.22
Proportion of variance accounted for		28.3	22.23

Table 4 Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
GDP per capita	overall	27007.66	12738.64	6490.58	85956.61	N =	120
	between		10023.01	10795.89	60412.38	n =	30
	within		8021.53	2883.04	52551.89	T =	4
Suicide rate	overall	13.57	6.30	2.03	37.76	N =	117
	between		6.01	2.03	29.45	n =	30
	within		2.63	1.85	23.60	T =	4
Life satisfaction	overall	6.67	0.87	4.70	7.80	N =	60
	between		0.88	4.70	7.80	n =	30
	within		0.00	6.67	6.67	T =	2
alcohol consumption	overall	9.31	3.03	1.34	15.44	N =	120
	between		2.99	1.49	13.71	n =	30
	within		0.70	7.22	11.25	T =	4
political constraint	overall	1.20	0.58	1.00	4.00	N =	120
	between		0.53	1.00	3.25	n =	30
	within		0.23	0.30	2.30	T =	4
rural population	overall	24.96	10.65	2.60	48.90	N =	120
	between		10.66	2.85	44.18	n =	30
	within		1.63	19.34	30.34	T =	4
age65 population	overall	14.17	3.49	4.50	23.00	N =	120
	between		3.36	5.18	18.73	n =	30
	within		1.077306	9.97	18.57	T =	4

Table 5 GLS regression analysis of GDP per capita in 30 OECD countries

	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
constnat	38000.78	(8060.79)	***	27495.43	(8600.60)	***	27212.67	(8677.25)	***
alcohol consumption	-740.09	(363.83)	**	-576.89	(357.52)		-561.89	(362.75)	
political constraint	-5777.69	(2421.38)	**	-3315.67	(2605.15)		-3645.46	(2938.42)	
rural population	-432.85	(92.10)	***	-442.23	(92.00)	***	-442.86	(92.02)	***
age65 population	961.30	(391.91)	**	1403.89	(441.54)	***	1439.28	(464.93)	***
efficiency index(A)				**2890.87**	**(1016.81)**	***	**2856.98**	**(1026.13)**	***
equity index(B)				-1171.79	(1335.74)		-1297.22	(1432.16)	
(A)x(B)							366.53	(1512.03)	
Log likelihood	-1279.37			-1275.25			-1275.22		
Wald chi2(6)	61.10	***		73.95	***		74.04	***	
Number of obs.	120			120			120		

standard errors in brackets. ***, ** and * : significant at 1%, 5% and 10%, respectively.

Table 6 GLS regression analysis of suicide rate in 30 OECD countries

	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std.Err.	
constnat	14.97	(4.65)	***	9.14	(4.87)	*	8.91	(4.95)	*
alcohol consumption	0.73	(0.21)	***	0.86	(0.20)	***	0.87	(0.21)	***
political constraint	-2.72	(1.56)	*	-0.82	(1.61)		-0.99	(1.72)	
rural population	-0.04	(0.05)		-0.03	(0.05)		-0.03	(0.05)	
age65 population	-0.29	(0.22)		-0.15	(0.25)		-0.12	(0.26)	
efficiency index(A)				**1.89**	**(0.57)**	***	**1.87**	**(0.57)**	***
equity index(B)				0.20	(0.74)		0.12	(0.80)	
(A)x(B)							0.24	(0.87)	
Log likelihood	-371.82			-366.37			-366.33		
Wald chi2(6)	19.45	***		32.79	***		32.89	***	
Number of obs.	117.00			117.00			117.00		

standard errors in brackets. ***, ** and * : significant at 1%, 5% and 10%, respectively.

Table 7 GLS regression analysis of life satisfaction in 30 OECD countries

satisfaction	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
constnat	10.32	(0.73)	***	9.00	(0.69)	***	8.95	(0.66)	***
alcohol consumption	-0.08	(0.04)	**	-0.03	(0.03)		-0.04	(0.03)	
political constraint	-0.86	(0.26)	***	-0.18	(0.26)		-0.48	(0.27)	*
rural population	-0.05	(0.01)	***	-0.04	(0.01)	***	-0.04	(0.01)	***
age65 population	-0.05	(0.03)	*	-0.06	(0.03)	*	-0.03	(0.03)	
efficiency index(A)				**0.32**	**(0.07)**	***	**0.27**	**(0.07)**	***
equity index(B)				**0.25**	**(0.10)**	**	**0.17**	**(0.10)**	*
(A)x(B)							**0.24**	**(0.10)**	**
Log likelihood	-55.44			-44.92			-41.92		
Wald chi2(6)	61.44	***		112.46	***		130.58	***	
Number of obs.	60			60			60		

standard errors in brackets. ***, ** and * : significant at 1%, 5% and 10%, respectively.

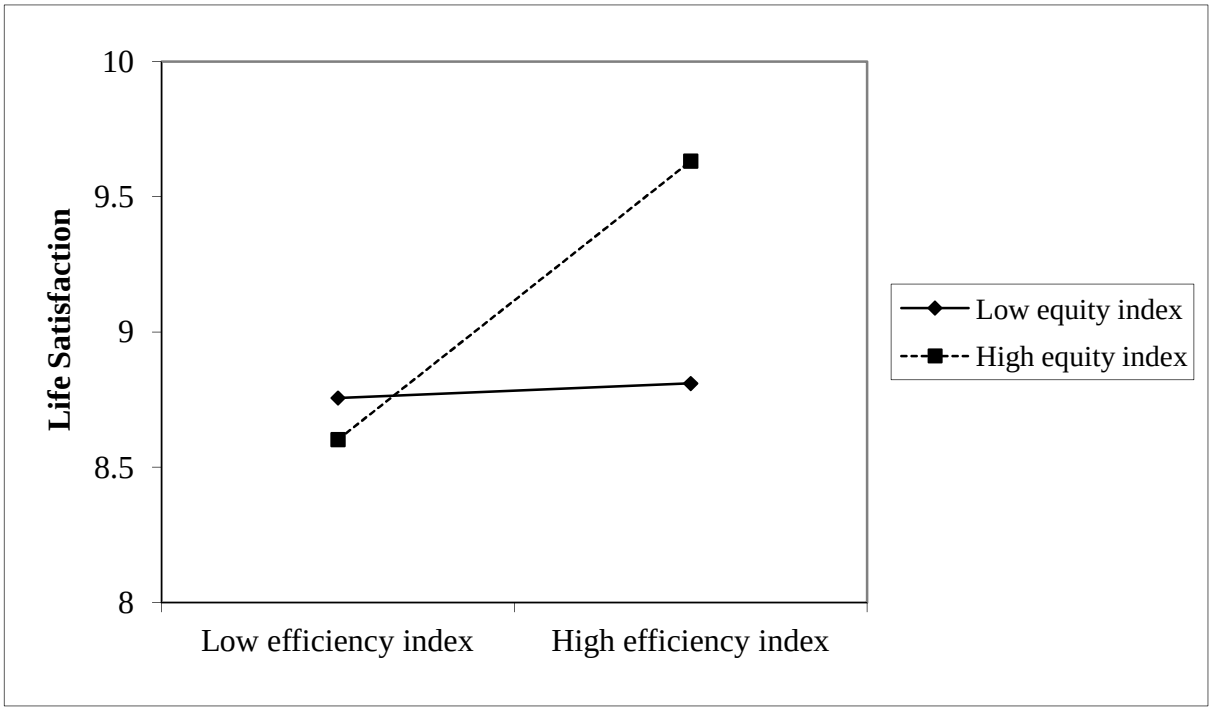

Figure 1 Interaction effects of efficiency and equity index on life satisfaction