

# The Comparison of Competitiveness of Selected Countries of the European Economic Area

Ingrid Majerová, Michaela Horúcková

**Abstract**—The concept of competitiveness is currently very frequently used term. However, the interpretation of its essence is different. In this paper, one of the many concepts of competitiveness will be analyzed and that is macroeconomic competitiveness, which is understood as a process, which is based on the productivity growth through the growth of key macroeconomic indicators such as standards of living and employment, where all of these variables must have a sustainable basis. Given the competition is a relative quantity it must be constantly compared with the development of competitiveness in other economies or regions. And this comparison method is also used in the article that compares the macro-competitiveness of selected economies of the European Economic Area – the Czech Republic, Poland, Austria, Switzerland and Germany. The aim of the paper is to verify the hypothesis concerning the direct correlation between the size of the economy and its competitiveness.

**Keywords**—Comparison, Competitiveness, European Economic Area, Global Competitiveness Index, Immeasurable Indicators of Competitiveness, Macro-competitiveness.

## I. INTRODUCTION

THE competitiveness of the economy is a very discussed topic. Competitiveness pertains to the ability to compete with other entities in a market and it can be related to the economy – respectively to the country as a whole, but also to the enterprise, to the product, but also to the branch or otherwise defined group of manufacturers. One might argue that the core of the competitiveness of the economy is the competitiveness of external trade, and therefore applies a sequence of product – enterprises – economy, but in the economy, there is a certain business environment given by the economic policy of government and the efficiency of the state. Thus, the state through the settings of the economic environment in turn influences enterprises, and their activities either stimulate or inhibit, and that applies feedback between the economy and businesses.

In this paper, the macroeconomic competitiveness will be analyzed through its immeasurable aggregates included in the Global Competitiveness Index (hereinafter GCI). This analysis

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will compare global competitiveness indexes of Czech, German, Polish, Austrian and the Swiss economy in the selected years from the period 2001 to 2009. The selection of these economies was not random, because it was necessary to select the correct matching sample of countries.

There were selected both the small economies (in terms of the concept of competitiveness one high level, one middle and one on the lower lever) and medium and large-size economies. Switzerland, Austria, the Czech Republic, Poland and Germany meet these criteria and in our opinion, they form the relevant group of countries in the European Economic Area. Data were used from the Global Competitiveness Reports [18]-[26].

Within this analysis and comparison of this sample, this paper aims verify the hypothesis that the competitiveness of the economy is directly proportional to its size and therefore, larger economy is more competitive.

## II. METHODOLOGICAL APPROACH TO THE CONCEPT OF COMPETITIVENESS

The concept of competitiveness is currently very frequently used term and hides behind a number of interpretations. The origin of the word comes from the Latin meaning “*cum-petere*”, which is interpreted as a certain action that is not necessarily conflicting [3] or perform any particular activity.

It could be explained by at the first sight contradictory assertion of using a metaphorical analogy ancient athlete who compete and strive together, but simultaneously against each other to obtain one objective – winning wreaths. The English word competition has roots in Latin. From this metaphorical concept, the nature of the word competitiveness can be determined. The essence of this term is the ability to compete in the (non)conflict competition in order to outdo the others to achieve a specific aim. This could be understood as a general characteristic, which can be further more specified.

### A. The Concept of Competitiveness and its Definition

In the economic literature, one could find many interpretations of how to understand the concept of competitiveness. According to Slaný et al. [3], the competitiveness is the relevant competitive performance. Gardiner, Martin and Tyler [4] argue that competitiveness is a function of the dynamic progression, innovation and ability to change and improve. Kadeřábková [1] sees the competition as a set of prerequisites for the gradual achievement of sustainable growth and sustainable increase of the economic level of the country in terms of internal and external balance.

The European Commission [8] defines competitiveness as the ability to provide an ever-increasing standard of living whereas decreasing involuntary unemployment. Reinert [7] approaches to the concept of competitiveness as a reflection of the important feature of the world economy, whereas the rejection of neoclassical theory of equilibrium of prices of production factors. In his concept of competitiveness can speak only in the case of economies where the benefit of increased productivity remains in the form of rent in the country of origin.

The concept of competitiveness from the perspective of mathematical methods, namely, from the perspective of the game theory, Martin et al. [12] defines competitiveness at the national level. In that case it is a zero-sum game, in which enterprises compete for market share when greater success of one means less success of others, and on the international level, where it is a non-zero sum game, because of mutual competition of countries through productivity growth results in improving the business performance of the country is not at the expense of other countries.

In addition to the positive approach to the concept of competitiveness, especially this macro-economical one (see further reading) there are authors who perceived competitiveness negatively. Krugman [14] considers the competition for the elusive essence that cannot be defined or measured and those who use this concept, considered to be ignorant of the nature of foreign trade. Klvačová [6] highlights the negative impact of efforts to maximize competitiveness, because the states in their approaches to its increase distorting national market, such as offering lower taxes and less protection of labor market for investors, who are for the most favorable conditions for their business.

Except the above-mentioned concepts, there are many others, but all have one common variable – progression, whether it is a growing value-added, corporate profits, economic growth or growth of the standards of living. This brings the definition of the concept of competitiveness, which is analyzed on three levels – micro, mezzo (sectorial and regional) and macro level.

The microeconomic level of competitiveness is given by the competitiveness of companies and its definition is among the oldest all the above types and is relatively simple. Competitiveness on the mezzo economic level can be defined according to the Martin [16] as the capacity of regional economy to optimize its internal resources for the purpose of competition and prosperity on a national, but also on a global market, and to adapt to changes in these two markets.

Within this paper, the economic competitiveness, but also national or international competitiveness, will be discussed. The concept of macroeconomic competitiveness began to be defined in the nineties of the last century, and thus belongs to the youngest categories of tier division of competitiveness. The fundamental problem is the breadth of this concept. Should it be understood as the ability to improve the competitiveness of the domestic business environment and thus also the macroeconomic environment and the status of the economy in the world economy? Or is the competitiveness

expressed by the openness of the economy and its ability to continually improve its balance of trade? May be such competitiveness perceived as an effort to ensure the innovative productivity growth? It can be said that the definition of macroeconomic productivity gives an affirmative answer to each above-mentioned questions. According to Hindls et al. [15], if the economy is able to penetrate foreign markets and international trade to acquire comparative advantages, it is competitive. This concept corresponds – with the adjustment to international conditions – to the definition of microeconomic concept of the competitiveness. The second concept, called by Slaný et al. [3] as the aggregate competitiveness, is based on the productivity growth through the growth of key macroeconomic indicators such as standards of living and employment, where all of these variables must have a sustainable basis.

If the concept of Porter et al. [11] will be adopted, within the macroeconomic competitiveness, four developmental stages through which individual countries go can be defined and those are production factors-driven stage, investment-driven stage, innovation-driven stage and wealth-driven stage. In the first stage, the economy is factor-driven and this stage is based on basic factors of production, such as natural resources or labor force. Technologies are passively accepted by companies or implemented through the foreign companies. In terms of competitiveness, the development of institutions, infrastructure, macroeconomic environment, health and basic education play are crucial. In the investment-driven stage, technologies are used as the most sophisticated factor, the economy prefers investment and long-term growth instead of consumption and the competitiveness is increasing by the higher quality of education, development of financial markets and technologies. On the stage driven by innovation, the increasing level of education, research and development are recorded. Innovations and optimization of manufacturing processes are important to increase the competitiveness. For each developmental stage, we can assign a specific economy. In the first stage are almost all developing economies, in the second stage, for instance, Bulgaria and Romania, in the third stage is the majority of European countries, including the Czech Republic and Poland, and in the fourth stage is Switzerland or the USA [10].

Given the subject of the paper, the last mentioned type of competitiveness will be analyzed, and this macroeconomic competitiveness, including the measurement and international comparisons.

### III. MACROECONOMIC COMPETITIVENESS AND ITS MEASUREMENT

Macroeconomic competitiveness was initially synonymous with export performance, on that basis was also the evaluation and testing was performed. Over time, this narrower conception has been replaced by a broader concept that includes the concept of competitiveness as the ability not only to produce goods and services that will succeed in the international market, but also the ability to maintain and enhance a high level of sustainable economies.

The international competitiveness is measured by two kinds of indicators, both those measurable – quantitative – to which belongs the indicators of inputs (costs) and outputs (measurable results), as well as immeasurable, in other words, qualitative ones.

Measurable data include only part of competitiveness and is calculated on the basis of hard data. Immeasurable indicators, respectively indicators difficult to measure, include the comprehensive competitiveness of the economy and use both hard data and soft data (questionnaire surveys captures indicators that cannot be measured with hard data), which may be based on subjective views of correspondents biased.

From the definition of macroeconomic competitiveness and its measurement implies that both measurement methods have certain negatives. Whereas the first one is not sufficient explicitness due to its incompleteness, the second one shows signs of subjectivity, thus the lack of an objective concept.

#### A. Immeasurable Indicators of Output

Immeasurable output indicators, or complex (multi-criteria) methods for evaluating the competitiveness, try to capture the competitiveness in the widest range and to provide an overall view of the competitiveness of individual economies. They try to analyze the different factors of competitiveness and used to both hard data (statistics) and soft data (questionnaires).

The result is scale – rankings – calculated values for each country. The aim of these measurements is to provide a comprehensive comparative data for foreign investors, but also representatives of political information and the business sphere about potential problems regarding the competitiveness and cause the activity leading to its gradual increase. As was already mentioned, the disadvantage is some subjectivity in the evaluation of soft data [5], which may lead to incorrect evaluations and conclusions [13].

In the last two decades, two ways of measuring the comprehensive competitiveness became significant: The measuring of Institute for Management Development (IMD) and measurement of the World Economic Forum (WEF), where the both institutions publish the results of their measurements in yearbooks. This paper deals with the second measurement through the Global Competitiveness Index.

#### Global Competitiveness Index of the World Economic Forum

Global competitiveness index (or growth index) (hereinafter GCI) has been published annually since 1979 in the annual World Competitiveness Report. GCI is constructed on the basis of hard and soft data and sub-indices that form GCI and they have different values depending on the degree of development of that given economy achieved.

This type of measurement has undergone several significant changes in the years 2001-2009. These changes were related to the distribution stage of development as well as to the amount of data included in the index.

As regards the distribution of economies, in the years 2001

to 2005 were divided economy in terms of technological development focus into the core economy, which are major innovators, and non-core economies that took over the technology developed abroad. Lopez-Claroz [2, p. xii] explains these differences as follows: "It is clear that technological innovations are more important for growth in countries that are close to the technological frontier. Innovation will be key in Sweden, but taking a foreign technology or technology transfer associated with FDI will be more important in a country like the Czech Republic. Therefore, in developing economies GCI divided into two groups..."

Since 2006, the economies were divided by stages of development [11]; *production factors-driven stage*, *investment-driven stage* and *innovation-driven stage*. In recent years, an intermediate step between the second and third stages has been added.

To calculate the GCI index for each country using weighted averages set of parametric values (pillars), as well as the score for each broad category, sub-category and narrow subcategory of microeconomic, macroeconomic and institutional determinants of competitiveness [25]. The GCI for the individual economies  $c$  given year  $t$  was calculated by using (1). Symbol  $S$  refers to stages of economic development drawn (factors, investment or innovation),  $\omega$  means a weighted average of individual pillars,  $MICRO$  represents the microeconomic pillar,  $SUPI$  the institutional one and  $MP$  refers to the macroeconomic pillar.

$$GCI_{c,t} = \omega_{MICRO}^S * MICRO_{c,t} + \omega_{SUPI}^S * SUPI_{c,t} + \omega_{MP}^S * MP_{c,t} \quad (1)$$

Evolution of the GCI index is shown in Table I [18]-[26]. The values are in the interval {1-7}, where the higher number indicates the better competitiveness. The numbers in parentheses indicate the ranking of the economies of all examining countries. In 2006 there was a conversion of the index for 2005 with regard to the changed methodology, which is the second number in brackets. Here is an unstable development, where the most unstable development could be seen in the case of Poland, the results (if we consider only the comparison of the beginning and end of the period) deteriorated. The Czech Republic and Poland have reached the worst performance in 2004, whereas Germany, Austria and Switzerland reached their worst performance at the beginning of the period under review, thus in 2001. Switzerland "climbed" the fifteen rungs up, whereas Germany ten up and Austria holds more or less at the same level throughout the period. What is very interesting is the comparison of the old and the new – recalculated – ranking after the conversion in 2005, where the results are vastly differ, in Germany (9 rungs) or Poland (difference of eight points). That clearly illustrate that the method of calculating the indicators play a significant role and in some cases, the overall picture of the economy may be very distorted.

TABLE I  
THE EVOLUTION OF COMPETITIVENESS INDEX RANKING

	2001 (74)	2002 (74)	2003 (101)	2004 (104)	2005 (117)	2006 (125)	2007 (131)	2008 (134)	2009 (133)
<i>Czech Republic</i>	4,41 (37)	4,26 (40)	4,48 (39)	4,55 (40)	4,42 (38, 29)	4,74 (29)	4,58 (33)	4,62 (33)	4,67 (31)
<i>Germany</i>	5,39 (17)	5,06 (14)	5,24 (13)	5,28 (13)	5,10 (16; 6)	5,58 (8)	5,51 (5)	5,46 (7)	5,37 (7)
<i>Poland</i>	4,40 (41)	3,98 (51)	4,15 (45)	3,98 (60)	4,00 (51; 43)	4,30 (48)	4,28 (51)	4,28 (53)	4,33 (46)
<i>Austria</i>	5,33 (18)	4,93 (18)	5,07 (17)	5,20 (17)	4,95 (17; 15)	5,32 (17)	5,23 (15)	5,23 (14)	5,13 (17)
<i>Switzerland</i>	5,43 (15)	5,36 (6)	5,51 (7)	5,49 (8)	5,46 (8; 4)	5,81 (1)	5,62 (2)	5,61 (2)	5,60 (1)

### B. Comparison of the Competitiveness of the Compared Economies in the GCI index

So far, this paper was devoted to the analysis, respectively, to the comparisons of immeasurable indicators of competitiveness as a whole and the position of individual economies within the whole, now the following part will be dedicated to compare the competitiveness of the Czech Republic, Poland, Germany, Austria and Switzerland in terms of achieved scores within a each index. For the purpose of this comparison, the GCI indexes from chosen years are used (2001, 2003, 2005, 2006, 2007 and 2009), when the number of sub-indexes rose from seven up to twelve (eighth sub-index for non-core countries – sub-index of technology transfer is not included in the polygons because it is incomparable with other economies). In each reference year, the average of the scores for each sub-index of three best-performed economies is consider for ideal (hereinafter only ideal) and then these ideals were compared with other selected economies for each year separately. Given that the WEF uses a spider diagrams (polygons) for clearer informative graphics capability, we have transposed this tradition as well, and inserted the resulting values into these polygons (see Figs. 1-6), where the minimum is represented by a score of zero, and vertices correspond to the maximum score, which is seven.

Fig. 1 represents the beginning of use of the GCI, a year 2001, when Germany, Austria and Switzerland reached the best results approaching the ideal of the area of technologies, macroeconomic stability and credit rating. Scores achieved in the field of law and corruption was above the average and conversely, these countries reached only the average in terms of innovation and very poor fiscal discipline. The last sub-index was surprisingly positively evaluated in the former socialist economies – the Czech Republic and Poland. The area of this hexagon was in the case of the last mentioned two economies very similar, where best evaluated values were in the area of technologies and macroeconomic stability, and on the other side, the worst one was (though not all countries surveyed) in “government waste”.

The year 2003 again meant a change in the values obtained for the individual economies. As shown in Fig. 2, whereas in countries like Austria, Germany and Switzerland was a significant improvement in government operations (increased surface at an angle of government waste), the Czech Republic and Poland experienced a negative trend – the Czech Republic

in the field of investment, also slightly in fiscal discipline and Poland significantly in fiscal and slightly in innovation. On the other hand, both of these economies have reached a slight improvement in the corrupted environment.

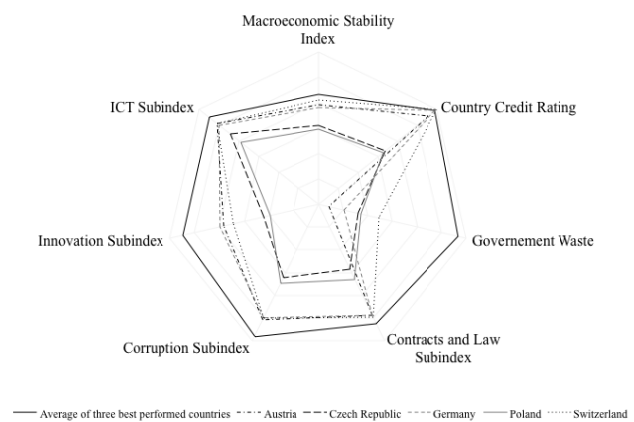


Fig. 1 Comparison of competitiveness through GCI index in 2001

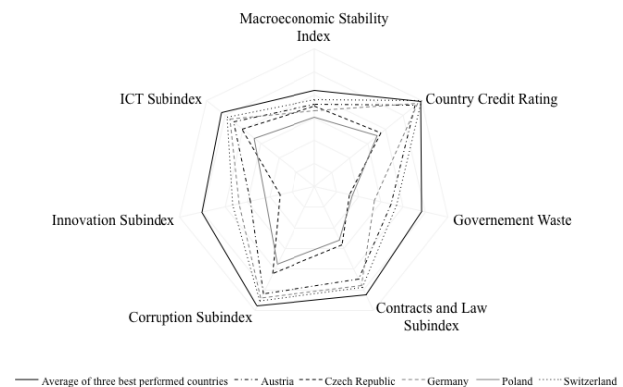


Fig. 2 Comparison of competitiveness through GCI index in 2003

Other changes in the global competitiveness index occurred in 2005, when the number of sub-indexes expanded from seven to nine. Only one sub-index remained unchanged (innovation), three sub-indexes were renamed (macroeconomic stability was renamed macroeconomics, information technology was renamed technological readiness treaties and contracts and laws to institutions), one sub-index

(the government waste index) was removed and several sub-indexed were added. Newly added sub-indexes were infrastructure, business sophistication, health and primary education, higher education and training and goods market efficiency. This of course changes the surface of the area of reference index, as shown in Fig. 3. This change is related not only to a different methodology, but also to the approach of all the states on the issue of competitiveness, the membership of new states in the EU (and their support of the integration) or the changing conditions in the world economy, etc. It can be seen that there is a large shift in achievement for all surveyed economies.

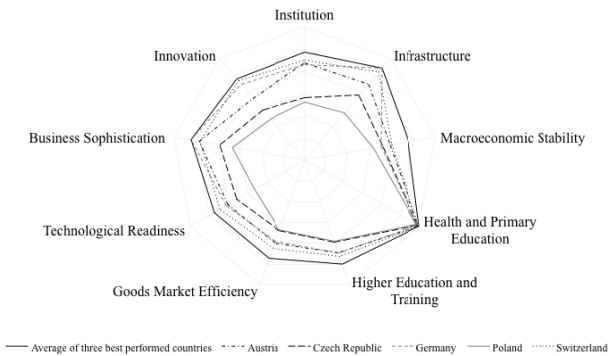


Fig. 3 Comparison of competitiveness through GCI index in 2005

In 2006, there was deterioration in the results of the assessment of health and primary education for all compared economies with the exception of the Czech Republic (see Fig. 4). Switzerland and Germany are catching up the position of the top three economies with the possible exception of the macro-environment. This is the biggest problem of the German economy, which is at the level of Poland. The Czech Republic in this assessment is on the same level as Austria. The last one, remaining economy is lagging behind in innovation and infrastructure. In contrast, the Czech Republic and Poland are catching up the level of other economies and the best results reached in the field of health and primary education. The Polish position during this period continued to deteriorate and the worst results reached in technological readiness, innovation, institutions and infrastructure. Areas of polygons compared to the previous years are more symmetrical. However, with the upcoming new methodology GCI index this was changed again.

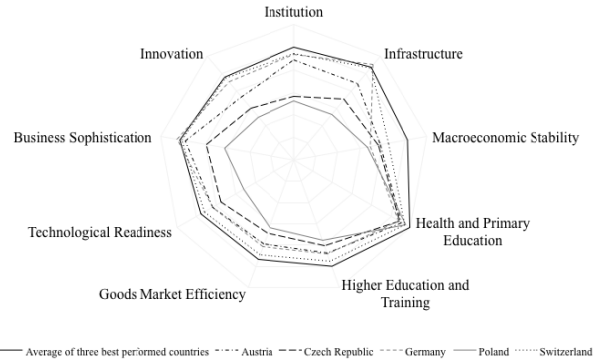


Fig. 4 Comparison of competitiveness through GCI index in 2006

Twelve-pillar structure of the Index is (now) a finite number of monitoring areas in terms of competitiveness. Whereas the ideal dodecagon in 2007 took on symmetrical shapes (as shown in Fig. 5), it was observed that economies showed somewhat problematic results (with the exception of Switzerland, which has a single blip in the market size pillar, what is logical, because it is along with the Czech Republic and Austria among the small-size economies). Nevertheless, the least uniform polygon is seen in the case of German and Polish economies. In the case of Germany, there is very interesting, that this country reached in some areas better values than the ideal (pillar infrastructure and business sophistication), in some areas reached the same level as the Polish economy (market flexibility and macroeconomic stability) and as regards the issue of health and primary education, Germany was even lagged behind all surveyed countries. Poland is still not resolved the problematic areas of technological readiness and infrastructure, which reached far the worst score. The Czech Republic with its flat shape suggests the need to improve the three "I" - innovation, institutions and infrastructure. Austria is lagging behind in innovation and labor market flexibility as well as Germany.

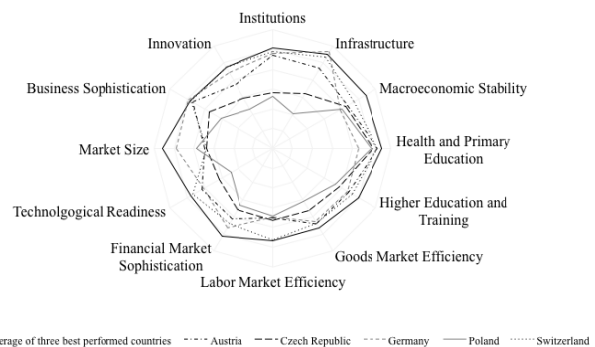


Fig. 5 Comparison of competitiveness through GCI index in 2007

As illustrated in Fig. 6, the last year of our analysis, a post-crisis year 2009 meant for most of economies the deterioration in macroeconomic stability (with the possible exception of Switzerland). Germany showed a further deterioration of the financial markets sophistication and labor market efficiency, but in tertiary education and training achieved better results

than ideal (and traditionally also in infrastructure). This area is very important for the competitiveness of economies, since many experts consider an educated and skilled workforce in terms of human capital as the key determinant of innovation and competitiveness (see [17] or [9]). Other polygons remain (as mentioned on macroeconomic stability) almost unchanged. The Czech Republic slightly advanced in terms of infrastructure and tertiary education.

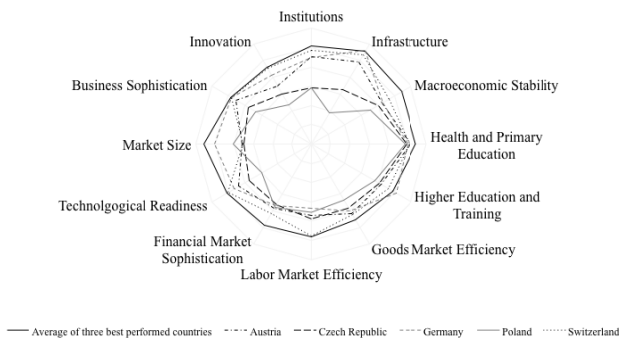


Fig. 6 Comparison of competitiveness through GCI index in 2009

#### IV. CONCLUSION

For several decades, there is increased attention paid to the concept of competitiveness, both at the microeconomic level, sectorial or macroeconomic. This attention is justified, because to be competitive means to compete in the market, develop and evolve. Europe in the world economy is gradually losing its competitiveness, although even there are some workhorses, who do “improve scores” (such as Switzerland and the Scandinavian countries). The purpose of this article was not an effort to criticize, but map the current situation in the economies whose situation in terms of competitiveness is different. These countries were selected as the sample on the basis of one indicator of classification of countries – the size of the economy.

This article answers the question whether the generally accepted rule of the better position of large economies in any economic variables would be confirmed also in the area of competitiveness. Therefore, the immeasurable indicators of competitiveness were examined on a sample of five countries – Switzerland, Austria and the Czech Republic, which represent small economies, Poland as a middle-size economy and Germany represents a large economy in the period from 2001 to 2009. For this reason, we at first used the first comparison GCI index score, and then we compared the development of the individual sub-indices within this index in each economy.

The result of our analysis showed somewhat unstable development. The most unstable economy in this comparison appeared the economy of Poland. Whereas Switzerland managed to “climb” the fifteen rungs up, Germany ten and the Czech Republic six rungs up, Austria remains more or less at the same level throughout the period and Poland even recorded worsening in its position by five points. What is very interesting is the comparison of the old and the new – recalculated – ranking after the conversion in 2005, where the

results vastly differ, in Germany (9 rungs) or Poland (difference of eight points). That clearly illustrates that the method of calculating the indicators plays a significant role and in some cases, the overall view of the economy may be very distorted.

Another finding was the level of competitiveness of the economies. As expected, the best results were achieved by Switzerland, followed by Germany and Austria, the fourth ranked Czech Republic and Poland takes the last place. However, this order does not correspond to the generally perceived rule – “the larger economy is more competitive” because as the imaginary first place was the smallest economy – Switzerland and the largest economy – Poland – occupied the last place. Thus, the stated hypothesis has not been confirmed.

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