

**INDUSTRIAL RELATIONS SYSTEMS AND  
WELL-BEING IN 30 OECD COUNTRIES, 2000-2012:  
A TWO-DIMENSIONAL APPROACH**

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**INDUSTRIAL RELATIONS SYSTEMS AND WELL-BEING IN 30 OECD COUNTRIES, 2000-2012:  
A TWO-DIMENSIONAL APPROACH**

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**Abstract**

This study explored the impact of national industrial relations systems on wider society, going beyond the usual outcomes directly related to work. Utilizing a 13-year dataset from 30 OECD member countries, a two-dimensional industrial relations systems approach was used to investigate international variation in well-being. It was found that the efficiency and equity of industrial relations systems significantly affected national happiness, life expectancy, suicide, the prison population, homicide, and divorce. This study suggests that the theoretical framework of industrial relations should be expanded to encompass the social domain.

## 1. Introduction

How to improve well-being has become an increasingly important issue in modern society, with the national level of well-being a valuable indicator when formulating government policy and private business strategies (Stiglitz et al. 2010; OECD 2013). The topic has attracted the interest of academics from several fields. For example, happiness and satisfaction have been studied in terms of social, clinical, cross-cultural, and industrial/organizational psychology. Employee well-being has also taken on greater importance in the management field (Kowalski et al. 2015) and has been investigated extensively at the individual (Loretto et al. 2009), organizational (Goetzel et al. 2002), and national levels (OECD 2013). The focus of recent research has shifted from identifying factors that maximize economic output to discovering antecedents of individual well-being, as much political and ideological debate ultimately focuses on the development of appropriate policies to enhance the overall quality of life of citizens.

The idea of work as a central, essential, and fundamental element of being human has been expressed by many philosophers, religious leaders, and scholars (Budd 2011), ranging from Karl Marx (1867) to Martin Heidegger (1927) to Pope John Paul II (1981). Research confirms that critical human needs are met through work and employment. Work acts as the foundation of an individual's life in terms working hours and primary income. Physiological, safety, belongingness, esteem, and self-actualization needs of individuals are all affected heavily by work (Maslow 1943). Work is also the foundation of the anthropogenic world, with the agricultural, scientific, and industrial revolutions all the result of workers and/or employers looking to make their work easier or more efficient (Budd 2011).

The satisfaction of work is important for individuals but also for the health and well-being of society (O'Toole and Lawler 2006). The social costs of insufficient or low-quality employment include diminished standards of living, decreased employee contribution to production, weakened social ties, and increased potential for social conflict, in addition to economic costs related to unused or underused human resources (Burchell 1999). The question of how changes in contemporary workplaces have influenced the overall well-being of individual societies therefore requires serious and sustained research by social scientists, including IR scholars.

The study of labour and industrial relations has tended to follow the framework of industrial relations systems. One of the important questions explored in this line of research has been "What are the outcomes of industrial relations systems?" Previous studies have defined key industrial relations outcomes in various ways, including "industrial democracy" (Webb and Webb 1897), "web of rules" (Dunlop 1958), and "the two faces

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**Comentario [1]:** You'll notice I tried to condense the first parts of the paper into a better introduction. I eliminated Budd's comments throughout.

of monopoly and voice” (Freeman and Medoff 1984), all of which have greatly extended our understanding of the outcomes of specific industrial relations systems.

All these classic theorists focused on the impacts of industrial relations on directly work-related issues at the micro-, meso-, and macro-levels. The present study, on the other hand, aims to examine the impact of national industrial relations systems on wider society, going beyond the conventional scope of industrial relations outcomes. We believe that, given the importance of work to the lives of human beings, the nature of labour and employment relations should influence broader social outcomes related to the daily lives of workers, in addition to workplace and economic outcomes. Our goal is to expand the potential range of industrial relations outcomes by investigating international variation in happiness and a set of indicators of social problems. Utilizing datasets for OECD member countries, the present study investigates how efficiency and equity in industrial relations systems affected national happiness and the social problems of crime, suicide, and family break-up.

#### *Two-dimensional approach to industrial relations*

For this study, we adopted Kim et al. (2015)’s methodology which uses a two-dimensional index based on IR efficiency and IR equity to summarize the state of a country’s industrial relations. Many authors (Barbash 1984; Meltz 1989) have argued that efficiency and equity are the two contrasting objectives of industrial relations. Budd 2004 distinguishes a third dimension, voice, and makes a strong conceptual argument for its importance. However, empirically Kim et al. could not differentiate voice from equity so voice is subsumed in equity in this model.

Efficiency refers to the maximization of output with a minimum of input, which is normally an important objective pursued by employers. Efficiency in an organization is crucial to maintaining profitability and sustainability. In the long run, at a national level, greater efficiency allows for a higher standard of living. On the other hand, equity is a main concern for workers and labour unions. Equity in industrial relations means satisfying the material needs of workers with a well-defined system of distributive and procedural justice accompanied by a high level of social consultation on labour rights and human dignity (Kim et al. 2015). In the present study, efficiency and equity, as two essential components of any industrial relations system, are expected to influence broader social outcomes such as happiness and social problems.

Kim et al. (2015) developed their model using data from 1993 to 2005. In this study, we use data from 2000-2012, from the same set of OECD countries, thus demonstrating the validity of the model in a later

time period for this group of developed nations. Our hypotheses were informed by the economic, political, and ideological context of this group of countries in the early part of this century.

*Equity and Efficiency in Many OECD Systems in the Early Twenty-First Century*

Like most IR scholars, we approach the issues in this paper from the perspective of pluralism. This tradition (Barbash 1984; Fox 1974; Budd et al. 2004) stresses that the balanced pursuit of efficiency and equity is an ideal industrial relations strategy for a nation (Kim et al. 2015). Although efficiency is primarily the objective of employers, and equity that of labour, efficiency and equity may be viewed as goals that are desired by society as a whole. In an industrial relations system, too great an emphasis on efficiency at the expense of equity can result in labour disputes or other forms of employee resistance in both the workplace and wider society, all of which will eventually harm efficiency. Similarly, focusing on equity alone can weaken the basis of economic activity by lessening the motivational potential of capitalism and, in the long run, reducing the economic foundation needed to realize equity. Hence, if public policy is tilted too far to one extreme (that is, either efficiency or equity is over-emphasized), there will be undesirable consequences for society as a whole. Hopefully, this will lead to change in which the political pendulum will swing back, bringing a more balanced policy approach.

In the period studied in this paper neo-liberalism was highly influential in public policy debates, and after the global economic crisis of 2008, many governments emphasized austerity in the provision of public services. Some even pursued “internal devaluation” and lower labour costs in pursuit of greater competitiveness in international trade. Union membership and influence declined in most OECD nations. In short, this period was one in which efficiency concerns dominated equity concerns (see also Befort and Budd 2009). Therefore, our hypotheses are based on the view that the unbalanced pursuit of efficiency was likely to have negative consequences, and a relatively greater emphasis on equity was likely to produce desirable results. At this stage, the pursuit of equity as a move to achieve an ideal balance between efficiency and equity can be considered an antidote to the social problems caused by an overemphasis on efficiency.

*Hypothesis 1. In 2000-20012, the emphasis on IR efficiency in many national industrial relations systems in the OECD relative to IR equity placed a premium on IR equity as a means to increase happiness. Hence, we hypothesize that in this data set:*

*1A. The efficiency emphasis in a national industrial relations system is negatively related to happiness.*

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*IB. The equity emphasis in a national industrial relations system is positively related to happiness.*

While greater efficiency is positive in the long run is positive in providing the basis for a higher standard of living, a one-sided pursuit of IR efficiency in a national system (e.g., greater freedom of dismissal) while ignoring IR equity can result in excessive competition and a lack of IR equality. A number of studies have found that a lack of equity results in a reduction of happiness. For example, a time-series study using both the U.S. General Social Survey and Eurobarometer (Alesina et al. 2004) found that, in both the U.S. and Europe, increasing income inequality (with other things being equal) reduces happiness (Helliwell et al. 2015). Another example is Poland during its period of economic transition after the 1990s. Income inequality was initially perceived as a positive signal of increased opportunities through competition, but after a few years of rapid economic transformation, unfulfilled expectations and diminishing patience brought about a change in attitude, and growing inequality started to undermine life satisfaction (Grosfeld and Senik 2010).

The United States has achieved striking economic and technological progress over the past half century without any increase in the self-reported happiness of its citizens. Instead, competition, uncertainty, and anxiety are high, social and economic inequality has widened considerably, social trust is in decline, and confidence in the government is at an all-time low. Perhaps for these reasons, life satisfaction has remained nearly unchanged despite the consistent rise in gross national product (GNP) per capita, which is an important indicator of efficiency (Helliwell et al. 2015).

IR equity, includes, but is much broader than reduced income inequality, promotes happiness. Happiness is enhanced by a high quality of life, companionship, and social support. In terms of industrial relations, equity is the satisfaction of both procedural and distributive justice in economic activity and outcomes by guaranteeing human dignity and human rights. Many studies have found that happiness is enhanced by the quality of one's working life. For example, Borooah (2006), utilizing data from approximately 113,000 respondents from 80 countries, found that a decent standard of living and the existence of a suitable number of job opportunities, an indication of equity in the workplace, are among the most important determinants of happiness.

Industrial relations systems that emphasize equity (including relatively more egalitarian income distribution) rather than efficiency and competition help to build cooperative and supportive relationships among co-workers, another dimension of human happiness. Indeed, cooperating in joint work activities is an important component of social support (Lu and Argyle 1991). The findings of these studies highlight the link

between the happiness of individuals and industrial relations. Industrial relations systems that focus heavily on efficiency and largely ignore equity tend to generate dissatisfaction and can lead to social instability, whereas those systems that emphasize equity increase happiness through an adequate standard of living, social support, and cooperation.

*Hypothesis 2. Again, for the OECD in 2000-2012, we hypothesize:*

*2A: The efficiency emphasis in a national industrial relations system is negatively related to life expectancy.*

*2B: The equity emphasis in a national industrial relations system is positively related to life expectancy.*

Here we explore the idea that multiple health issues and life expectancy can be affected by industrial relations systems through differences in socio-economic status.

The debate about the relationship between income levels and life expectancy has been dominated by two competing hypotheses. The absolute income hypothesis (AIH) dates back to 1975, when Samuel H. Preston examined mortality in relation to economic development. Preston proposed the AIH, which states that maximizing efficiency is positively related to health and that this relationship follows a concave function due to diminishing returns (Preston 1975). In other words, the overall wealth of the nation, as a result of the pursuit of efficiency, is considered an important determinant of health and life expectancy. This theory seemed particularly applicable to explaining differences between developing and developed nations.

Wilkinson (1996), however, later argued that focusing solely on efficiency, as measured by income and economic growth, does not tell the whole story. At least for developed countries, he proposed shifting attention to equity or inequity because this had a greater influence on life expectancy. This became known as the relative income hypothesis (RIH) and it is based on the assumption that a lack of equity is detrimental to social cohesion and social trust, which in turn increases personal stress and consequently mortality (Wilkinson 1996; Wilkinson and Pickett 2009; Pickett and Wilkinson 2015). RIH theorists also postulate that relative socio-economic status affects health primarily through psychosocial stress. Furthermore, individuals who feel that there are others who are more well off may become depressed, which in turn, may affect health both directly (e.g., blood pressure) and indirectly (e.g., alcohol abuse and smoking). The pursuit of efficiency without equity can thus increase the size of the gap between individuals in terms of their socio-economic status, which in turn leads to health problems.

The psychosocial environment theory, the foundational theory for most of the contemporary research



on life expectancy, argues that a lack of equity affects life expectancy through two main pathways: stress and behaviour (Wilkinson 1996). With low economic status comes chronic anxiety, which leads to the production of stress hormones such as cortisol and adrenaline and is associated with physiological risk factors such as high blood pressure, a weak immune system, obesity, and heart disease (Marmot et al. 1984, Wilkinson 1997).

Based on the RIH and the psychosocial environment theory, the present study hypothesizes that national industrial relations systems that focus too exclusively on efficiency and tolerate low equity (e.g., in the form of unequal distribution of income, unequal social status, insecure employment, lack of voice at work, etc.) have more health problems and a shorter life expectancy. On the other hand, more equal national industrial relations systems have better health outcomes and consequently a higher life expectancy.

*Hypothesis 3. Again, for the OECD in 2000-2012, we hypothesize:*

*3A: The efficiency emphasis in a national industrial relations system is positively related to the suicide rate.*

*3B: The equity emphasis in a national industrial relations system is negatively related to the suicide rate.*

There is also a significant body of evidence suggesting that a broad range of social problems may be more common in more unequal societies. Suicide is one such social problem.

Various social science disciplines have approached suicide quite differently. Psychologists and economists have each approached suicide from the standpoint of the individual. Psychologists have tended to emphasize state of mind (depression) while economists have investigated the relationship between suicide and income. According to the economic theory of suicide proposed by Hamermesh and Soss (1974), an individual decides to commit suicide when their expected lifetime utility remaining falls below a certain threshold. Individuals will tend to harbour fewer thoughts of suicide when they earn a higher income (in other words, when they have a higher overall life satisfaction, or utility). In contrast, others argue that economic development increases the suicide rate. Richer countries, such as the Nordic countries, have been found to have higher rates of suicide, suggesting that increased wealth alone does not decrease the suicide rate (Lester 1996; Unnithan et al. 1994).

Of the well-known theories and studies of suicide, Durkheim's (1951[1897]) sociological research appears to be particularly relevant to the present study. Durkheim argued that suicide is not a collection of individual actions but a social phenomenon and thus should be explained sociologically. Durkheim asserted that suicide rates are strongly influenced by social regulations and integration. Later scholars who followed in the

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**Comentario [3]:** I changed the order to put divorce last and suicide in its place because suicide is a "clear bad" and divorce is a trickier matter – at least to U.S. citizens – in that it is sometimes a good idea. I thought it was jarring to have it second but last is OK.

footsteps of Durkheim's theory have found that social networks, trust, and social ties are important social institutions that reduce the likelihood of suicide (Berkman et al. 2000; Helliwell 2007).

From this sociological perspective, a national industrial relations system can be viewed as one indicator of the social institutions within a society. Societies with industrial relations that emphasize efficiency and ignore equity encourage competition between individuals, reduce the level of trust among co-workers, and may precipitate depression in individuals who regard themselves as failures. Previous studies have shown that depression is the most frequent forerunner of suicide attempts (e.g., Rosenfeld 2000). In addition, an efficiency-oriented society has weak social bonds, networks, and trust, meaning that suicidal individuals are less likely to be rescued by others, simply because there may be few they are close to. Thus, the present study expects that countries characterized by industrial relations that are too heavily efficiency-oriented will have higher suicide rates.

On the other hand, societies with industrial relations that emphasize equity over efficiency may be characterized by stronger social ties between individuals. These ties may help to reduce social isolation and depression. There should be lower suicide rates because there will be stronger social networks and support. Thus, the present study expects that countries characterized by equity-oriented industrial relations will have lower suicide rates.

*Hypothesis 4. Again, for the OECD in 2000-2012, we hypothesize:*

*4A: The efficiency emphasis in a national industrial relations system is positively related to the size of the prison population.*

*4B: The equity emphasis in a national industrial relations system is negatively related to the size of the prison population.*

The centrality of work to human life is likely to affect crime and the prison population by shaping society through socio-economic inequality. Kawachi et al. (1997) argued that communities with low social capital and greater inequality may have elevated levels of stress and have a higher violent crime rate. Both rich and poor are hurt. Kaplan et al. (1996), utilizing data from 50 states in the U.S. in 1980 and 1990, reported strong associations (adjusted for median state incomes) between greater state income inequality and higher rates of violent crime and imprisonment. Outcomes were significantly worse in more unequal regions.

It has been argued that the feeling of shame and humiliation resulting from social status differences

encourages a recourse to violent acts. Violence increases stress and anxiety within a population. In addition to this, people living in societies where economic growth and efficiency are encouraged at the expense of equity are more likely to engage in unethical behaviour such as bribery and corruption. For all these reasons, we expect large income inequalities may cause political and social systems to have higher crime rates and a larger prison population.

On the other hand, in societies with industrial relations that emphasize equity, socio-economic inequality is not as pronounced, and the political and social system is more supportive of the unemployed and those earning lower wages. This is likely to increase social cohesion and trust, decrease levels of violence, and discourage corruption, which leads to lower crime rates and a smaller prison population.

*Hypothesis 5. Again, for the OECD in 2000-2012, we hypothesize:*

*5A: The efficiency emphasis in a national industrial relations system is positively related to the homicide rate.*

*5B: The equity emphasis in a national industrial relations system is negatively related to the homicide rate.*

Societies with an efficiency-oriented industrial relations system are likely to suffer not only higher crime rates in general, but also a higher rate of violent crime such as homicide. One contextual indicator of a safer society is the level of interpersonal trust. A lack of equity at work intensifies interpersonal competition and social hierarchies, which affects the levels of social anxiety and class conflict by eroding social trust and cohesion (Marmot et al. 2008; Uslaner 2002). A wider income gap and excessive competition resulting from efficiency-orientated industrial relations are seen to contribute to a harsh, individualistic social environment that ineffectively suppresses violent behaviour. Support for this hypothesis comes from studies utilizing household data in the U.S. that shows income inequality is positively correlated with violence (Kennedy et al. 1996).

Furthermore, Kaplan et al. (1996), analysing data from 50 states in the U.S. in 1980 and 1990, reported strong correlations between state income inequalities, rates of violent crime, and homicide rates. A large body of evidence suggests that there is a robust relationship between greater inequality and higher homicide rates. Indeed, Hsieh and Pugh (1993) conducted a meta-analysis of 34 studies reporting on violent crime, poverty, and income inequality, and concluded that poverty and income inequality are both associated with violent crime. The analysis, however, shows considerable variation in the estimated size of the relationships, and suggests that homicide and assault may be more closely associated with poverty or income inequality than rape and robbery. The authors concluded that the tendency for homicides to be more common in

more unequal societies was robust.

On the other hand, in a society with industrial relations based on equity, there is likely to be a higher level of mutual support and trust among the working population, and higher income equality than that for industrial relations based on efficiency. In such a society, we believe that there will be less violent crime, especially homicide, which is the most extreme form of violence.

*Hypothesis 6. The contemporary emphasis on IR efficiency in many national industrial relations systems in the OECD relative to IR equity places a premium on IR equity as a means to improve work-life balance, and thereby reduce a nation's divorce rate. Hence, we hypothesize:*

*6A: The efficiency emphasis in a national industrial relations system is positively related to the divorce rate.*

*6B: The equity emphasis in a national industrial relations system is negatively related to the divorce rate.*

Recently, the social stigma surrounding divorce has weakened in many parts of the world, and this has contributed to a reduction in the legal barriers to divorce. The rise in individualism associated with urbanization and industrialization has placed greater emphasis individual self-fulfilment and made people less likely to tolerate an unhappy marriage. We recognize that divorce may sometimes be beneficial, as opposed to being a social problem, per se. However, high rates of family dissolution may be problematic insofar as they contribute to poverty, especially for children, and may lead children to have inadequate supervision in the absence of social programs providing for daycare, sick leave for parents when children are ill, flexible work hours, and so forth. In short, industrial relations systems may increase stress on families. Work-life balance is one such source of stress.

Numerous studies have found that the work-family balance is one important factors affecting the decision to divorce. Absence of work-life balance can cause marital instability (May 1980; Riley 1991; Thornton 1989). Specifically, Fagnani and Letablier (2004), utilizing a French data set, found that workers who had their working hours reduced generally felt that this had made it easier for them to combine their work and family life. Various studies have also demonstrated that giving employees more control over their working conditions, such as the use of flexible work schedules, helped them to balance work with other aspects of their lives, including marriage (e.g., Hayman 2010).

Competitive and performance-driven work, characterized by long working hours and a lack of support from the workplace, clearly makes work-life balance more difficult. Contemporary employment is increasingly

driven by competitive business practices that seek to enhance shareholder value through the pursuit of efficiency. Fierce competition between companies makes work more stressful for employees with a family, and as a result, it becomes increasingly difficult to balance work and family. This is why we hypothesize that an over-emphasis on IR efficiency contributes to a rising divorce rate.

On the other hand, a society that emphasizes equity in labour relations promotes individual human rights and quality of life rather than focusing solely on competition between companies. Here companies are more likely to implement management practices that guarantee a better balance between work and family through less stressful work schedules.

### **3. Methods**

In this study, we first evaluated the national industrial relations systems of OECD countries to score each of them on efficiency and equity, using factor analysis. We then explored whether efficiency and equity scores explain variation in national happiness and select social indicators. A GLS regression model combining cross-sectional and time-series variation was used to test the hypotheses proposed above.

#### *Sample*

Our dataset includes 30 OECD countries. We selected OECD member countries because they are a relatively homogenous group and statistical data are readily available (Kim et al. 2015). We were thus able to minimize the occurrence of outliers, which may lead to bias, by studying countries that share a great deal in common, as OECD member countries generally do. We used a 2000-2012 dataset, since measuring happiness gained global attention in this period, as shown in the fact that the UN released its first World Happiness Report in 2011. We collected empirical data for our quantitative study from various international organizations, such as the OECD, the United Nations (UN), and the World Bank. Table 1 summarizes these sources in terms of the dependent, independent, and control variables. Table 2 shows how each data series was classified as an input, process or output, as well as how each ultimately affected either the efficiency or equity factor score.

#### *Measurements*

The general term “well-being” means “the state of being well, happy, or prosperous” (Merriam-

Webster Dictionary, accessed 1/2/2016). Although gross domestic product (GDP) has long been used as an indicator of well-being (Easterlin 1995; Myers and Diener 1995; Oswald 1997), there has been increasing criticism of this practice (Kasser and Ryan 1993 and 1996; McManus and Floyd 2011) because GDP is only an indicator of market production and does not reliably represent quality of life. Furthermore, subjective well-being (SWB) advocates (Diener and Suh 1997 and 2000; Diener et al. 2003; Kahneman and Krueger 2006) argue that the recent economic polarization in society obviously raises the question of whether GDP is a reasonable measure of something as subjective as “happiness” for the entire population.

Because well-being is a multi-dimensional construct, it is considered difficult to measure using a single parameter. Any measurement of well-being requires a combination of several different variables that include both subjective and objective measures. Thus, the present study defined national well-being as a collection of individual components, consisting of happiness as a subjective measure and social problems as objective measures.

The subjective perception of happiness represents a non-material well-being index of the “state of mind” of an economic actor (Skidelsky and Skidelsky 2012). Recent studies have collected reliable and valid measures of quality of life directly from respondents across various countries and cultures (Frey and Stutzer 2002). Consequently, comparative or cross-cultural studies identifying and measuring the well-being construct have been gaining wide attention. In the present study, national happiness was measured as the subjective appreciation of life as a whole as assessed by surveys of the general population within OECD countries (Veenhoven 2016). The data was accessible from the World Database of Happiness, which is managed by the Happiness Economics Research Organization from Erasmus University of Rotterdam. Respondents were asked to answer to the following survey question on a scale of 0-10: “Taken all together, how satisfied or dissatisfied are you with your life as a whole these days?”

The present study also measured objective living conditions by focusing on life expectancy and the social problems of suicide, prison population, homicide, and divorce, as suggested by Glatzer (2012). Life expectancy at birth is defined as how long, on average, a new-born is expected to live if current death rates do not change. Life expectancy at birth is one of the most frequently used health-related well-being indicators. Suicide was measured as the number of people who voluntarily and intentionally took their own life in the full knowledge or expectation of a fatal outcome per 100,000 people. Prison population was defined as the number of prisoners per 100,000 people. The homicide rate was calculated as the number of murders per 100,000 people. Finally, the divorce rate was measured as the annual number of marriages legally ending in divorce per 1,000

people.

In order to measure the efficiency and equity of national industrial relations systems (the key independent variables in the present study), we followed Kim et al. (2015) in identifying efficiency and equity indicators and classifying them into three stages in a given system. Then we used factor analysis to create overall efficiency and equity indicators. Table 2 presents the results of the factor analysis of the efficiency and equity variables for input, process, and output indicators in national industrial relations systems. It was found that the efficiency indicators and the equity indicators were classified into two separate factors and that thus a large number of variables could be summarized.

We also included control variables that have been found to influence happiness and objective social indicators derived from previous studies. We measured each country's GDP per capita as general indicator of economic resources potentially available on average to a person in the population (Milner et al. 2011). Scholars have also found evidence that the heavy consumption of alcohol is strongly related with a greater prevalence of social problems such as suicide and crime (Brainerd 2001; Neumayer 2003). Thus, we controlled for alcohol consumption. We also included the level of political constraint because the political structure or political regime of a country may affect the social indicators considered in our study (Stack 2002). In addition, the size of the rural population was introduced as a control because inhabitants in rural regions may experience problems, such as a lack of access to health services, lower incomes, and an exodus of young people if there is a high volume of migration from rural to urban regions (Milner et al. 2012). Furthermore, the overall population size was included as a control for the size of a country which may affect social cohesion (Milner et al. 2012). Finally, previous studies on happiness constantly found that unemployment significantly affects individual happiness (e.g., Di Tella, MacCulloch, and Oswald, 2001; Frey and Stutzer, 2010; Winkelmann and Winkelmann, 1995). Thus, we controlled for unemployment rate in the analysis. Table 3 summarizes the descriptive statistics and correlations among the dependent, independent, and control variables.

#### *Analyses*

Generalized least square (GLS) was used to estimate a cross-sectional time-series model for the 30 OECD countries over the 13 years in the study. GLS is a generalized method specifying the variance-covariance matrix of the error structure, allowing the modelling of differences in variance across panels as well as panel-specific first-order autoregressive error terms. This model is considered to have homoscedasticity in error terms without autocorrelation. GLS regression analysis was executed using the *xtgls* command in STATA 13.0. We

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present results both with and without controls for Gross Domestic Product.

#### 4. Results

##### *Main results*

The efficiency and equity of the national industrial relations systems affected happiness and the five social indicators that we investigated as indicators of national well-being (see Table 4). The key estimated coefficients were significant in most, but not all, cases in the direction hypothesized.

The equity index had a significant positive effect on happiness (Model 2;  $\beta=1.02$ ,  $p<.10$ ), but the efficiency index and happiness were not significantly associated. Thus, Hypothesis 1 was only partially supported. However, the results fully supported Hypothesis 2. The efficiency index had a significant negative effect on life expectancy (Model 10;  $\beta=-.63$ ,  $p<.01$ ), and the equity index had a significant positive effect on life expectancy (Model 10;  $\beta=1.05$ ,  $p<.01$ ).

The efficiency index had a significant positive effect on the suicide rate (Model 8;  $\beta=1.80$ ,  $p<.01$ ), and the equity index also had a significant negative effect on the suicide rate (model 8;  $\beta=-2.47$ ,  $p<.01$ ). Therefore, Hypothesis 3 was fully supported. Hypothesis 4 also was largely supported by the empirical results. The equity index had a significant negative effect on the prison population (Model 4;  $\beta=-33.44$ ,  $p<.01$ ), while the efficiency index and the prison population demonstrated a significantly positive association (Model 3;  $\beta=21.20$ ,  $p<.05$ ).

The equity index had a significant negative effect on the homicide rate (Model 12;  $\beta=-.64$ ,  $p<.01$ ), but the efficiency index and homicide rate were not significantly correlated. Thus, Hypothesis 5 was only partially supported. The efficiency index also had a significant positive effect on the divorce rate (Model 6;  $\beta=.20$ ,  $p<.01$ ), whereas the equity index and divorce rate were not significantly correlated. Thus, Hypothesis 6 was partially supported. In sum, of the six hypotheses, three were fully supported (life expectancy, suicide, and the prison population) and three (happiness, homicide, and divorce) were only partially supported.

##### *Additional results*

In addition, we examined the interaction effects of equity and efficiency on the objective and subjective well-being of a country's residents. There were significant interactional effects on three objective social indicators – suicide rate, divorce rate, and homicide rate (Table 5). The interaction of efficiency and equity had a significant negative effect on the divorce rate ( $\beta=-.24$ ,  $p<.05$ ), a significant positive effect on the

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**Comentario [5]:** Can you add a reason why there might be an interaction? I had trouble thinking of one....



homicide rate ( $\beta=1.13$ ,  $p<.05$ ), and a significant negative effect on the suicide rate ( $\beta=-2.56$ ,  $p<.05$ ). No interactional effects were found on the other three indicators of well-being: happiness, prison population, and life expectancy.

The interaction effects of efficiency and equity on the objective social indicators are illustrated in Figure 1. It can be seen that a high level of efficiency increases the divorce rate and the suicide rate, and a high level of equity mitigates the rate of increase of these two indicators. Figure 1 also shows that a high level of equity decreases the homicide rate when the level of efficiency is low but not when the level of efficiency is high. In other words, equity plays a role in mitigating the negative influence of efficiency. Overall, these findings support the present study's general claim that the strengthening of equity can ameliorate the social problems caused by the excessive pursuit of efficiency.

## 5. Conclusion and Discussion

Most industrial relations studies have analysed the direct impact of labour relations on work-related outcomes. We began with the idea that previous theory and research has understated the central influence of work on societal outcomes – the lives of people outside work. This study empirically tested the effects of industrial relations on selected measures of social well-being at a national level. We hypothesized that industrial relations systems affect a wide range of social issues, including happiness, health, marriage, and crime.

The characteristics of labour relations, which were the independent variables of this study, were measured by the two dimensions developed in earlier empirical research: equity and efficiency. Social well-being, a dependent variable, was measured using six indicators: happiness, life expectancy, suicide, prison population, homicide, and divorce. Panel data from OECD member countries for 13 years from 2000 to 2012 were collected from various sources and were analysed using a pooled cross-sectional time-series regression model.

The empirical results showed that, in general, the efficiency and equity of industrial relations systems significantly affected a wide range of social outcomes. There were also significant interactional effects between efficiency and equity on three well-being indicators (suicide, homicide, and divorce).

Our empirical results were based on a period in which many countries in the OECD were influenced by neo-liberal ideas and often followed policies that emphasized austerity in terms of social services, and hence moved IR systems in the direction of greater efficiency and less equity. The results suggested that some may

have, as a consequence, fallen out of a desirable balance between equity and efficiency insofar as we found that a labour relations system which is overly biased towards efficiency can reduce happiness and be associated with a higher level of various social problems. Moving in a direction of greater equity would contribute to the improvement of the well-being along a number of dimensions.

The present study is not without limitations. The study was conducted using data from the period 2000-2012 – in other periods, a greater focus on efficiency might have positive results. This research examined relatively affluent OECD member countries and excluded most developing countries, in part because needed data from countries outside of the OECD is generally limited. Reliance on OECD nations, however, may weaken the generalizability of the present study. Less developed countries may need to improve efficiency to create a material basis for greater equity in employment and industrial relations.

In short, this study suggests that the relative importance of equity and efficiency depends on the circumstances. To get a more complete picture, scholars should analyse data over a longer period of time in the future. This study covered only 13 years, so we could not verify any change in the importance of efficiency or equity over a long period of time.

Finally, we recognize that religious attitudes may influence suicide (Pescosolido and Georgianna, 1989), homicide (Stack and Lester, 1991), and divorce (Mahoney et al., 2001). However, we were not able to control for the religious attitudes because obtaining longitudinal data for religious attitudes was not possible – religious affiliation and/or doctrine does not change much on a year to year basis in a nation. There may be other control variables that are missing. We hope that future study can overcome these limitations.

In conclusion, research on industrial relations typically has been limited exclusively work-related outcomes at the micro-, meso-, and macro-levels. This study finds that the characteristics of industrial relations systems have a wider impact on various social problems related with happiness, health, marriage, and crime. The results of this study clearly suggest that the theoretical framework of industrial relations should be expanded to encompass a broader set of social outcomes.



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**TABLE 1. Data Sources**

<i>Categories</i>	<i>Variables</i>	<i>Definitions/Measures</i>	<i>Sources<sup>a</sup></i>
Subjective Well-being	Happiness	“Taking all together, how satisfied or dissatisfied are you with your life-as-a-whole these days?” From 0 to 10	World Database of Happiness <a href="http://worlddatabaseofhappiness.eur.nl">http://worlddatabaseofhappiness.eur.nl</a>
Objective Indicators of Social Problems	Life expectancy	How long, on average, a newborn can expect to live (in years)	<a href="https://data.oecd.org/healthstat/life-expectancy-at-birth.htm">https://data.oecd.org/healthstat/life-expectancy-at-birth.htm</a>
	Divorce rate	The annual number of marriages legally ended as divorces, divorces per 1,000 people	<a href="http://www.oecd.org/els/family/database.htm">http://www.oecd.org/els/family/database.htm</a>
	Prison Population	The number of prisoners in prisons per 100,000 populations	<a href="https://data.oecd.org/">https://data.oecd.org/</a>
	Homicide rate	Number of unlawful deaths purposefully inflicted on a person by another person, expressed per 100,000 people	<a href="http://hdr.undp.org/en/content/homicide-rate-100000">http://hdr.undp.org/en/content/homicide-rate-100000</a>
	Suicide rate	The number of deaths deliberately initiated and performed by a person in the full knowledge or expectation of the fatal outcome of suicide, expressed per 100,000 inhabitants	<a href="https://data.oecd.org/healthstat/suicide-rates.htm">https://data.oecd.org/healthstat/suicide-rates.htm</a>
Control Variables	GDP	Current PPPs (US dollars, constant prices)	<a href="https://data.oecd.org/gdp/gross-domestic-product-gdp.htm">https://data.oecd.org/gdp/gross-domestic-product-gdp.htm</a>
	Alcohol consumption	Annual sales of pure alcohol in litres per person aged 15 years and older.	<a href="https://data.oecd.org/healthrisk/alcohol-consumption.htm">https://data.oecd.org/healthrisk/alcohol-consumption.htm</a>
	Political constraint	Degree of civil liberties From 1 to 4	
	Rural population	Share of inhabitants by rural region in a given country. Measured as a percentage of the national population	<a href="https://data.oecd.org/popregion/national-population-distribution.htm">https://data.oecd.org/popregion/national-population-distribution.htm</a>
	Population	Present in the country, or temporarily absent from the country, and aliens permanently settled in the country (in 1,000 persons)	<a href="http://stats.oecd.org/index.aspx?DatasetCode=POP_FIVE_HIST">http://stats.oecd.org/index.aspx?DatasetCode=POP_FIVE_HIST</a>
	Unemployment rate	The number of unemployed people as a percentage of the labour force	<a href="https://data.oecd.org/unemp/unemployment-rate..htm">https://data.oecd.org/unemp/unemployment-rate..htm</a>

<sup>a</sup>Detailed references are available from the authors

**TABLE 1. Data Sources**

<i>Categories</i>	<i>Variables</i>	<i>Definitions/Measures</i>	<i>Sources<sup>a</sup></i>
Efficiency-input (Legal context and proxies for some aspects of the union actors)	Freedom of dismissal on regular workers	Difficulty of dismissal <sup>b</sup> Strictness of Employment Protection Legislation <sup>b</sup>	<a href="http://stats.oecd.org/wbos/">http://stats.oecd.org/wbos/</a>
	Freedom of dismissal on temporary workers	Fixed-term contracts <sup>b</sup> Temporary work agencies <sup>b</sup>	<a href="http://stats.oecd.org/wbos/">http://stats.oecd.org/wbos/</a>
	Literacy rate	Illiteracy rate (%) <sup>b</sup>	World Bank <a href="http://data.worldbank.org/data-catalog/ed-stats">http://data.worldbank.org/data-catalog/ed-stats</a>
Equity-input (law related to equity plus some aspects of the union actors)	Union density	(%)	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
	Expenditure on ALMP (active labour market policies)	(% of GDP)	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
	Public social expenditure	(% of GDP)	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
	Centralization of wage-setting institution	From 1 to 5	ICTWSS Database 5.0
Efficiency-process (industrial relations processes)	Coordination of wage setting institution	From 1 to 4	ICTWSS Database 5.0
	Labour-employer relations	Confrontational ↔ co-operative (WEF Executive Opinion Survey)	WEF
	Equity-process (indicators of a high degree of union influence)	Collective bargaining coverage	From 0 to 100, employees covered by collective (wage) bargaining agreements as a proportion of all wage and salary earners
Efficiency-output (outcomes important to management)	Wage bargaining level	From 1 to 5, The predominant level(s) at which wage bargaining takes place	ICTWSS Database 5.0
	Labour productivity growth	GDP per hour worked	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
	Economic growth rates	GDP, at constant prices	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
	Injuries: Deaths	Per 100,000 workers <sup>b</sup>	ILO stats: <a href="https://www.ilo.org/ilostat">https://www.ilo.org/ilostat</a>
	Annual hours worked per person <sup>b</sup>		<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>
Income distribution	Gini coefficient <sup>b</sup>		World Income Inequality Database United Nations Development program
	Income distribution	Minimum relative to average wages of full time workers	<a href="http://stats.oecd.org/index.aspx">http://stats.oecd.org/index.aspx</a>

**TABLE 2. Factor Analysis**

Variables		2006		2012	
<b>Input</b>					
		Factor 1	Factor 2	Factor 1	Factor 2
	Freedom of dismissal on regular workers		.767		.629
Efficiency	Freedom of dismissal on temporary workers		.797		.855
	Literacy rate		.709		.668
	Union density	.727		.748	
	Expenditure on ALMP (active labour market policies)	.840		.799	
Equity	Public social expenditure	.756		.870	
	Centralization of wage-setting institution	.869		.841	
	Coordination of wage setting institution	.657		.802	
<b>Process</b>					
		Factor 1	Factor 2	Factor 1	Factor 2
Efficiency	Labour-employer relations		1.000		.996
	Collective bargaining coverage	.938		.967	
Equity	Wage bargaining level	.938		.967	
<b>Output</b>					
		Factor 1	Factor 2	Factor 1	Factor 2
	Economic growth rates		.928		.742
Efficiency	Labour productivity growth		.884		.742
	Gini coefficient*	.948		.834	
	Injuries: Deaths	.680		.850	
Equity	Annual hours worked per person	.636		.743	
	Income distribution	.582		.755	

Note. \* Item was reverse-coded.

\*\* Factor loading scores indicates that the associated item loads at .40 or greater on a single factor



**TABLE 3. Descriptive Statistics and Correlations**

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Happiness	6.79	4.12													
2. Prison Population	133.51	118.80	-0.02												
3. Divorce Rate	2.10	0.65	0.08	0.12*											
4. Suicide Rate	13.03	5.98	-0.03	-0.09	0.45***										
5. Life Expectancy	78.90	2.64	0.06	-0.29***	0.11*	-0.08									
6. Homicide Rate	1.97	2.93	0.06	0.33***	-0.32***	-0.19***	-0.49***								
7. GDP	32588.09	13054.37	0.11**	0.01	0.21***	-0.08*	0.63***	-0.29***							
8. Population	39,300	58,500	0.02	0.80***	-0.07*	-0.06*	-0.1*	0.4***	-0.04						
9. Rural Population	23.13	10.26	-0.1**	0.07	-0.34***	-0.1**	-0.47***	0.01	-0.42***	-0.05					
10. Alcohol Consumption	9.59	2.61	0.07	-0.05	0.34***	0.29***	0.14***	-0.38***	0.21***	-0.25***	0.15***				
11. Political Constraint	1.13	0.47	-0.04	0.02	-0.34***	-0.29***	-0.51***	0.65***	-0.39***	0.19***	0.13**	-0.65***			
12. Unemployment rate	7.19	3.79	-0.08	0.07	-0.17***	-0.16***	-0.20***	0.08	-0.35***	-0.04	0.40***	0.01	0.03		
13. Efficiency Index	0.00	0.56	0.06	0.08	0.27***	0.28***	0.12**	-0.2***	0.29***	-0.02	-0.16***	0.17***	-0.37***	0.29	
14. Equity Index	0.02	0.72	0.12*	-0.47***	0.21***	-0.02	0.52***	-0.51***	0.44***	-0.47***	-0.28***	0.37***	-0.50***	-0.02	0.08

\*\*\*  $P < 0.001$ ; \*\*  $P < 0.01$ ; \*  $P < 0.05$

**TABLE 4. The Results of Cross-sectional Time-series GLS Regression Analyses**

	Happiness		Prison population		Divorce rate		Suicide rate		Life expectancy		Homicide rate	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Constant	3.37 (2.61)	3.94 (2.38)	-43.28 ** (46.33)	30.46 (38.92)	2.05 *** (0.29)	1.80 *** (0.24)	20.02 *** (2.74)	12.64 *** (2.46)	84.19 *** (0.79)	87.65 *** (0.75)	-4.21 *** (1.29)	-4.92 *** (1.10)
GDP	0.00 (0.00)		0.00 *** (0.00)		0.00 (0.00)		0.00 *** (0.00)		0.00 *** (0.00)		0.00 (0.00)	
Population	0.00 (0.00)	0.00 (0.00)	0.00 *** (0.00)	0.00 *** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 * (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 *** (0.00)	0.00 *** (0.00)
Rural population	-0.01 (0.03)	-0.02 (0.03)	0.38 (0.57)	0.19 (0.57)	-0.03 *** (0.00)	-0.03 *** (0.00)	-0.16 *** (0.03)	-0.13 *** (0.04)	-0.04 *** (0.01)	-0.06 *** (0.01)	-0.03 * (0.02)	-0.02 (0.02)
Alcohol consumption	0.18 (0.15)	0.18 (0.15)	5.19 ** (2.52)	4.81 * (2.56)	0.10 *** (0.02)	0.10 *** (0.02)	0.77 *** (0.15)	0.77 *** (0.12)	-0.30 *** (0.05)	-0.29 *** (0.05)	0.22 *** (0.07)	0.23 *** (0.07)
Political constraint	1.17 (0.89)	1.11 (0.89)	-21.88 (16.08)	-30.46 * (16.09)	-0.10 (0.10)	-0.08 (0.10)	-4.13 *** (1.11)	-3.23 *** (1.14)	-3.03 *** (0.28)	-3.39 *** (0.30)	4.66 *** (0.47)	4.74 *** (0.46)
Unemployment rate	-0.01 (0.08)	-0.02 (0.08)	5.44 *** (1.62)	3.84 ** (1.56)	0.00 (0.01)	0.01 (0.01)	-0.19 * (0.10)	-0.03 (0.09)	-0.07 ** (0.28)	-0.14 *** (0.03)	-0.07 (0.05)	-0.06 (0.05)
Efficiency_	0.37 (0.47)	0.40 (0.47)	17.84 ** (8.99)	21.20 ** (9.08)	0.21 *** (0.06)	0.20 *** (0.06)	2.09 *** (0.58)	1.80 *** (0.60)	-0.82 *** (0.17)	-0.63 *** (0.18)	-0.22 (0.26)	-0.26 (0.26)
Equity	0.97 * (0.50)	1.02 * (0.49)	-43.13 *** (9.10)	-33.44 *** (8.57)	-0.03 (0.06)	-0.06 (0.05)	-1.57 *** (0.54)	-2.47 *** (0.54)	0.60 *** (0.16)	1.05 *** (0.17)	-0.53 ** (0.26)	-0.64 *** (0.24)
Log likelihood	-830.19	-830.25	-1129.02	-1132.90	-284.95	-286.27	-1061.16	-1074.76	-705.40	-740.55	-513.37	-513.94
Wald chi	10.95	10.67	532.42 ***	504.88 ***	174.46 ***	170.54 ***	130.58 ***	94.6 ***	661.41 ***	484.50 ***	308.40 ***	305.86 ***
Observations	294	294	203	203	356	356	348	348	376	376	244	244

*Note.* Standard errors in brackets. \*\*\*, \*\* and \* : significant at 1%, 5% and 10%, respectively

**TABLE 5. The Results of Interaction Effects on Cross-sectional Time-series GLS Regression Analyses**

	Suicide rate			Divorce rate			Homicide rate		
Constant	19.25	(2.73)	***	2.00	(0.28)	***	-3.79	(1.28)	***
GDP	0.00	(0.00)	***	0.00	(0.00)	*	0.00	(0.00)	
Population	0.00	(0.00)	*	0.00	(0.01)		0.00	(0.00)	***
Rural population	-0.14	(0.04)	***	-0.03	(0.00)	***	-0.03	(0.02)	**
Alcohol consumption	0.70	(0.15)	***	0.09	(0.02)	***	0.23	(0.07)	***
Political constraint	-2.48	(1.27)	*	0.02	(0.12)		3.97	(0.54)	***
Unemployment rate	-0.25	(0.10)	**	0.00	(0.01)		-0.04	(0.05)	
Efficiency	2.50	(0.60)	***	0.24	(0.06)	***	-0.38	(0.27)	
Equity	-1.45	(0.54)	***	-0.02	(0.06)		-0.57	(0.26)	**
Interactions	-2.56	(1.01)	**	-0.24	(0.10)	**	1.13	(0.46)	**
Log likelihood	-1057.96			-282.09			-510.41		
Wald chi	139.45	***		184.07	***		321.98	***	
Observations	348			356			244		

**FIGURE 1. Interactions of National Industrial Relations Systems and Objective Indicators of Well-being**

