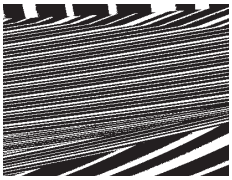

A CONTRIBUTION TO THE MEASUREMENT AND ANALYSIS OF THE GLOBALIZATION OF NATIONAL ECONOMIES

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This paper introduces a multi-criteria method for measuring the globalization of national economies with the intention of establishing and thoroughly studying a country's position and potential for international integration. It is based on some of the advantages of the analytic hierarchy process methodology. By utilizing the traditional theory of comparative advantages, the new theory of competitive advantages, the theory of international production and some adequate empirical studies, we have developed a theoretical framework and set up a hierarchical model of relevant indicators for measuring and analyzing the globalization of national economies. Additionally, this paper offers solutions for restructuring the hierarchy of the model to consider data for all included indicators. The positions and potentials of national economies – especially the Croatian one – were researched in different international environments that are interesting for international integration. For the Croatian national economy, the empirical case study defines key success and failure spheres of its performance in the period of contemporary globalization, and suggests some measures for economic policymaking.

Key words: the analytic hierarchy process, economic policymaking, globalization, measurement, national economy

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INTRODUCTION

Measuring and Analyzing Globalization: Necessities for International Integration

When including in international economic unions and into the broader context of the world economy, it is very important for a country's policy-makers to establish and thoroughly study its position in different environments with respect to different criteria. This statement is supported by the well--known thesis that globalization creates opportunities for rapid growth and development of economies that are ready for it (Das, 2004, 15), that is, in those economies in which the domestic economic, political and social environment is conducive to underpinning the globalization processes (Srinivasan, 2002). Therefore, the importance of measuring and analyzing globalization is increasing: in a period of severe competition, national policymaking should be based on analytical tools that continually ascertain a country's position and potential for international integration. For these reasons, the Croatian national economy should be analyzed in a broader global context and – because of June 18, 2004 when Croatia was awarded candidate status – in the context of European Union (EU) candidate countries.

Some Attempts towards Measuring Globalization

There have been several attempts at measuring globalization. The "Globalization Index" (Foreign Policy and A. T. Kearney, Inc., 2004) measures the global integration of a country by the indicators of economic and technological connectedness and by indicators of political activity and personal contacts. The public repercussions of this index have been an incentive for the development of some alternative approaches towards measuring globalization (such as Andersen and Herbertsson (2003), Dreher (2003), and Lockwood (2003)). Furthermore, the "G-Index" (WMRC, 2001) focuses on the measuring of a country's international economic connection via indicators for the so-called old and new economy at a ratio of 70 to 30. The World Bank (WB, 2003) assesses a country's integration with the world economy on the basis of the indicators of the international commodity exchange, private capital flows and foreign direct investment (FDI) flows. The OECD (2002, 2003) measures national economies' international integration through trade, investment flows and technology transfer, as well as the effects of domestic and foreign multinational companies' (MNCs) activities on a national economy's performance. UNCTAD's Inward/Outward FDI Performance Indices and Inward/Outward FDI Potential Indices define a country's rank with re-

gard to inward/outward FDI flows and with a view towards the potential for inward/outward FDI, respectively (UNCTAD, 2002, 2003), while the Transnationality Index (UNCTAD, 2003) considers national performance on the basis of inward FDI as well. Dörrenbächer (2000) measures the activities of domestic MNCs abroad by a system of structural, performance and behavior indicators. Fisch and Oesterle (2000) calculate geographical spread and the cultural diversity of the activities of domestic MNCs abroad and link together both measures in a complex number – the degree of globalization. Yip (1992) focuses on soft globalization indicators and defines groups of so-called industrial globalization drivers that are crucial for foreign MNC's investment decisions.

The above-mentioned approaches reveal some obvious varieties in their intention of measuring globalization, such as:

– to find out a level of global integration of a country ("Globalization Index", "G-Index", World Bank's globalization indicators, OECD's globalization indicators),

– to state a country's position and potential for inward/outward FDI and foreign MNC's investment decisions (UNCTAD's indices, Yip's indicators),

– to find out the effects of domestic and foreign MNC's activities on the performance of a national economy (OECD's globalization indicators), or

– to state the extent and quality of domestic MNC's activities abroad (Fisch's and Oesterle's concept, Dörrenbächer's indicators).

The ascertained varieties notwithstanding, most of the discussed approaches share two main common characteristics: they measure the results[1] and they are based on either a too broad or too narrow comprehension of the globalization of national economies. These characteristics, which we treat as a problem, are mostly the consequence of the complexity of contemporary globalization, which influences and arises from different spheres of national economies. Such complexity hinders the development of a generally accepted theoretical concept about globalization, as well as broader consensus on the intention of measuring globalization. In addition to the theoretical, there are some methodological deficiencies in the above-mentioned approaches as well: either, due to a lack of data, they do not allow for a cross-country empirical analysis to be performed at all (Yip's indicators, Dörrenbächer's indicators), or, the empirical analysis is very limited due to data shortcomings like non-comparability and non-availability (OECD's globalization indicators), or, there are some hesitations about constructing composite indices, such as the weighting procedure ("Globalization Index", "G-Index") and differences in the time-periods of observed data (UNCTAD's indices).

The Joint Research Centre of the European Commission (EC, JRC, 2002) examines the Analytic Hierarchy Process (AHP) as one of the common methodologies for composite indicators development.[2] The AHP[3] has been developed by Saaty (see 1994) as a practical systematic approach for dealing with complexity (Forman and Gass, 2001). The main advantage of AHP is that it is based on pair-wise comparisons. Another advantage of AHP is that unlike many other methods based on Utility Theory, its use for purposes of comparisons does not require a universal scale.

Research Aims and Methodology

Studying the intentions, relevant indicators and methodologies in previous attempts at measuring globalization, and simultaneously treating this problem as a complex one, the aim of this study is to build up a well-grounded theoretical framework for measuring globalization and to set up our own hierarchical model of relevant indicators for its assessment. This paper introduces a multi-criteria method for measuring the globalization of national economies and offers solutions for restructuring the hierarchy of the model, preferred by evaluators of the indicators' importance, to the final hierarchy of the model that allows the consideration of data for all included indicators. The method's intention is to ascertain a country's position and potential for international integration. Our research aim is to establish, analyze and present the positions and potentials of national economies – especially the Croatian one – in different international environments that are interesting for international integration. Furthermore, for the Croatian national economy, our aim is to define (by using this method) key success and failure spheres of its performance in the period of contemporary globalization, and to suggest measures for national economic policymaking.

The method includes some advantages of AHP (see Saaty, 1994), emphasizing establishing priorities for the indicators' importance.[4] Available data are measured by value functions and the direct method. When applying this methodology to measuring the globalization of national economies, we concluded that it should involve the following steps:

– *Problem definition*. The problem is defined with an emphasis on the intention of measuring globalization and in the field of its results' applications as described in the first paragraph of this chapter.

– *Model structuring*. On the basis of the traditional theory of comparative advantages that emphasizes the use of opportunities, expressed by direct indicators, as well as the new theory of competitive advantages, the theory of international

production and several empirical studies that emphasize the potential for global integration of national economies, expressed by the indirect indicators, we researched the theoretical framework for analyzing the globalization of national economies as described in the chapter 'Key Spheres of a National Economy's Performance in Contemporary Globalization.' We set up the hierarchical model of relevant indicators for measuring the globalization of national economies as described in the chapter 'Model Structuring, Data, Measurement and Samples'.

– *Data collecting and measuring*. We used the data about both the direct and indirect indicators, available in international statistical sources. Together with the observed statistical samples, they are delineated in the chapter 'Model Structuring, Data, Measurement and Samples'.

– *Establishing priorities for the importance of the criteria*. On the basis of traditional trade theory, new trade theory (see Bobek and Gusel, 1997), the theory of international production and relevant empirical analyses, experts from economic, business and social sciences compared the importance of the direct indicators with respect to the goal and importance of indirect indicators with respect to each direct indicator by pair-wise comparisons (as described in the chapter 'Instruments and the Procedure for Establishing Priorities'). These judgements were used to obtain the weights of k direct indicators w_m, $m = 1, 2, \ldots, k$, and the weights of q indirect indicators w_{ms}, $m = 1, 2, \ldots, k$, $s = 1, 2, \ldots, q$, in the model, structured for establishing priorities.

– *Hierarchy restructuring and weights (re)calculation*. Since measuring the globalization of national economies not only involves data about indirect indicators that are the lowest level criteria, but also data about direct indicators for the alternatives – national economies must be taken into account; the model's hierarchy is transformed so that both the direct and the indirect indicators are put in one level. Consequently, it was necessary to recalculate weights. Following the judgements on the importance between the direct and the indirect indicators, we obtained the weight of the direct indicators w_D and the weight of the indirect indicators w_I. In the final model's hierarchy, the weights of k direct indicators are obtained by:

$$w_p = w_D w_m, \qquad \text{for each } p = 1, 2, \ldots, k, \tag{1}$$

and the weights of q indirect indicators by:

$$w_p = w_I \sum_{m=1}^{k} w_m w_{ms}, \quad \text{for each } p = k + 1, k + 2, \ldots, k + q, \text{ where } s = p - k. \tag{2}$$

– *Synthesis*. This step is necessary to obtain the final values of globalization measures of national economies.

– *Sensitivity analysis*. It helps define the indicators that need improved performance and verify the assessment of a position and potential of a national economy for international integration.

KEY SPHERES OF A NATIONAL ECONOMY'S PERFORMANCE IN CONTEMPORARY GLOBALIZATION

In the development of a theoretical framework for analyzing the globalization of a national economy, we arise from the ascertainment about the operation of a contemporary national economy: it functions as a complex system of several spheres and attains the most favorable results – higher competitiveness and growth – if all spheres are able to adapt to the requirements of a changed socio-economic environment (Hämäläinen, 2003, 23). The theoretical origins for analyzing the globalization of a national economy from a so-called systemic point of view can be found in the theory of international production (see Dunning, 1997). The importance of the institutions for the operation of a contemporary national economy has been proved in many empirical studies (see Dollar, 2004; Rodrik et al., 2004; WTO, 2004, 180). The arguments for systemic thinking in the field of analyzing globalization derive from the effects of FDI and activities of MNCs on a national economy's growth and development, as well. To achieve benefits in this sphere, the specific level of education, technology, financial market sophistication, macroeconomic stability, institutions' quality, financial discipline, effective fiscal system, developed capital market and regulations' transparentness are necessary (Blomström, 2002).

Many surveys of the world today have confirmed that nations relatively open to trade tend to be more prosperous than nations that are relatively closed. Namely, many empirical studies have tried to verify the relationship between openness and growth (such as Frankel and Romer, 1996; Baldwin, 2003) and some of them have found empirical evidences about the influence of institutions on this relationship (such as Bolaky and Freund, 2004). Furthermore, the paradox of a location's significance in the period of global competition[5] places Porter's (1998) microeconomic concept of national competitiveness in the center of a theoretical framework for studying the globalization of a national economy. Thus, the adequacy of our theoretical approach towards analyzing the globalization of a national economy is additionally confirmed: the globalization of a national economy cannot only be expressed by its position but also by the potential for a response to the demands of the contemporary world economy.

International trade is the most frequently used indicator of the globalization of a national economy. This is mostly due to the fact that, after the Second World War and especially in the nineties, the flows of the international commodity trade have increased approximately twenty times, and international trade in services doubled (UNCTAD, 2003, 78). While explaining international trade flows, we have to consider the important role of *foreign direct investment*; FDI flows have increased by a factor of seven in the period from 1982 to 2002, therefore they are an important generator of economic growth (Svetličič, 2003). New forms of investment and the covering of risks at international capital markets have come into existence. The volume of *portfolio investment* amounted to more than one third of all of international financial flows in the year 2000, whilst its volume in the year 1980 amounted to 20% (see Landefeld and Kozlow, 2003, 2).

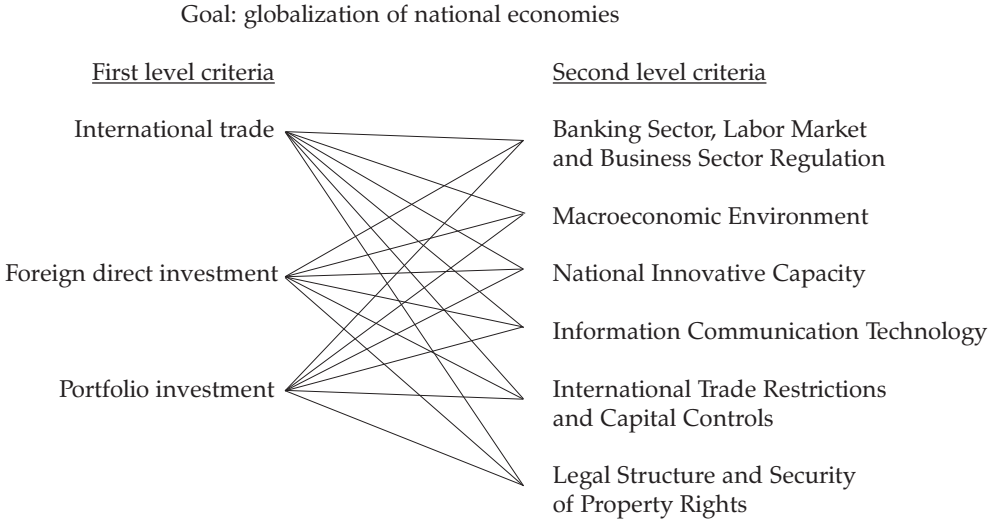
An economy cannot grow unless the *macroeconomic environment* is favorable. Today, most of the middle– and highly-developed countries are conducting very similar macroeconomic policies, which is partly the consequence of more extensive regional integration. However, the microeconomic part of economic development is becoming increasingly important, and is closely related to the operation of companies and to the quality of the factors of business environment (see Porter, 2000, 40). *Restrictions in the banking sector, in the labor market and in the field of entrepreneurship development* limit the economic freedom of a country and therefore its potential for international integration. Countries that strive to achieve a higher level of global integration should build up a competitive and effective banking sector, they should allow market forces to determine wages and they should set up a more flexible employment system, as well as a system of unemployment compensation that preserves the working initiative. *The innovative capacity* of a national economy reveals its readiness for development and the absorption of new technologies. Innovative potential is dependent on former technological sophistication, on human resources, as well as on governmental and business decisions that influence the research and development initiatives and commercial activities for innovations' exploitation. The role of information and their influence over the economy's potential for global integration are increasing. *Information-communication technology* (ICT) is the dominant force that allows companies to develop new products, to exploit new distribution channels and to implement various services. Besides, ICT is an important catalyst for social transformation and progress. *International trade restrictions and capital controls* have an influence on an econo-

my's capability to develop higher forms of international exchange and therefore on its potential for global integration. An ineffective *legal system* weakens the functioning of a market economy, as a basis for a national economy's global integration. If individuals and companies doubt about the application of legal provisions, it will hamper their readiness for business activities.

MODEL STRUCTURING, DATA, MEASUREMENT AND SAMPLES

Following the theoretical framework presented in the previous chapter, we structured the most important indicators for measuring the globalization of national economies into a hierarchy. Direct indicators are defined as the first-level and indirect indicators as the second-level criteria because of common characteristics of (and rules for) the direct indicators. Considering the traditional theory of comparative advantages that emphasizes the use of opportunities (Smith, 1776, 1947; Ricardo, 1817, 1971; Heckscher, 1919, 1949; Ohlin, 1933) and therefore including direct indicators, the new theory of competitive advantages (Porter, 1998; Hämäläinen, 2003), the theory of international production (Dunning, 1997, 2004) and several empirical studies that emphasize the potentials for the global integration of a national economy and therefore including indirect indicators, we structured the problem in Figure 1.

FIGURE 1
The indicators' structure for measuring the globalization of national economies



Source: The developed theoretical framework based on the theories as delineated in Note 4.

We employed conventional and unconventional secondary statistical data bases:

– To measure opportunities, we used data available in international statistical sources (UNCTAD, 2002, 2003; IMF, 2003;

WTO, 2003; CIA, 2004). International Trade is expressed as the export and import of goods and services as a percentage of GDP, Foreign Direct Investment is expressed as inward and outward FDI as a percentage of GDP, and Portfolio Investment is expressed as portfolio investment assets and liabilities as a percentage of GDP.

– To measure a country's potential for global integration, the combined indicators, including so-called soft indicators, must be taken into account. They are expressed as indices that are composed of more, hard and soft components. The Macroeconomic Environment is measured by the macroeconomic environment index[6] (WEF, 2003), National Innovative Capacity is measured by the national innovative capacity index[7] (WEF, 2003), and Information Communication Technology is measured by the network readiness index[8] (WEF, 2003). The Fraser Institute (Gwartney and Lawson, 2004) offers the International Trade Restrictions and Capital Controls ratings,[9] the Banking Sector, Labor Market and Business Sector Regulation ratings,[10] and the Legal Structure and Security of Property Rights ratings.[11]

In this research, the globalization of national economies was measured for the period 2000-2003. From numerical statistical data about direct indicators (see UNCTAD, 2002, 2003; IMF, 2003; WTO, 2003; CIA, 2004) we obtained average values for the period, with available data for each alternative (a national economy). Similarly, averages were calculated and considered as input data about the criteria, expressed as ratings by the Fraser Institute (Gwartney and Lawson, 2004). The alternatives' values, with respect to the direct indicators, were measured by the direct method, whereas with respect to the indirect indicators, expressed as indices, the alternatives were measured by linear value functions with the lowest and the highest values, found in the sample with the original data.

The research was performed in different international environments, interesting for international integration:

1. When studying the position and opportunities of national economies, especially the Croatian one, we began with a larger statistical sample. It includes 36 countries: EU member countries, EU candidate countries and OECD member countries (as of May 1, 2004).[12]

2. To obtain a clearer information basis for thoroughly studying the synthesis results and for the supporting economic policy by sensitivity analysis, we extracted a smaller sample. It includes four EU candidate countries: Bulgaria, Croatia, Romania and Turkey.

INDICATORS' IMPORTANCE

Instruments and the Procedure for Establishing Priorities

Experts from economic, business and social sciences – members of the research project[13] – took part in obtaining the indicators' weights. They were given a questionnaire for establishing priorities by pair-wise comparisons,[14] prepared by following the criteria's structure for establishing priorities in Figure 1 by a group member. When establishing priorities on the indicators' importance by pair-wise comparisons, they used the numerical and verbal intensity levels of AHP.[15] The sequential coordination method[16] was used to obtain the intensity levels presented in Tables 1, 2, 3 and 4, which were used to obtain the weights for the direct and the indirect indicators by AHP; they are written in Table 5 (see Note 3).

Following traditional trade theory, new trade theory, the theory of international production and relevant empirical analyses, the experts assessed and compared the importance of direct indicators with respect to the goal – measuring the globalization of national economies, as shown in Table 1, and the importance of the indirect indicators with respect to each direct indicator by pair-wise comparisons, as shown in Tables 2, 3 and 4. The values of the inconsistency ratio (CR < 0.1) (see (A7) in the Appendix) in Tables 1, 2, 3, and 4 show that evaluators' understanding of the indicators' importance is consistent.

➲ TABLE 1
The comparison matrix of the direct indicators' importance

CR = 0	Foreign Direct Investment	Portfolio Investment
International Trade	1	6
Foreign Direct Investment		7

Source: Questionnaire of the project V5-0810 (see Note 13).

From Table 1, it is evident that Foreign Direct Investment is very strongly more important (numerical intensity level is 7) than Portfolio Investment. The argumentation for this judgement arises from the recognition that there was a substantially bigger swing of FDI in comparison to portfolio investment in the nineties of the last century. Furthermore, this judgement is argumented within the context of the much broader influences (direct and spill-over effects) of FDI and the activities of MNCs respectively over a national economy in comparison to speculative portfolio activities. Other intensity levels can be similarly read by using the verbal representations of numerical judgements (see Note 15).

Table 2 shows, for example, that Macroeconomic Environment is moderately more important than National Inno-

vative Capacity (numerical intensity level is 3) with respect to International Trade. This judgement is based mainly in the context of monetary policy, whose main aggregates – inflation rate, exchange rate and interest rate – should be moderate, stable and balanced to assure the correct distribution of income in international trade.

TABLE 2
The comparison matrix of the indirect indicators' importance with respect to International Trade

CR = 0.05	I2	I3	I4	I5	I6 Legal Structure and Security of Property Rights
I1 Banking Sector, Labor Market and Business Sector Regulation	1	1	1	1/3	1
I2 Macroeconomic Environment		3	4	1/5	1
I3 National Innovative Capacity			1	1/5	1
I4 Information Communication Technology				1/5	1
I5 International Trade Restrictions and Capital Controls					7

Source: Questionnaire of the project V5-0810 (see Note 13).
Note: Meaning of abbreviations: I1 – Banking Sector, Labor Market and Business Sector Regulation, I2 – Macroeconomic Environment, I3 – National Innovative Capacity, I4 – Information Communication Technology, I5 – International Trade Restrictions and Capital Controls, I6 – Legal Structure and Security of Property Rights.

CR = 0.03	I2	I3	I4	I5	I6 Legal Structure and Security of Property Rights
I1 Banking Sector, Labor Market and Business Sector Regulation	3	1	1	3	3
I2 Macroeconomic Environment		1/3	1	1	2
I3 National Innovative Capacity			1	3	3
I4 Information Communication Technology				3	3
I5 International Trade Restrictions and Capital Controls					2

Source: Questionnaire of the project V5-0810 (see Note 13).
Note: For the meaning of abbreviations see the Note of Table 2.

TABLE 3
The comparison matrix of the indirect indicators' importance with respect to Foreign Direct Investment

Table 3 shows that the Banking Sector, Labor Market and Business Sector Regulation is moderately more important than Macroeconomic Environment with respect to Foreign Direct Investment. The general crux of Porter's thesis (Porter, 2000, 40) about the diminishing importance of the macroeconomic environment in the period of contemporary globalization in comparison to the microeconomic part of the development of a national economy is the basis for this intensity level.

CR = 0.03	I2	I3	I4	I5	I6 Legal Structure and Security of Property Rights
I1 Banking Sector, Labor Market and Business Sector Regulation	4	4	3	5	3
I2 Macroeconomic Environment		1	1	2	3
I3 National Innovative Capacity			1	1	1
I4 Information Communication Technology				1	1
I5 International Trade Restrictions and Capital Controls					1

Source: Questionnaire of the project V5-0810 (see Note 13).
Note: For the meaning of abbreviations see the Note of Table 2.

TABLE 4
The comparison matrix of the indirect indicators' importance with respect to Portfolio Investment

From Table 4, it is evident that the Banking Sector, Labor Market and Business Sector Regulation is moderately more important than Legal Structure and Security of Property Rights with respect to Portfolio Investment. Namely, speculative investment has a very narrow interest (to earn a profit at the stock exchange) in companies and national economies, respectively. Thus, the general legal environment of a national economy has very limited importance for this type of investment.

The weights of the criteria in the structure for establishing priorities (Figure 1), obtained by following the intensity levels in Tables 1, 2, 3 and 4 by the adequate computer program (Forman et al., 2000), are written in Table 5. It can be concluded that Portfolio Investment has the lowest weight among the direct indicators. The indicator International Trade Restrictions and Capital Controls has the highest weight among the indirect indicators with respect to International Trade. The Banking Sector, Labor Market and Business Sector Regulation as well as National Innovative Capacity have the high-est weights with respect to Foreign Direct Investment, and the first mentioned indirect indicator has the highest weight with respect to Portfolio Investment.

TABLE 5
Weights in the model, structured for establishing priorities

First Level Criteria		International Trade	Foreign Direct Investment	Portfolio Investment
m		1	2	3
w_m		0.45227	0.47612	0.07161
Second Level Criteria	s	w_{1s}	w_{2s}	w_{3s}
Banking Sector, Labor Market and Business Sector Regulation	1	0.10735	0.25268	0.42224
Macroeconomic Environment	2	0.15973	0.11821	0.15774
National Innovative Capacity	3	0.08037	0.25268	0.11045
Information Communication Technology	4	0.07826	0.2144	0.11614
International Trade Restrictions and Capital Controls	5	0.48143	0.09507	0.09429
Legal Structure and Security of Property Rights	6	0.09285	0.06696	0.09914

Source: Calculated on the basis of Tables 1, 2, 3 and 4.

Restructuring the Model's Hierarchy

To consider the available data about the direct indicators on the first, and the indirect indicators on the second level in Figure 1, the hierarchy of the model in Figure 1 is transformed so that both the direct and the indirect indicators become the first-level indicators as shown in Table 6. The experts (see Note 13) judged that the direct indicators were moderately more important than the indirect ones; therefore the obtained weights are $w_D = 0.75$ and $w_I = 0.25$.[17] Following (1), (2), the weights in Table 5, w_D and w_I, we calculated the weights (presented in Table 6) that were used in the final model, structured for considering available data.

TABLE 6
Weights in the final model, structured for considering available data

Goal: globalization of national economies First level criteria	p	w_p
International Trade	1	0.33921
Foreign Direct Investment	2	0.35709
Portfolio Investment	3	0.05370
Banking Sector, Labor Market and Business Sector Regulation	4	0.04977
Macroeconomic Environment	5	0.03496
National Innovative Capacity	6	0.04114
Information Communication Technology	7	0.03645
International Trade Restrictions and Capital Controls	8	0.06744
Legal Structure and Security of Property Rights	9	0.02024

Source: Calculated on the basis of Table 5.

SYNTHESIS AND SENSITIVITY RESULTS – SUPPORTS FOR NATIONAL POLICYMAKING

Via synthesis (see Note 3), we obtained the value of the globalization measure for each observed country. In Table 7, we summarized the final values of globalization for the first ("larger") sample, and in Table 8 for the second ("smaller") sample – both introduced in the chapter "Model Structuring, Data, Measurement and Samples." The results show that the final value of the Croatian economy's globalization measure is higher than the final values of the globalization measures of, for example, two EU member (Poland and Greece) and two EU candidate countries (Romania and Turkey).

By synthesis with respect to the indicators and sensitivity analysis, we – firstly, defined the key success and failure spheres of national economies in the period of contemporary globalization, and – secondly, verified national economies' positions and potential for international integration by changing the indicators' weights. From the Performance Sensitivity Graph in Figure 2 it is apparent that key success spheres of

the Croatian economy, in comparison with other EU candidate countries, are Portfolio Investment; the Banking Sector, Labor Market and Business Sector Regulation; National Innovative Capacity; Information Communication Technology; and Legal Structure and Security of Property Rights. A detailed explanation can be given by using the results of synthesis with respect to indicators, with which we obtain local values of alternatives[18] (see Table 9). Namely, these results show that the local value of the Croatian economy with respect to Portfolio Investment is 0.518 (the local value of Croatia amounts to 51.8% of the total value of Portfolio Investment among four considered EU candidate countries), to the Banking Sector, Labor Market and Business Sector Regulation 0.375, to National Innovative Capacity even 0.607, to Information Communication Technology 0.429, and to Legal Structure and Security of Property Rights 0.344.

TABLE 7
Final values of the globalization measure – larger sample

1st sample: EU member, EU candidate, OECD member

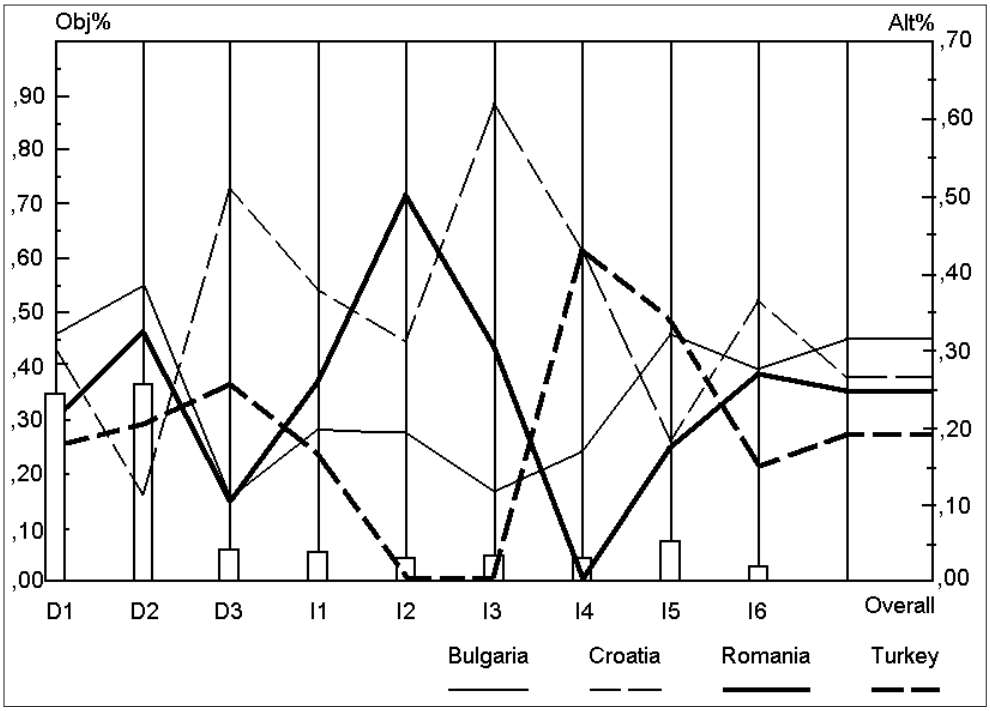
Country	Rank	Final Value	Country	Rank	Final Value
Ireland	1.	0.07669	Portugal	19.	0.02474
Belgium	2.	0.05793	Norway	20.	0.02452
The Netherlands	3.	0.05542	Australia	21.	0.02421
Switzerland	4.	0.04544	Slovenia	22.	0.02188
Estonia	5.	0.03924	Latvia	23.	0.02127
United Kingdom	6.	0.03699	Iceland	24.	0.02068
Sweden	7.	0.03695	Lithuania	25.	0.02065
Denmark	8.	0.03563	Bulgaria	26.	0.01933
Finland	9.	0.03268	USA	27.	0.01922
Hungary	10.	0.03124	South Korea	28.	0.01846
Canada	11.	0.03100	Italy	29.	0.01808
Czech Republic	12.	0.02974	Croatia	30.	0.01606
Austria	13.	0.02911	Poland	31.	0.01474
New Zealand	14.	0.02807	Mexico	32.	0.01439
Spain	15.	0.02695	Greece	33.	0.01423
France	16.	0.02687	Romania	34.	0.01373
Germany	17.	0.02653	Turkey	35.	0.01139
Slovakia	18.	0.02490	Japan	36.	0.01103

Source: Calculated on the basis of Table 6 and the belonging data in UNCTAD, 2002, 2003; IMF, 2003; WTO, 2003; CIA, 2004; WEF, 2003; Gwartney and Lawson, 2004.

TABLE 8
Final values of the globalization measure – smaller sample

2nd sample: EU candidate Country	Rank	Final Value
Bulgaria	1.	0.30846
Croatia	2.	0.25661
Romania	3.	0.24142
Turkey	4.	0.19351

Source: See the Source of Table 7.



Source: Table 9.
Note: Meaning of abbreviations: D1 – International Trade, D2 – Foreign Direct Investment, D3 – Portfolio Investment, for indirect indicators see the Note of Table 2.

FIGURE 2
Performance Sensitivity Graph – smaller sample

From Figure 2 and Table 9, it can also be concluded that Croatian economic policymaking should take additional measures in the fields of Foreign Direct Investment, and International Trade Restrictions and Capital Controls. The local value of Croatia with respect to Foreign Direct Investment is 0.115; it means that Croatia has 11.5% of the Foreign Direct Investment value of four considered EU candidate countries. Our finding is reconciliated with one of the principal goals of Croatian economic policy – modernizing FDI promotion (MGRP, 2004). Furthermore, Croatia has 17.1% of the International Trade Restrictions and Capital Controls value among four considered EU candidate countries. To attract more FDI and activate business, it is indispensable to improve the investment climate in Croatia. There are still high administrative barriers to flows of FDI; foreign business people often encounter lengthy procedures, such as applications for entry visas and work permits for foreign managers and workers, company registration and other procedures for founding a business, business-location problems such as land acquisition, construction permits, usage permit for utility services, etc. These are often perceived as "administrative harassment."

Indicator	Bulgaria	Croatia	Romania	Turkey
International Trade	0.32640	0.29352	0.20771	0.17238
Foreign Direct Investment	0.38111	0.11544	0.30341	0.20003
Portfolio Investment	0.12058	0.51766	0.10597	0.25579
Banking Sector, Labor Market and Business Sector Regulation	0.20833	0.37500	0.25000	0.16667
Macroeconomic Environment	0.20305	0.29442	0.50254	0.00000
National Innovative Capacity	0.12465	0.60665	0.26870	0.00000
Information Communication Technology	0.16518	0.42857	0.00000	0.40625
International Trade Restrictions and Capital Controls	0.31707	0.17073	0.15854	0.35366
Legal Structure and Security of Property Rights	0.25556	0.34444	0.25556	0.14444

Source: See the Source of Table 7.

TABLE 9
Local values of globalization measure – smaller sample

In the context of the real-life problems of the Croatian economy in a broader international economic environment, high unemployment remains the most delicate problem for Croatian economic policy, also in the implementation of structural reforms. The basic preconditions for initiating the turn of tendencies and encouraging the opening of productive work places are political and macroeconomic stability as well as adequately functioning law-governed state. These factors can crucially influence the increase of international competitiveness of the Croatian economy and faster growth of FDI, which are preconditions for both a rise in employment and sustainable economic growth.

In the second part of the sensitivity analysis, where mainly Gradient and Dynamic Sensitivity Graphs were used (see Forman et al., 2000) we verified the assessment of a position and potential of the Croatian economy for international integration by changing the weights of the indicators. Dealing with key failure spheres of the Croatian economy's globalization, we found out, for example, that the weight of Foreign Direct Investment should decrease from 0.357 to 0.202 to put Croatia in first place in the overall globalization ranking among four EU candidate countries. However, dealing with key success spheres of the Croatian economy's globalization we found out, for example, that the weight of Legal Structure and Security of Property Rights should increase from 0.020 to 0.379 to put Croatia in first place in the overall globalization ranking among EU candidate countries.

CONCLUSIONS

In this paper we managed to build up a well-grounded theoretical framework for analyzing globalization and to find an argumentation for the appropriate intention of measuring the globalization of national economies. Together with the already discussed methodological advantages and reliability

of our approach, it can be treated as an attempt towards the diminishing of uncertainties and deficiencies of other approaches (as discussed in this paper) that concern themselves with the measuring of globalization.

In measuring globalization, the multi-criteria method shown in this paper allows users making pair-wise comparisons (as one of the main advantages of the AHP technique) in the model they prefer (where the indirect indicators are sub-criteria of the direct ones), while final values of globalization measures are obtained by considering the data of each indicator included in the hierarchy (and not only the indirect ones on the lowest hierarchy level). The research brings solutions for weights' recalculation as well.

This paper shows that the positions and potentials of national economies in different international environments can be ascertained, analyzed and verified using the multi-criteria method presented here. It allows national economic policy-makers to find the value of a globalization measure for each observed country and to define key success and failure spheres of a national economy in the period of contemporary globalization. With respect to the globalization of national economies, the empirical study's results put the Croatian economy in thirtieth place among 36 observed OECD member countries, EU member and EU candidate countries; for example, it is followed by two EU member countries Poland and Greece. However, among four EU candidate countries, the Croatian economy has the second highest value when it comes to the globalization measurement. For the Croatian national economy, the empirical study defines the key success spheres of its performance in the environment of four EU candidate countries as Portfolio Investment; the Banking Sector, Labor Market and Business Sector Regulation; National Innovative Capacity; Information Communication Technology; and Legal Structure and Security of Property Rights. Following the results of this study, it can be concluded that the failure spheres of Croatian economic policymaking in the period of contemporary globalization are: Foreign Direct Investment, and International Trade Restrictions and Capital Controls. Necessary measures of Croatian economic policy in these fields – like improving the investment climate and reducing administrative barriers – should evolve in the context of solving the real-life problems of the Croatian economy: the basic preconditions for initiating the turn of tendencies and enhancing the opening of productive work places are political and macroeconomic stability as well as adequately functioning law-governed state.

APPENDIX

Résumé of the Objective Mathematics of AHP

Let $z_1, z_2, \ldots, z_k$ be the attributes, i.e. the criteria in the lowest hierarchy level, and $w_1, w_2, \ldots, w_k$ their weights. Further, let us consider:

$$w_1 + w_2 + \ldots + w_k = 1, w_m \geq 0, m = 1, 2, \ldots, k. \quad \text{(A1)}$$

The AHP method is characterized by the hierarchical determination of weights: the sum of the weights of each criteria set in a lower level that initiate from the common criterion of a higher level is equal to 1. The quotations of weights:

$$a_{ij} = \frac{w_i}{w_j}, \; i = 1, 2, \ldots, k, \qquad j = 1, 2, \ldots, k, \quad \text{(A2)}$$

express that the attribute z_i is a_{ij} times more important than the attribute z_j. Following the pair-wise comparisons of criteria's importance, the k-by-k matrix can be written:

$$A = [a_{ij}]. \quad \text{(A3)}$$

Its elements are expressed with (A2). The characteristics of (A3) are:

$$a_{ij} > 0, \; a_{ij} = \frac{1}{a_{ji}}, \; a_{ii} = 1, \text{ and}$$
$$a_{im}a_{mj} = a_{ij}, \; i, m, j = 1, 2, \ldots, k. \quad \text{(A4)}$$

The characteristic (A4) is possible in the case of perfect consistency. The matrix (A3) is consistent if and only if k is its principal eigenvalue and

$$Aw = kw \quad \text{(A5)}$$

(Saaty, 1994). In praxis, perfect consistency is not usual; therefore (A5) is substituted by:

$$Aw = \lambda w, \quad \text{(A6)}$$

where λ is the eigenvalue of (A3) and w is the eigenvector of (A3) that belongs to the eigenvalue λ. The unique solution is calculated for the highest eigenvalue λ_{max} considering (A1). Saaty (1994) defined a consistency index as:

$$CI = \frac{\lambda_{max} - k}{k - 1}.$$

He arrived at an average consistency index for random judgements R for each k and defined the inconsistency ratio:

$$CR = \frac{CI}{R} \tag{A7}$$

When expressing the judgements about the criteria's importance, experts form the upper part of (A3):

$$\begin{bmatrix} a_{12} & a_{13} & \dots & a_{1k} \\ & a_{23} & \dots & a_{2k} \\ & & \vdots & \vdots \\ & & & a_{k-1,k} \end{bmatrix} \tag{A8}$$

When the inconsistency ratio CR is lower than or equal to 0.1, the judgements are generally considered reasonably consistent (see Saaty, 1994).

The synthesis is the process of changing the local priorities of the alternatives using the global priorities of their parent criteria. These are summarized at the model's last level for each alternative. When the criteria are structured in only one level, the final values are obtained by:

$$v(P_l) = \sum_{m=1}^{k} w_m v_m(P_l), \; l = 1, 2, \dots, h, \tag{A9}$$

where $v(P_l)$ is the final value of the l-th alternative, w_m is the weight of the l-th criterion, and $v_m(P_l)$ is the local value of the l-th alternative with respect to the m-th criterion.

NOTES

[1] The exceptions are Yip's, UNCTAD's, Andersen's and Herbertsson's, and Dreher's indicators since they consider a national economy's potential.

[2] It examines also aggregation systems, multiple linear regression models, principal components analysis and factor analysis, Cronbach Alpha, neutralization of the correlation effect, the efficiency frontier, distance to targets, experts and public opinion (EC, JCR, 2002).

[3] For a résumé of the objective mathematics of AHP, see the Appendix. For a detailed explanation see Saaty (1994), Čančer (2003).

[4] Based on the traditional theory of comparative advantages (Smith, 1776, 1947; Ricardo, 1817, 1971; Heckscher, 1919, 1949; Ohlin, 1933), the new theory of competitive advantages (Porter, 1998; Hämäläinen, 2003), the theory of international production (Dunning, 1997, 2004) and empirical studies (Frankel and Romer, 1996; Baldwin, 2003; Bolaky and Freund, 2004; Dollar, 2004; Rodrik et al., 2004; WTO, 2004).

[5] Productive resources can be effectively obtained at global markets or in corporate networks, but the geographic concentration of some specific knowledge-based operations rises.

[6] Composed out of a subindex of general macroeconomic stability (inflation rate, savings rate, interest rate, exchange rate and budget surplus/deficit), international credit ability rating and government consumption as a share of GDP (WEF, 2003).

[7] Composed out of a subindex of the availability of scientists and engineers (shares in total workforce), and subindices of innovative policy, the entrepreneurial environment for innovation, connectedness in the field of innovation and the innovative orientation of companies (WEF, 2003).

[8] Composed out of an environment for ICT, ICT readiness and ICT usage. Subindices of an environment component refer to the market, the political/legal environment and infrastructure. Subindices of the readiness component refer to the ability of individuals, companies and the government to fully exploit ICT potential and subindices of a usage component refer to the level of ICT influence on individuals, companies and government (WEF, 2003).

[9] Based on the components: international trade duties, hidden import barriers and the costs of import and restrictions on the capital market (Gwartney and Lawson, 2004).

[10] Based on the components: ownership and competition in the banking sector, the extent of granted loans to the private sector, the level of interest-rate control, the level of labor market flexibility and administrative conditions for entrepreneurship development (Gwartney and Lawson, 2004).

[11] Based on the components: courts' independence and impartiality and legal system integrity (Gwartney and Lawson, 2004).

[12] Because of unavailable data about some criteria we eliminated Cyprus, Luxembourg and Malta from the initial sample of 39 states.

[13] This investigation is part of the project 'Setting up the Model for the Assessment of the Global Competitiveness of Slovenian Economy' (Project Number V5-0810, 5 members of the project research group, project ordered and financed by Ministry of Higher Education, Science and Technology and Ministry of the Economy, Republic of Slovenia, duration period: October 2003 – October 2005) within the framework of the National Target Research Program 'Competitiveness of the Republic of Slovenia 2001-2006'.

[14] Indicator *i* is (write the intensity level) more important than indicator *j*.

[15] As adapted for this problem from the literature (Forman et al., 2000, 55), the AHP scale for the intensity levels of judgements is as follows: the verbal representation of numerical intensity level 1 is, 'Indicators are equally important'; 3 – 'The considered indicator is moderately more important than the compared one'; similarly: 5 – 'strongly'; 7 – 'very strongly'; 9 – 'extremely'. We can also use the inverse intensity, e.g. 1/3 – 'moderately less important', and intermediate intensity, e.g. 4 – 'moderately to strongly more important'.

[16] Group members reached a certain agreement at each stage of the process of establishing priorities before moving on to the next.

[17] These weights are equal to those that would be obtained by the SMARTER method (Hämäläinen and Mustajoki, 2003) if they had

ranked the direct indicators first, and the indirect second. The above-mentioned group of experts (see Note 13) agreed – in contrast to most of the other approaches towards measuring globalization – that a national economy's institutional set-up is important for an economy's globalization level. They considered the acknowledged thesis (Srinivasan, 2002; Das, 2004) that the domestic environment only underpins globalization.

[18] The sum of the four local values with respect to each considered indicator is 1.

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ČANČER, V., BOBEK, V.,
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A CONTRIBUTION TO...

Doprinos mjerenju i analizi globalizacije nacionalnih gospodarstava

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Članak uvodi višekriterijsku metodu za mjerenje ekonomske globaliziranosti nacionalnih gospodarstava, a cilj je utvrđivanje i temeljito proučavanje položaja države i njezina potencijala za međunarodnu integraciju. Metoda se zasniva na određenim prednostima metodologije analitičkoga hijerarhijskog procesa. Na osnovama tradicionalne teorije komparativnih prednosti, nove teorije kompetitivnih prednosti, teorije međunarodne proizvodnje i određenih empirijskih studija, razvili smo teorijski okvir i postavili hijerarhijski model relevantnih indikatora za mjerenje i analizu globaliziranosti nacionalnih gospodarstava. Članak nudi rješenja za restrukturiranje hijerarhije modela u konačni model koji omogućuje upotrebu svih raspoloživih podataka. Pozicije i potencijali nacionalnih gospodarstava, posebno hrvatskoga, istraživani su u različitim internacionalnim okruženjima zanimljivima za međunarodnu integraciju. U pogledu hrvatske nacionalne ekonomije, ova empirijska studija određuje područja njezina uspjeha i neuspjeha u razdoblju suvremene globalizacije te daje određene prijedloge mjera ekonomske politike.

Ključne riječi: analitički hijerarhijski proces, ekonomska politika, globaliziranost, mjerenje, nacionalno gospodarstvo

Beitrag zur Messung und Analyse der Globalisiertheit von Nationalwirtschaften

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Dieser Artikel führt eine Methode mehrfacher Kriterien zur Messung der Globalisiertheit von Nationalwirtschaften ein mit dem Ziel, die Lage eines bestimmten Staates und seines Potentials zur internationalen Integrierung zu ermitteln und einer gründlichen Untersuchung zu unterziehen. Die Wahl dieser Methode gründet auf bestimmten Vorzügen, die die Methodologie des analytischen Hierarchieprozesses

aufzuweisen hat. Auf der Basis der traditionellen Theorie komparativer Vorzüge, der neuen Theorie kompetitiver Vorzüge, der Theorie der internationalen Produktion und bestimmter anderer empirischer Studien haben die Autoren einen theoretischen Rahmen entwickelt und ein Hierarchiemodell relevanter Indikatoren zur Messung und Analyse der Globalisiertheit nationaler Wirtschaftssysteme aufgestellt. Es werden Lösungen zur Restrukturierung des Hierarchiemodells in ein endgültiges Modell angeboten, welches die Nutzung aller verfügbarer Daten ermöglicht. Position und Potential nationaler Wirtschaftssysteme, zumal aber des kroatischen, wurden in einem jeweils unterschiedlichen internationalen Umfeld untersucht, das für eine internationale Integrierung interessant ist. Im Hinblick auf Kroatien werden Bereiche bestimmt, in denen die kroatische Wirtschaft, im Rahmen der zeitgenössischen Globalisierung, Erfolge und Misserfolge hervorbringen könnte. Die Autoren geben abschließend verschiedene Vorschläge zur Verbesserung der Wirtschaftspolitik.

Schlüsselwörter: Analytischer Hierarchieprozess, Wirtschaftspolitik, Globalisierungsgrad, Messung, Nationalwirtschaft