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Estimating the Impact of Globalization on International Competitiveness: A Multidimensional Approach

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This paper examines the effects of globalization on international competitiveness (IC). The aggregated and disaggregated indices of IC (World Economic Forum) and globalization (KOF) for 132 countries in 2008 are used for the estimation of regression functions. The results show that globalization positively influences IC at the highest aggregation levels of the indices used. Social and political globalization affect IC at intermediate aggregation levels, whereas, economic globalization has no impact on IC. At the lowest aggregation levels, personal contacts, cultural proximity, and political globalization are the primary factors affecting IC's pillars, although the impact of economic restrictions on some of the IC pillars is also observed.

Keywords: globalization, competitiveness, regression models

Introduction

The objective of this study is to obtain an answer to the following question: "Is there any relationship between international competitiveness and globalization in their respective dimensions, and if so, what specific analytic form does this relationship assume?". We will apply multivariate regression functions, the parameters of which will be estimated by using data from international competitiveness indices (Schwab & Porter, 2008) and KOF globalization indices (Dreher, 2006; Dreher, Gaston, & Martens, 2008; KOF, 2009) for 132 countries in 2008.

An extensive literature exists on the effects of globalization. Most of the research have been dedicated to studying the impact of globalization on economic growth and income distribution, including inequality and poverty. Discrepancies in empirical research results have led to several well-known controversies surrounding the effects of globalization (Stiglitz, 2002; Bhagwati, 2001, 2004; Friedman, 2003; Gomory & Baumol, 2004; Lindert & Williamson, 2001; O'Rourke, 2001; Rodrik, 1997, 2004; Tanzi, 2004; Nayyar, 2001; Ohmae, 1990; Bauman, 2000; Giddens, 2000; Gray, 2000; Sullivan, 2002; Intrilligator, 2004; Micklethwait & Wooldridge, 2000; World Bank, 2002).

International economic competitiveness is defined as "… the set of institutions, policies and factors that determine the level of productivity of a country. More competitive economies tend to be able to produce higher levels of income for their citizens" (Sala-i-Martin et al., 2008, p. 2). A quantitative index of international competitiveness measures the country's potential for economic growth.

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Published studies of the relationship between globalization and international competitiveness are scarce. Recently, Salvatore (2010) found a positive correlation between these phenomena, making use of the KOF globalization index and the IMD international competitiveness index (2009) for 52 countries. However, he did not analyze the relationship with respect to the particular dimensions of globalization and competitiveness. The number of studies dedicated to more detailed aspects of the issues in question is also limited. For example, Zhang (2010) studied the impact of globalization on industrial competitiveness, while Ivaniashvili-Orbeliani (2009) analyzed the role played by the National Innovative System on competitiveness-oriented economic development policies in Georgia.

However, we have no knowledge of any research regarding the impact of particular globalization processes on specific aspects of international competitiveness. The objective of this study is to fill this gap.

The paper is arranged as follows: The second part of the paper is devoted to the issues of measuring globalization and international competitiveness. It discusses the structures of the KOF globalization index and the GCI global competitiveness index, which are applied in World Economic Forum analyses, and distinguishes three levels of aggregation in both of these indices. The third part presents the statistical data and methods applied in this study. Part four presents the results of the empirical research. Part five provides conclusions and recommendations for further research.

The Measurement of Globalization and International Competitiveness

Globalization has been defined in many different ways and to date no single, universally accepted definition of this term has been adopted. For the purposes of the present considerations, it has been assumed that globalization is "… the process of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital and goods" (Clark, 2000, p. 86).

For the purposes of empirical research, globalization is presented by detailing its most material attributes, functioning as dimensions. Various quantitative representations, in the form of indices, are proposed for each of these dimensions.

Keohane and Nye (2000, p. 4) highlight the following globalization dimensions:

- economic globalization, characterized as long distance flows of goods, capital, and services as well as information and perceptions that accompany market exchanges;
- social globalization, expressed as the spread of ideas, information, images, and people;
- political globalization, characterized by a diffusion of government policies.

A more detailed specification of the aforementioned dimensions of globalization has been proposed by Dreher (2006).[1] He claimed that economic globalization comprised two dimensions, namely, actual flows and restrictions, expressed quantitatively by two relevant indices. Actual flows represent the index that provides data on trade, foreign direct investment and portfolio investment (all as a percentage of GDP). Income payments to foreign nationals and capital employed (as a percentage of GDP) are included to proxy for the extent to which a country employs foreign people and capital in its production processes. The second index measures restrictions on trade and capital due to hidden import barriers, mean tariff rates, taxes on international trade (as a share of current revenue), and an index of capital controls.

[1] The work was limited to KOF indices. For other systems of indices of globalization, Dreher, Gaston, and Martens (2008, pp. 26-29).

According to Dreher (2006), social globalization has three dimensions, i.e., personal contacts, information flows, and cultural proximity. Measures used to proxy flows of information and personal contacts include, for example, international tourism, internet users, and the number of radios. Following Saich (2000, p. 209) and Rosendorf (2000, p. 111), Dreher interprets cultural globalization as the dominance of American cultural products. The quantitative measurement of cultural proximity is much more difficult. Because of the lack of sufficient data, Dreher suggests using the number of McDonald's restaurants as an indicator in a given country.

The number of embassies in a given country, the number of international organizations of which it is a member and the number of UN peacekeeping missions that it has participated in are used to proxy the degree of political globalization (Dreher, 2006). These variables have been also proposed by ATK/FP (2000) to proxy political engagement.

By aggregating the indices estimated for the initial dimensions, globalization indices are obtained for each of the three groups (economic, social, and political). Next, these three indices are themselves aggregated (by means of relevant weights), which gives the overall globalization index (OGI) for a given country.

As mentioned in the previous section, international competitiveness is defined as "… the sets of institutions, policies, and factors that determine the level of productivity of a country" (Sala-i-Martin et al., 2008, p. 2). A country's level of competitiveness reflects the extent to which it is able to provide rising prosperity to its citizens.

The concept of international competitiveness and the means for its quantitative measurement are no less controversial than globalization itself. For example, Krugman (1994a) questions the very meaning of the concept. He claims that the concept of corporate international competitiveness does not automatically apply to countries. In his opinion, "The idea that a country's economic fortunes are largely determined by its success on world markets is a hypothesis, not necessary truth; and as a practical, empirical matter, that hypothesis is flatly wrong". He further notes that "… when we say that a corporation is uncompetitive, we mean that its market position is unsustainable that unless it improves its performance, it will cease to exit. Countries, on the other hand, do not go out of business. They may be happy or unhappy with their economic performance, but they have no well-defined bottom line". Krugman then concludes: "… the concept of national competitiveness is elusive".

Krugman's views have been polemicized by, e.g., Scharping (1994), Thurow (1994), Prestowitz (1994), Steil (1994), and Cohen (1994). And Krugman (1994b) in turn has challenged the arguments of his critics. This polemic, however, has not definitively settled the issues surrounding the very meaning of the international competitiveness concept. It may be presumed that these relatively old controversies concerning the idea of international competitiveness have not significantly affected subsequent research. The objective of this study is not to assess the legitimacy of concept of international competitiveness per se, instead, the focus is on practical ways of measurement of this phenomenon.

Measuring economic competitiveness is a difficult task. One alleged shortcoming with competitiveness indices was their sometimes low observed correlation with the real per capita income of a given nation in relation to other nations (Salvatore, 2010). This author notes, however, that competitiveness indices measure the nation's ability and prospects for future growth, while a high per capita income measures the nation's past achievements and growth. Furthermore, a nation that ranks low on its overall competitiveness score may be highly competitive in some sectors, as this is clearly shown by the more disaggregated data that go into the calculation of the overall competitiveness index for the entire economy (Salvatore, 2010).

Sala-i-Martin et al. (2008, pp. 2-7) defined 12 pillars of international competitiveness: (1) institutions; (2) infrastructure; (3) macroeconomic stability; (4) health and primary education; (5) higher education and training; (6) goods market efficiency; (7) labor market efficiency; (8) financial market sophistication; (9) technological readiness; (10) market size; (11) business sophistication; and (12) innovation. The first four pillars form the group of "basic requirements", pillars 5-10 form the "efficiency enhancers" group, and the last two pillars (11) and (12) form the "innovation and sophistication factors" group.

The selection of these pillars as well as the factors that enter each of them is based on the latest theoretical and empirical research. It is important to note that none of these factors alone can ensure competitiveness (Lopez-Carlos et al., 2007)

The aforementioned approach to describe international competitiveness via twelve pillars, corresponds to Porter's (1990) concept of gradual social and economic development.[2] Following this concept, countries can be divided into three groups with respect to their stages of technical and technological advancements. Thus, the basic requirements refer to factor-driven countries, efficiency enhancers refer to efficiency-driven countries, and innovation and sophistication factors refer to innovation-driven countries.

Schwab and Porter (2008) suggest quantitative measures, in the form of indices, for each of the twelve pillars. By aggregating these indices, using the appropriate weights, indices for the three aforementioned groups are obtained. Finally, a global competitiveness index (GCI) is created as a weighted aggregate of those three indices, using another system of weights.

Further on, we will focus on analyzing the relationship between international competitiveness and globalization at three aggregation levels, using particular indices. In the case of international competitiveness, the first (lowest) aggregation level will be composed of indices for particular pillars, the second level will be the aggregated indices for the three abovementioned groups, and the third (highest) aggregation level will be represented by the GCI.

We will determine the levels of aggregation for the globalization indices in a similar manner. The first (lowest) aggregation level will consist of globalization indices referring to the six previously discussed dimensions, namely, actual flows, restrictions, personal contacts, information flows, cultural proximity, and the political. The second level of aggregation will include economic, social and political globalization indices. Finally, the third (highest) level of aggregation will be represented by the GCI.

Statistical Data and Methods

The analysis of the relationship between globalization and international competitiveness has been conducted by using cross-sectional data for the year 2008. To describe international competitiveness, the indices (scores) of The Global Competitiveness Report 2008-2009 have been used, and globalization has been described by using indices from the KOF (2009) database. The combination of the data from both sources resulted in a sample of 132 countries[3] for the year 2008, the most recent year for which the data from the globalization indices were available.

In these studies, scores are used instead of ranks for two reasons. First, scores are measured using a ratio scale, which allows for the application of a significantly richer set of statistical measures than data presented in

[2] See Dunning (1993) for an internationalization of Porter's diamond.

[3] Although The Global Competitiveness Report 2008-2009 includes data for 134 countries areas, two of them (Taiwan and Hong-Kong) do not appear in the KOF database.

the form of ranks (in an ordinal scale). Second, data in the form of ranks include an additional factor: the impacts of other countries' relative positions. If a given country behaves in a constant manner in two consecutive periods, its score will not change. Yet, its rank could increase or decrease, depending on whether any other country received a higher or lower score. Thus, using ratios prevents the countries' scores from affecting one another.

To study the relationship between international competitiveness and globalization, multivariate regression functions will be used. Indices of competitiveness (at different levels of aggregation) will function as the dependent variables. Thus, the indices of globalization will be the only independent variables in these functions. As the objective of the study is to establish a "pure" impact of globalization on international competitiveness, we will not include any other additional independent variables.

The statistical package STATISTICA (StatSoft) will be used for estimating the parameters of the multivariate linear regression models. The general regression models, the module of STATISTICA, allow for the choice of best subsets of independent variables.

Empirical Results

To initially verify the presence of a relationship (from the stochastic point of view) between the indices of competitiveness and globalization, Pearson's linear correlation coefficients have been estimated (see Table 1).

Table 1

Pearson's Coefficients of Correlation Between International Competitiveness and Globalization

	Index of competitiveness				Index of globalization			
	GCI*	Basic	Efficiency	Innovation	OGI*	Economic	Social	Political
GCI*	1.0000	0.9611	0.9719	0.9394	0.8310	0.6901	0.8292	0.3836
Basic	0.9611	1.0000	0.9029	0.8552	0.8251	0.7362	0.8481	0.2708
Efficiency	0.9719	0.9029	1.0000	0.9368	0.8583	0.7019	0.8315	0.4499
Innovation	0.9394	0.8552	0.9368	1.0000	0.7501	0.5652	0.7289	0.4505
OGI*	0.8310	0.8251	0.8583	0.7501	1.0000	0.8837	0.9495	0.4995
Economic	0.6901	0.7362	0.7019	0.5652	0.8837	1.0000	0.8184	0.1330**
Social	0.8292	0.8481	0.8315	0.7289	0.9495	0.8184	1.0000	0.2963
Political	0.3836	0.2708	0.4499	0.4505	0.4995	0.1330**	0.2963	1.0000

Notes. * GCI—Global Competitiveness Index, OGI—Overall Globalization Index; ** non-significant at 0.05 significance level.

Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009, and KOF (2009).

The estimate of the coefficient of correlation between the global international competitiveness index (GCI) and the overall globalization index (OGI), 0.8310, is statistically significant and positive. Therefore, there is a relationship between the globalization level of a given country and its level of competitiveness, and this relationship is directly proportional. In other words, the more (or less) a given country is globalized, the higher (or lower) its level of competitiveness will be. Thus, the research results obtained by Salvatore (2010) have been confirmed. By employing the coefficient of rank correlation, Salvatore obtained a positive correlation between the index of globalization (KOF) and the index of competitiveness (IMD) (2009).

At the lower level of globalization index aggregation, there is also a statistically significant, positive correlation between the GCI index and the indices of economic, social, and political globalization. The estimates of the correlation coefficients for the indices of economic, social, and political globalization were

0.6901, 0.8292, and 0.3836, respectively. The correlations between the index of the basic requirements competitiveness group and the indices of economic, social, and political globalization were 0.7362, 0.8481, and 0.2708, respectively. The correlations between the efficiency enhancers group and the indices of economic, social, and political globalization were 0.7019, 0.8315, and 0.4499, respectively, and the correlations between the innovation constituent and the indices of economic, social, and political globalization were 0.5652, 0.7289, and 0.4505, respectively.

By analyzing the results presented in Table 1, one may also observe that the international competitiveness indices have a strong positive correlation. In the case of the globalization indices, there is a strong correlation between economic and social globalization (r = 0.8184). The correlation between social and political globalization (r = 0.2963) is slightly weaker (although still statistically significant). However, no statistically significant correlation can be observed between economic and political globalization.

Because of this internal correlation between globalization indices coefficients of partial correlation between specified indices of international competitiveness (a dependent variable) and the indices of economic, social, and political globalization have also been estimated. The results are presented in Table 2.

Table 2

Coefficients of Partial Correlation Between International Competitiveness and One Dimension of Globalization

Dependent variable (groups or pillars)	Economic	Social	Political
Global competitiveness index	0.0919*	0.582-0	0.2711
Basic requirements	0.1492*	0.5991	0.0682*
1. Institutions	0.1781*	0.3452	0.0551*
2. Infrastructure	0.0442*	0.5587	0.1089*
3. Macroeconomic stability	0.1629*	0.1497*	0.0111*
4. Health and primary education	0.0026*	0.6526	-0.0179*
Efficiency enhancers	0.1584*	0.5667	0.4060
5. Higher education and training	0.1565*	0.6476	0.2946
6. Goods market efficiency	0.2749	0.344	0.2640
7. Labor market efficiency	0.2386	0.1340*	-0.11570
8. Financial market efficiency	0.3734	0.2928	0.1571*
9. Technological readiness	0.2226	0.6111	0.2689
10. Market size	-0.3137	0.4586	0.5602
Innovation and sophistication factors	-0.0088*	0.4895	0.3510
11. Business sophistication	0.0176*	0.4998	0.3649
12. Innovation	-0.0249*	0.4455	0.3124

Notes. * non-significant at 5% significance level. Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009, and KOF (2009).

An analysis of the results stated in Table 2 shows that the index of economic globalization (disregarding the impacts of social and political globalization) is not correlated in terms of statistical significance with the overall index of competitiveness or with any of the indices of international competitiveness at the second level of aggregation (i.e., with the basic requirements, efficiency enhancers and innovation and sophistication factor indices). At the lowest level of international competitiveness pillar aggregation, the impact of economic globalization is statistically significant for only five pillars: goods market efficiency (pillar 6), labor market efficiency (pillar 7), financial market efficiency (pillar 8), technological readiness (pillar 9), and market size

(pillar 10). In the case of market size (pillar 10), the partial correlation coefficient is statistically less than zero.

Social globalization exerts a much more significant impact on international competitiveness than economic globalization. This result is substantiated by the estimates of the partial correlation coefficient (see Table 2). The impact of social globalization on international competitiveness (disregarding the impacts of economic and social globalization) was not significant statistically for only two pillars: macroeconomic stability (pillar 3) and labor market efficiency (pillar 7).

The impact of political globalization on international competitiveness, as measured by the partial correlation coefficient (disregarding the impact of economic and social globalization) was statistically significant for the global index of competitiveness and the second aggregation level indices (basic requirements, efficiency enhancers, and innovation and sophistication factors). At the lowest aggregation level of the competitiveness index (i.e., at the pillars level), political globalization had a statistically significant impact on six pillars, namely, higher education and training (pillar 5), goods market efficiency (pillar 6), technological readiness (pillar 9), market size (pillar 10), business sophistication (pillar 11), and innovation (pillar 12).

On the basis of these results, it may be presumed that social globalization is decisive in regression models linking indices of competitiveness (dependent variables) with those of globalization (independent variables).

After an initial analysis of the relationship between international competitiveness and globalization, work was begun on establishing the functional form of this relationship.

The relationship between the global competitiveness index (GCI) and the overall globalization index (OGI) is expressed in the following estimated regression model (estimated standard errors in parentheses):

$$GCI = 1.732579 + 0.038315 \cdot OGI$$
$$(0.148377) \quad (0.002250) \qquad R^2 = 0.705625$$

The two parameters of this model are significant statistically (at 0.05 significance level). The estimate of the multiple R^2 shows that OGI can explain over 70 percent of the variability of GCI. It follows that the more globalised the country, the more internationally competitive it is.

Next to be estimated were the impacts of economic, social, and political globalization constituents on overall international competitiveness and its groups of individual pillars. Table 3 presents estimates of multivariate regression parameters with the indices of economic, social, and political globalization as independent variables.

Table 3

Effects of Economic, Social, and Political Globalization on International Competitiveness (OLS Estimates of Regression Parameters)

Dependent variable	Constant	Social globalization	Political globalization	Adjusted R^2
Global competitiveness index	2.2736 (0.1829)	0.02573 (0.0017)	0.0066 (0.0025)	0.7213
Basic requirements	2.6364 (0.1105)	0.0340 (0.0019)		0.7378
Efficiency enhancers	1.85344 (0.1844)	0.0266 (0.0017)	0.0098 (0.0025)	0.7466
Innovation and sophistication Factors	1.3566 (0.2490)	0.0243 (0.0023)	0.0141 (0.0033)	0.6079

Note. Estimated standard errors shown in parentheses. Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009, and KOF (2009).

An analysis of the results presented in Table 3 shows that the GCI describes a regression model in which indices of social and political globalization act as independent variables. The two independent variables have statistically significant impacts on the GCI and account for approximately 72% of the variability in this dependent variable. At this point, it is worth noting that social globalization explains a great deal more of the variation in the dependent variable than political globalization does.[4]

Further explanation should be provided regarding the omission of the economic globalization from the model describing the GCI. Both of these indices have a significantly positive correlation (r = 0.6901, see Table 1). However, the indices of economic and social globalization are strongly correlated (r = 0.8184, see Table 1), which suggests the possibility of collinearity when both independent variables appear jointly in the regression model for the GCI. Thus, two non-nested hypotheses were suggested:

$$H_0: y = a \cdot x + b + u_0 u_0 \sim IN(0, \sigma_0) \quad (1)$$

and:

$$H_1: y = c \cdot z + d + u_1,\ u_1 \sim IN(0, \sigma_1) \quad (2)$$

where y equals GCI, x the economic globalization index, and z the social globalization index. On the basis of the Davidson-MacKinnon J-test (1983), hypothesis H_0 was rejected, and hypothesis H_1 was adopted. In other words, the GCI can be treated as a function of the social globalization index, and not the economic globalization index.

Thus, taking the above into account, the regression function model has been estimated with a predetermined indispensable occurrence of economic globalization. The following model has been estimated (standard errors in parentheses):

$$GCI = 1.219125 + 0.002651 \cdot ECON + 0.015952 \cdot POLIT$$
$$(0.253076)\ (0.002389) \qquad (0.002778) \qquad R^2 = 0.598755$$

where ECON is the index of economic globalization and POLIT is the index of political globalization.

We can see that because of the values of R^2, the above model is more poorly specified than the model in Table 3, which uses social globalization and political globalization as independent variables.[5]

Concerning the impact of the three globalization variables (listed in Table 3) on the competitiveness index constituents at the second level of aggregation, the only independent variable that meets the basic requirements to function as a dependent variable is social globalization. Hence, with efficiency enhancers and innovation and sophistication factors as dependent variables, the social globalization and political globalization indices become the independent variables. Again, as in the previous two models, social globalization accounts for much more of the variation in the dependent variable than political globalization.

Moving to the lowest (first) aggregation level of the globalization index (i.e., with the 12 pillars as dependent variables), a more complex picture than the previous one is revealed—that of the impact of the three considered dimensions of globalization.

On the basis of an analysis of the results presented in Table 4, economic globalization—included as a separate independent variable—has statistically significant impacts on labor market efficiency (pillar 7). It is worth noting that economic globalization accounts for a non-significant percentage of the variability of these

[4] The values of the beta parameter for social and political globalization were 0.79 and 0.14, respectively. Beta parameters were not provided in Table 3 because of a lack of space.

[5] As a result of including social globalization as an additional variable in the model, economic globalization became statistically non-significant (p = 0.252940).

dependent variables. The R^2 value for this pillar was 0.245114.

Economic globalization appears as an independent variable—but this time not separately—in the regression models for the following pillars: goods market efficiency (6), financial market sophistication (8), and market size (10). In the case of the last model, the impact of economic globalization on market size (10) is negative.

Table 4

Effects of Economic, Social, and Political Globalization on the Pillars of International Competitiveness (OLS Estimates of Regression Parameters)

Dependent variable	Constant (intercept)	Economic globalization	Social globalization	Political globalization	Adjusted R^2
(1) Institutions	2.4261 (0.1712)		0.0311 (0.0029)		0.4938
(2) Infrastructure	0.9537 (0.1970)		0.0501 (0.0033)		0.6579
(3) Macroeconomic stability	3.8880 (0.1834)		0.0181 (0.0031)		0.2191
(4) Health and primary education	3.2776 (0.1230)		0.0366 (0.0021)		0.7254
(5) Higher education and training	1.3209 (0.2189)		0.0383 (0.0020)	0.0078 (0.0029)	0.7957
(6) Goods market efficiency	2.3465 (0.2535)	0.0109 (0.0038)	0.0124 (0.0033)	0.0073 (0.0027)	0.6038
(7) Labor market efficiency	3.4505 (0.1567)	0.0144 (0.0023)			0.2451
(8) Financial market efficiency	2.3457 (0.1928)	0.0176 (0.0049)	0.0161 (0.0039)		0.5914
(9) Technological readiness	1.0770 (0.1316)		0.0466 (0.0022)		0.7904
(10) Market size	0.0623* (0.5610)	-0.0190 (0.0085)	0.0289 (0.0073)	0.0426 (0.0060)	0.5165
(11) Business sophistication	1.8059 (0.2299)		0.0238 (0.0021)	0.0137 (0.0031)	0.6356
(12) Innovation	0.9093 (0.2954)		0.0248 (0.0028)	0.0144 (0.0040)	0.5337

Notes. Estimated standard errors shown in parentheses, * not significant at 5% significance level. Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009, and KOF (2009).

Social globalization affects the pillars of competitiveness to a much greater extent than economic globalization. In regression models for the 12 pillars, social globalization occurs as an independent variable in all models with exception of labor market efficiency (7). In models for institutions (1), infrastructure (2), macroeconomic stability (3) health and primary education (4), and technological readiness (9), social globalization is a separate independent variable. In the other seven models for the pillars, social globalization is accompanied by other independent variables.

Political globalization was a significant factor for international competitiveness. However, political globalization does not appear in any of the models (see Table 4) as a separate independent variable. It should be pointed out that political globalization does not have an impact on any of the pillars from the basic requirements group, but it has a statistically significant impact on such competitiveness pillars as: higher education and training (5), goods market efficiency (6), market size (10), business sophistication (11), and innovation (12).

The next stage concerns an analysis of the relationship between international competitiveness and globalization when globalization is measured by indices at the lowest aggregation level, i.e., the most detailed level. Estimates of the regression parameters have been included in Table 5.

Table 5

Effects of Disaggregated Dimensions of Globalization on International Competitiveness (OLS Estimates of Regression Parameters)

Dependent variable	Constant	Social globalization			Political globalization	Adjusted R^2
		Personal contacts	Information flows	Cultural proximity		
Global competitiveness index	2.5216 (0.2294)	0.0132 (0.0020)		0.0109 (0.0017)	0.0070 (0.0028)	0.7503
Basic requirements	2.9479 (0.1012)	0.0206 (0.0022)		0.0119 (0.0017)		0.7607
Efficiency enhancers	2.1776 (0.2334)	0.0125 (0.0020)		0.0119 (0.0018)	0.0099 (0.0029)	0.7663
Innovation and sophistication factors	2.1685 (0.3380)	0.0172 (0.0034)	-0.0125 (0.0044)	0.0142 (0.0024)	0.0135 (0.0038)	0.6702

Note. Estimated standard errors shown in parentheses. Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009, and KOF (2009).

On the basis of a results analysis (see Table 5), the GCI is a function of three factors: personal contacts, cultural proximity, and political factors. Each of these exerts a positive impact on international competitiveness. However, competitiveness remains unaffected by factors such as information flows (from the social group) and any of the factors from the economic group, i.e., actual flows and restrictions.

Only two factors affect statistical significance of the basic requirements dependent variable: personal contacts and cultural proximity. Personal contacts affect this dependent variable to a greater extent than cultural proximity.

The regression model for the efficiency enhancers variable is considerably richer. Three factors exert significant impacts in this case: personal contacts, cultural proximity, and the political factors. Among these, cultural proximity is the most crucial. The impacts of personal contacts and political factors are similar. The impact of political globalization on the efficiency enhancers index is smaller than the impacts of personal contacts and cultural proximity.

The innovation and sophistication factors dependent variable is explained by four factors: personal contacts, information flows, cultural proximity, and the political factors. The impact of information flows is negative. The impact of remaining factors is similar.

Interesting conclusions can also be drawn by studying the impact of the globalization factors in question on particular competitiveness pillars (see Table 6). The actual flows factor (from the economic globalization group) exerts a positive impact on the financial market efficiency pillar (8) and a negative impact on the market size pillar (10).

The explanation for the negative sign of the parameter value on the actual flows factor in the regression model for the market size pillar (10) can be found in the structures of the indices themselves. Namely, the index of competitiveness for market size contains the natural logarithm of total GDP and imports less (important!) than exports (The Global Competitiveness Report, 2008-2009, p. 495). Conversely, the actual flows index contains, i.e., a trade element equaling the total of exports and imports expressed as the GDP fraction (Dreher,

Gaston, & Martens, 2008, p. 43). Thus, if the exports of a given country increase, then the trade element of the actual flows index also increases, ceteris paribus. However, an increase in exports diminishes the value of the dependent variable. These contradictory impacts of increasing exports on the independent and dependent variables manifested themselves as a negative parameter value on the actual flows factor.

Table 6

Effects of Disaggregated Dimensions of Globalization on the Pillars of International Competitiveness (OLS Estimates of Regression Parameters)

Dependent variable (pillars)	Constant	Economic globalization		Social globalization			Political globalization	Adjusted R^2
		Actual flows	Restrictions	Personal contacts	Information flows	Cultural proximity		
1. Institutions	3.2017			0.0330	-0.0176	0.0116		0.6117
	(0.2624)			(0.0042)	(0.0056)	(0.0026)		
2. Infrastructure	1.9294			0.0364	-0.0133	0.0210		0.7171
	(0.3077)			(0.0049)	(0.0066)	(0.0031)		
3. Macroeconomic stability	3.7730		0.0123			0.0073		0.2119
	(0.2974)		(0.0054)			(0.0031)		
4. Health & primary education	2.5303				0.0341	0.0076		0.7551
	(0.1951)				(0.0033)	(0.0020)		
5. Higher education & training	1.0515			0.0166	0.0118	0.0099	0.0112	0.7875
	(0.3271)			(0.0033)	(0.0042)	(0.0023)	(0.0036)	
6. Goods market efficiency	2.7796		0.0105	0.0123	-0.0092	0.0070	0.0075	0.6551
	(0.2850)		(0.0033)	(0.0028)	(0.0035)	(0.0020)	(0.0029)	
7. Labor market efficiency	3.5006		0.0092	0.0054				0.2622
	(0.1671)		(0.0036)	(0.0027)				
8. Financial market efficiency	2.9223	0.0082	0.0130	0.0159	-0.0151	0.0084		0.6443
	(0.2504)	(0.0038)	(0.0044)	(0.0040)	(0.0047)	(0.0022)		
9. Technological readiness	0.7290			0.0283		0.0138	0.0112	0.8201
	(0.3115)			(0.0027)		(0.0024)	(0.0039)	
10. Market size	1.0853	-0.0146				0.0230	0.0344	0.6403
	(0.5113)	(0.0043)				(0.0033)	(0.0058)	
11. Business sophistication	2.5697			0.0155	-0.01060	0.0136	0.0131	0.6901
	(0.3106)			(0.0031)	(0.0040)	(0.0022)	(0.0034)	
12. Innovation	1.7697			0.0190	-0.0144	0.0148	0.0138	0.5991
	(0.4087)			(0.0041)	(0.0053)	(0.0029)	(0.0045)	

Note. Estimated standard errors shown in parentheses. Source: Authors' calculations using data from The Global Competitiveness Report 2008-2009.

It should also be noted that in the estimated regression models including the pillars as dependent variables (with the exception of pillars 8 and 10), economic globalization has a significant impact if it appears mainly through the restrictions factor. The said factor does not appear in one independent variable regression models. Together with other globalization factors, the restrictions factor is included in the model for the macroeconomic stability (3), goods market efficiency (6), labor market efficiency (6), and financial market sophistication (8) pillars.

Positive values of the parameter on this independent variable mean that increased liberalization of trade and capital flows entails increased competitiveness being expressed by the said pillars.

Globalization in the personal contacts dimension seems to be a key factor for international competitiveness. This factor occurs in nine models that include the following pillars: institutions (1), infrastructure (2), higher education and training (5), goods market efficiency (6), labor market efficiency (7), financial market sophistication (8), technological readiness (9), business sophistication (11), and innovation (12).

Personal contacts primarily affect the following pillars: institutions (1) and infrastructure (2), and to the least extent the labor market efficiency pillar (7).

The information flows globalization factor shows a statistically significant impact on eight pillars. We can observe a positive impact of globalization on the following pillars: health and primary education (4) and higher education and training (5). Thus, the freer the flow of information, the higher the international competitiveness level expressed by these two pillars. However, in the models for the remaining five pillars, the information flows factor has a negative sign. This negative sign would mean that the greater a country's potential for receiving news from other countries, the less competitiveness it exhibits in this remaining dimension, ceteris paribus.

The cultural proximity globalization factor positively affects the degree of competitiveness expressed by all pillars, except for the labor market efficiency pillar (7). It appears that cultural proximity affects the market size pillar (10) to the greatest extent and exerts the least influence on the goods market efficiency pillar (6). According to Saich (2000, p. 209), "... cultural globalization in large part refers to the domination of U.S. cultural products". It should be noted that as a proxy for cultural proximity, the number of McDonald's restaurants located in a country is used (because of the lack of other data).

The political globalization factor has a positive impact on half of the competitiveness pillars, i.e., higher education and training (5), goods market efficiency (6), technological readiness (9), market size (10), business sophistication (11), and innovation (12). The political factor has the greatest impact on the market size pillar (10) and exerts the least impact on the goods market efficiency pillar (6).

Conclusions and Policy Recommendations

Bearing in mind the purely statistical criteria for the selection of independent variables in the regression models, social and political globalization have the greatest impacts on international competitiveness. In particular, among the dimensions of social globalization, personal contacts and cultural proximity have decisive impacts on competitiveness.

Economic globalization is not significant here. This refers in particular to actual flows. Restrictions, the second dimension of economic globalization, have an impact on a small number of competitiveness pillars such as macroeconomic stability and some pillars from the efficiency enhancers group.

Our results imply the following policy recommendation: If a nation does not stimulate the development of direct interactions with people living in different countries, and if it does not promote cultural proximity, its international competitiveness will remain low.

Obviously, a conjecture can be made that, apart from globalization, additional factors affect international competitiveness. Nonetheless, this competitiveness can be treated as one of globalization's effects. However, to determine the cause-and-effect relationship, it is necessary to include in the analysis the dynamic aspect of the phenomena in question. Further research will focus on these issues.

The idea of examining the relationship between international competitiveness and globalization in more detailed settings, e.g., regional settings, seems interesting. This is indicated by the significant impacts of the social globalization dimensions of personal contacts and cultural proximity. It seems that both of these phenomena occur at the regional scale rather than at the global one. It may be assumed that these relationships will be disparate in groups of countries with differing levels of social and economic development.

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