

Relationship between Some Indicators of Business Environment: Evidence from the European Union

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Abstract—Presented paper deals with possible relationships between some indicators of business environment among the selected European Union Member States. The main observed indicators were Employment protection legislation, Product market regulation and Ease of doing business. First, these measurements of business regulation were compared (reference year 2008). Empirical results showed that favorable level of business regulation existed in United Kingdom and Ireland. Second, non-parametrical approach was applied. Values of Spearman's rank correlation coefficient suggested that there existed positive correlation between individual rankings, especially between Product market regulation and Ease of doing business.

Index Terms—Business environment, European Union, comparison, regulation, Spearman's rank correlation coefficient.

I. INTRODUCTION

It is well known that the regulation of the economy through institutions have a major impact on economic performance and hence on economic growth. Moreover, according to most theoretical studies, anticompetitive business regulations (e.g., entry restrictions, price controls) generally reduce equilibrium output and thus labor demand, as in [1]. Regulatory measures alone may have the nature of a legislative or administrative one. Moreover, some institutional factors can have influence on the corruption (e.g. taxes), as in [2].

The paper is structured as follows: (i) in the first part, the paper deals with some general aspects of the business regulation and its influence on the economy; (ii) the second part consists of methodology background; (iii) the third part focuses on empirical results - we deal with the main trends in the development of the selected indicators of business environment among EU countries. The last part concludes.

II. REVIEW OF LITERATURE

According to Scarpetta *et al.* [3] there is evidence that stringent regulatory settings in the product market have a negative bearing on productivity and (although the results are more tentative) on market access by new firms. In addition, strict employment protection legislation, by reducing employment turnover, may in a number of circumstances

lead to lower productivity performance and discourage the entry of firms.

Haidar [4] studied the impact of business regulatory reforms on economic growth rates over the period 2006–2010. Main finding is that there is statistically significant evidence, across 172 countries, for economic growth response to business regulatory reforms. There is fairly robust evidence of positive impacts of regulatory reforms and these estimated impacts are sizeable and plausibly large. Each additional reform during 2006–2010 is associated, on average, with a 0.15% increase in economic growth.

According to Djankov *et al.* [5] the relationship between more business-friendly regulations and higher growth rates is consistently significant in various specifications of standard growth models. Moreover, results of this study suggest that countries should put priority on reforming their business regulations when designing growth policies. In addition, identifying and implementing such reforms can accelerate economic growth.

Nicoletti and Scarpetta [6] argue, based on the regression analysis, that less restrictive product market regulation is conducive to growth. In other words it means that an improvement of $\frac{1}{2}$ index points of barriers to entrepreneurship would translate into approximately a 0.4% higher average annual rate of GDP per capita growth.

Klapper *et al.* [7] found that costly regulations hamper the creation of new firms, especially in industries that should naturally have high entry. In addition, Brandt [8] suggest that the process of firm entry and exit plays an important role for structural change and economic performance. New firms seem to be important for shifting resources to expanding markets and for enhancing productivity growth especially in newly emerging sectors. Moreover, Product market regulations which constitute direct or indirect barriers to entry may impinge on a country's ability to exploit the potential of young firms' contribution to innovation and productivity growth in younger markets.

Feldman [1] analyzes to what extent anticompetitive business regulations, like price controls and administrative obstacles to start a new business, affect labor force participation and employment rates in his study. Results of the regression analysis show that they lower both.

If we look at regulation of the labor market, we can find out two parallel view of Employment protection legislation (EPL). The first one supposes that strict EPL can impede effective labor market performance and implicitly the economy. The latter one is based on an opinion that employment will be more stable and individual contracts long-term if EPL is stricter. In other words – strict EPL reduces hiring and firing and stabilize the flows within labor

Manuscript received January 13, 2013; revised March 20, 2013. This work was supported in part by the Student Grant System within the grant SGS/7/2012 "Influence of Regional Disparities on Business Environment".

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market.

One possible reason why EPL exists is a finding that in many models and besides this in reality too the market interactions are not such as to ensure that laissez-faire employment relationships achieve complete efficiency, as in [9]. Cazes and Nesporova [10] mention that strictness of EPL could influence both employers decision making and employees decision making: the main argument supporting EPL has connection with employees safety during job performance, job and income security and not least an advantage of stabile employment relationship that encourages investment in specific human capital and thereby upgrade the productivity of the worker. Another argument in favor of EPL has connection with willingness of workers to accept technological change and internal job mobility, with a potential increase of productivity. At the macro level, EPL is considered a stabilizer in labor market adjustment process in case of economic shock. Strict EPL significantly increase unemployment rate, as in [11]-[12], and [13].

III. METHODOLOGY

The Spearman's Rank Correlation Coefficient is a nonparametric (distribution-free) rank statistic proposed by Ch. Spearman in 1904 as a measure of the strength of the associations between two variables. The Spearman rank correlation coefficient can be used to give an R-estimate, and is a measure of monotone association that is used when the distribution of the data make Pearson's correlation coefficient undesirable or misleading. As with any other hypothesis test, for Spearman's test you take a sample, work out the test statistic from the sample and compare it to the critical value appropriate for the sample size, the required significance level and whether the test is 1- or 2-tail.

The Spearman's rank correlation coefficient is defined by Gujarati and Porter [14]:

$$r_s = 1 - \frac{6 \sum_{i=1}^n (i_x - i_y)^2}{n \cdot (n^2 - 1)} \quad (1)$$

where, $(i_x - i_y)$ is the difference in the ranks given to the two variable values for each item data, and n is number of individuals of phenomena ranked. r_s value +1 means perfect positive correlation, r_s value close to zero means no correlation and r_s value -1 means perfect negative correlation. Moreover, the smaller the correlation coefficients the more likely the data points will be scattered on the graph. Without considering scatter lots, t-test significance analysis, and slope analyses it is easy to misinterpret correlation coefficients. In our case, we computed this r_s for two variables: the overall EPL index (year 2008) and the unemployment rate (year 2008). The sample size (n) was 20 countries. According to Hudec et al. [15] in examining the two measurable variables it must be expected that the same values of both variables can be found. Then same values are assigned the same serial number that is calculated as the average of the serial numbers. For this purpose we used a corrected version of the Spearman correlation coefficient, where the term $n(n-1)$ replaced by

(n^2-1) :

$$r_s = 1 - \frac{6 \sum_{i=1}^n (i_x - i_y)^2}{n \cdot (n^2 - 1) - c} \quad (2)$$

where c is correction coefficient which is computed as:

$$c = \sum_{j=1}^k (c_j^3 - c_j) \quad (3)$$

where c_j is a number of repetitions.

Because the ranks used in Spearman test are not drawn from a bivariate Normal population, the tables of critical values are worked out differently from those for the Pearson's product moment correlation coefficient and, hence, have different values.

The null hypothesis should be written in terms of there being no association between the variables. This conveys the purpose of the test: investigating possible association in the underlying population. Now the question remains whether the true population correlation is 0. If the sample size exceeds 10, the test statistic is approximated by a t -statistic with $n-2$ degrees of freedom, as shown in Equation 4:

$$t = r_s \sqrt{\frac{n-2}{1-r_s^2}} \quad (4)$$

where, r_s is Spearman's correlation coefficient and n is sample size.

Then the null and alternative hypotheses are:

H0: $\rho_s = 0.0$

HA: $\rho_s \neq 0.0$

If the computed t value exceeds the critical t value, we may accept the hypothesis of heteroscedasticity; otherwise we may reject it.

IV. EMPIRICAL RESULTS

OECD has developed a system of indicators for the measurement of the level of job protection or in other words labor regulation. These indicators consist of 21 items that quantify the costs and procedures associated with firing and hiring. Individual dismissal of workers with regular contracts: incorporates three aspects of dismissal protection: (i) procedural inconveniences that employers face when starting the dismissal process, such as notification and consultation requirements; (ii) notice periods and severance pay, which typically vary by tenure of the employee; and (iii) difficulty of dismissal, as determined by the circumstances in which it is possible to dismiss workers, as well as the repercussions for the employer if a dismissal is found to be unfair (such as compensation and reinstatement).

Additional costs for collective dismissals: most countries impose additional delays, costs or notification procedures when an employer dismisses a large number of workers at one time. This measure includes only additional costs which

go beyond those applicable for individual dismissal. It does not reflect the overall strictness of regulation of collective dismissals, which is the sum of costs for individual dismissals and any additional cost of collective dismissals.

Regulation of temporary contracts: quantifies regulation of fixed-term and temporary work agency contracts with respect to the types of work for which these contracts are allowed and their duration. This measure also includes regulation governing the establishment and operation of temporary work agencies and requirements for agency workers to receive the same pay and/or conditions as equivalent workers in the user firm, which can increase the cost of using temporary agency workers relative to hiring workers on permanent contracts.

The OECD Indicators of Product Market Regulation (PMR) are a comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. They measure the economy-wide regulatory and market environments in 30 OECD countries in (or around) 1998, 2003 and 2008. They are consistent across time and countries. Users of the data must be aware that they may no longer fully reflect the current situation in fast reforming countries. The indicators cover formal regulations in the following areas: state control of business enterprises; legal and administrative barriers to entrepreneurship; barriers to international trade and investment.

The Doing Business Report (DB) is a study elaborated by the World Bank Group since 2004 every year that is aimed to measure the costs to firms of business regulations in 183 countries in 2012. We used 2008 ranking because of data consistency. The Ease of doing business index ranks economies from 1 to 178 (in 2008). The index is calculated as the ranking on the simple average of country percentile rankings on each of the 10 topics covered in Doing Business 2008. The ranking on each topic is the simple average of the percentile rankings on its component indicators.

If an economy has no laws or regulations covering a specific area—for example, bankruptcy—it receives a “no practice” or “not possible” mark. Similarly, an economy receives a “no practice” or “not possible” mark if regulation exists but is never used in practice or if a competing regulation prohibits such practice. Either way, such a mark puts the country at the bottom of the rankings on the relevant indicator.

As seen from Fig. 1 the best rankings among both observed categories obtained United Kingdom, Ireland, Denmark, Netherlands, Finland and Sweden. In other words we can say that favorable level of business regulation and product market regulation existed in these countries. While in the case of the Czech Republic, Poland and Greece high level of both business regulation and product market regulation was found. Although it was not the purpose of this paper to find a relationship between the level of regulation of business and economic performance we can state, according to previous studies, that this high level of regulation can have some negative effects.

In Fig. 2 we also compared rankings (Product Market Regulation and Employment Protection). As in the previous case, United Kingdom and Ireland achieved the best result in both rankings. The group with low ranking positions consists

of Luxembourg, Greece, Portugal, Spain, France, Slovenia and Belgium. Slovakia and Poland achieved relatively good ranking in the case of EPL (less strict regulation of hiring and firing workers). However, product market regulation was high in these countries.

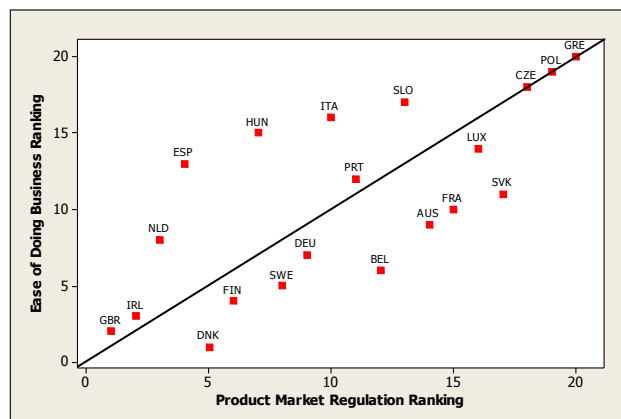


Fig. 1. Relationship between ease of doing business and product market regulation rankings; source: OECD and World Bank

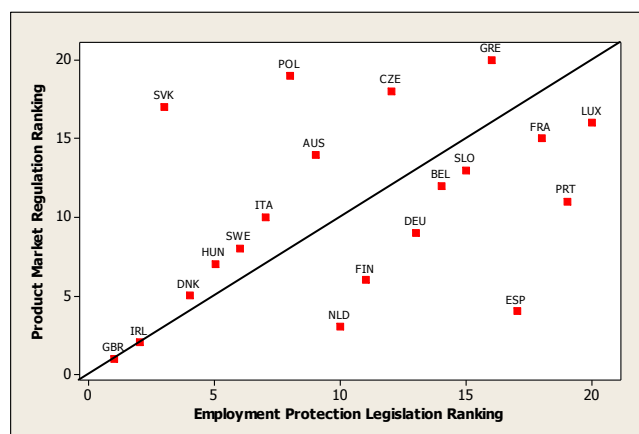


Fig. 2. Relationship between product market regulation and employment protection legislation rankings; source: OECD.

Fig. 3 contains comparison of Ease of Doing Business and Employment Protection Legislation rankings. As seen from the figure we obtained similar results in comparison with previous figures.

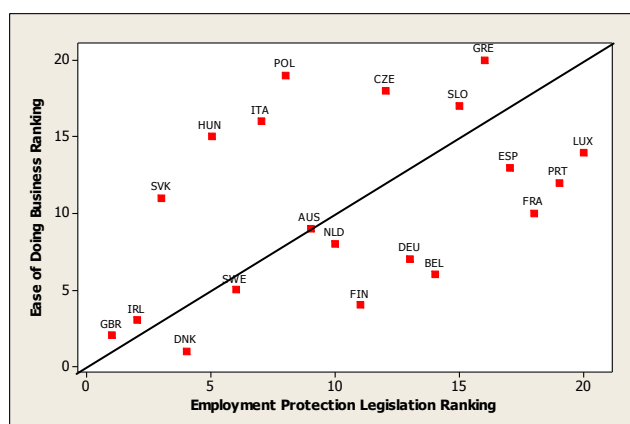


Fig. 3. Relationship between ease of doing business and employment protection legislation rankings; source: OECD and World Bank.

Spearman’s rank correlation coefficient in the first case (possible correlation between product market regulation and employment protection legislation) was 0.413689 and our computed the test statistics was 1.927835. From this value of

r_s (0.413689), we can say that it shows that the two sets of data show weak, positive correlation. It means, in other words, that the coefficient s value suggested positive relationship between EPL and PMR (the level of EPL strictness is correlated with the level of PMR among selected countries). To test the null hypothesis using the t-statistic, we go to the t-distribution table with $n-2= 18$ degrees of freedom for the appropriate significance level. Using a significance level of 0.05, we get critical t-values equal to 1.734000 so the null hypothesis, that there is no association in the underlying bivariate population, would not be accepted. In the second case, we tested possible correlation between employment protection legislation and ease of doing business. Spearman s rank correlation coefficient was 0.434586 and our computed the test statistics was 2.047227.

To test the null hypothesis using the t-statistic, we go to the t-distribution table with $n - 2 = 18$ degrees of freedom for the appropriate significance level. Using a significance level of 0.05, we get critical t-values equal to 1.734000 so the null hypothesis, that there is no association in the underlying bivariate population, would not be accepted. In the third case, we tested possible correlation between product market regulation and ease of doing business. Spearman s rank correlation coefficient was 0.711278 and our computed the test statistics was 4.293146. To test the null hypothesis using the t-statistic, we go to the t-distribution table with $n - 2 = 18$ degrees of freedom for the appropriate significance level. Using a significance level of 0.05, we get critical t-values equal to 1.734000 so the null hypothesis, that there is no association in the underlying bivariate population, would not be accepted.

V. CONCLUSION

The presented paper deals with possible relationships between some indicators of business environment among the selected European Union Member States. According to literature there is evidence that stringent regulatory settings in the product market could have a negative bearing on productivity and economic growth. The main observed indicators of the business environment of regulation were Employment protection legislation, Product market regulation and Ease of doing business. First, these measurements of business regulation were compared (reference year 2008). Empirical results showed that favorable level of business regulation existed in United Kingdom and Ireland. Second, non-parametrical approach was applied. Values of Spearman s rank correlation coefficient suggested that there existed positive correlation between individual rankings, especially between Product

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