

# Forgotten Effects in the Comparative Economic Analysis for Spain and Russia in Conditions of Globalization

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**Abstract**— In this study a very useful mathematical method for obtaining the forgotten effects in the field of economic policy is proposed. Globalization and a high level of data volume are the main reasons of using this tool. Comparative analysis of the exterior economic interests of Spain and Russia is considered.

**Keywords**— globalization; economic policy; forgotten effects

## I. INTRODUCTION

Globalization is determined as an increasing integration of different countries into all areas and especially the internationalization of economic activities. The driving forces of this process are the development of technology in transport and communication, the desire of people to take advantage of new opportunities (through trade, migration, investment, etc.) and the reduction of the barriers for international trade and capital flows [1].

The globalization affects differently the development of the countries giving more benefits for the developed members and poorer conditions for the developing countries.

In order to compete in the modern economic conditions both governments and companies are required to take new actions on their macroeconomic policies and business to guarantee an adequacy of their economic decisions.

Permanent changes and a current economic instability require much effort of the managers in the struggle for survival. The leaders of a new generation should know how to use new mathematical tools that offer an optimum solution of the economic and financial problems that can have a modern enterprise or a country, in general.

In this article we limit to study only one tool that allow to solve the problems that appear during a comparative analysis of the economic positions of different countries. New economic situation due to internationalization and global economic crisis generates an increasing flow of information and critical data that is necessary to examine and take into account. The proposed tool is a sure way to avoid losing or leaving without consideration the input data obtained from experts. This method allows finding forgotten effects or incidences of the second generation [2]. Two countries such as Spain and Russia were considered. Basic characteristics of globalization were determined. Actions (causes) that affect the integration of each country into globalization were detailed. Spanish and Russian experts gave their valuations relating to

the preferences that each country has for its economic development.

## II. THE PHENOMENON OF GLOBALIZATION IN THE WORLD ECONOMY

In a rapidly changing world the phenomenon of globalization has stood out significantly changing our vision of the world and culture of other countries, changing political regimes and convulsing a social panorama of the planet.

The definition of the “world economic globalization” was introduced in the late 80’s and early 90’s of the last century. Initially the “globalization” was used to determine a specific phenomenon that meant a union of independent markets for selling the products of the large international companies [3-5].

In the 90’s this term has acquired a new meaning that began to define new characteristics of the development of the global economy and its status [6-9].

The IMF determines the world economy globalization as a “growing economic interdependence of the countries as a result of increased volume and variety of international transactions of goods/ services and flow of global capital, and due to rapid and wide diffusion of technologies” [1,10].

There are several factors that influence globalization such as: competitiveness in the market that affects both domestic and world markets; scientific and technological progress [9]; creation and activity of the transnational corporations in the industrial and financial sectors [11,12]. Globalization process does not eliminate the general laws that govern the economic development of the world that means that there is a lack of uniformity [11,13-15].

As for this article two different countries such as Spain and Russia were considered. Each member has its preferences and interests in economic and political behaviour. The position that each country shows relating to the phenomenon of globalization and its main characteristics are considered.

Globalization has effected significantly the economic development of both countries. For Spain there are the following results: commerce liberalization, integration into European Union, liberalization of foreign investment in Spain and Spanish investment abroad, etc. Russia, despite of its very different economic and social characteristics, could integrate into international economic and political system as any other participant presenting its interests.

### III. FOGOTTEN EFFECTS

Always and at all moment mistakes and oversights have been made as a result of forgetfulness or neglect. Even with the help of the most advanced equipment for data processing and effective means designed to improve human memory and neglect the risk of forgetting will never disappear totally.

When the sequences of incidents, inferences or consequences appear they are usually not treated properly. Often only two or three steps of reasoning are treated. In order to improve the investigation of forgotten effects or oversights computers and adequate mathematical models are used.

These models are usually the graphs with binary values in the arcs or vertices; these graphs can be valued by numbers in  $[0;1]$  or by intervals of confidence of  $[0;1]$ . The Boolean theory, the theory of fuzzy subsets or the "expertons" are used.

The importance of the effects of the second, third, etc. generation is appreciable in all areas of decision making such as political, economic, business, medicine, biology, etc. [16]. Qualitative incidence matrices are used to investigate different mechanisms of cause/ effect that it is not yet possible to find out with the help of intuition or experience; it is possible to create new mechanisms between different sectors in order to transform certain situations [17].

The idea of the effects of the second generation in the socio-economic and ecological fields has been developed by Jean Fourastié. There are the effects that have not been considered during decision making process. These "forgotten effects" become obvious later. It is convenient to detect them in advance and take necessary measures a priori. Using this concept Fourastié developed a method that allows obtain forgotten effects during the decision making process.

It is necessary to mention the following authors that have recently dedicated their research works to the theme of the forgotten effects: [2,18].

### IV. EMPIRICAL STUDY

The objective of this study is to obtain the differences between the countries in the valuation of globalization process. This study shows the different views of the experts relating to the concept of globalization and the actions that influence its basic properties. Creating the cause-effect relations between the properties and actions it was obtained not only an overview of internationalization for each country but also the "forgotten effects" that were significant for the analysis but have not been taken into account.

Globalization is characterized by the following properties (subset *B*), which are effects for this study:

- B1. Integration in international markets
- B2. Increasing of exports/ imports
- B3. Product quality
- B4. New technologies in production processes and management
- B5. Production costs
- B6. Political and economic measures for common progress
- B7. Security in financial transactions
- B8. Competitive position in international markets
- B9. Globalization of science and technology
- B10. Migration processes

The actions that affect the development of the process (subset *A*), which are causes for this case, are the following:

- A1. Establishment of global production networks
- A2. Opening the market to multinational companies
- A3. Modernization of production and communication processes
- A4. Flexibility in adopting tariff policy
- A5. Favourable economic and financial agreements
- A6. Manufacture of high-tech products
- A7. Improving the quality of products and services
- A8. Expansion of trade and transport networks
- A9. Creation and support in the development of research centres
- A10. Cooperation in international projects to promote science and technology
- A11. Adoption of environmental protection policies
- A12. Social protection measures in migration area

The analysis of the relations between each cause and effect gives a  $12 \times 10$  rectangular matrix  $M$  where the cells show the direct impact of each action on each property. The valuations are made using an endecadario system  $\{0;0,1;\dots;1\}$ . A group of Spanish and Russian experts were interviewed in order to obtain the opinions with respect to the relations. The results are the following:

For Spain

$M$	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0,7	0,8	0,5	0,3	0,6	0,3	0,6	0,8	0,5	0,6
A2	0,7	0,7	0,7	0,3	0,7	0,4	0,7	0,3	0,7	0,6
A3	0,7	0,5	0,8	0,9	0,8	0,7	0,4	0,8	0,3	0,1
A4	0,8	1	0,3	0,2	0,5	0,6	0,9	0,7	0,3	0,1
A5	0,9	0,8	0,4	0,6	0,5	0,7	0,8	0,7	0,7	0,6
A6	0,8	0,8	0,7	0,9	0,6	0,7	0,3	0,9	0,8	0,4
A7	0,6	0,7	0,8	0,3	0,3	0,7	0,4	0,8	0,3	0,1
A8	0,7	0,8	0,6	0,2	0,7	0,7	0,7	0,8	0,2	0,6
A9	0,7	0,2	0,3	0,6	0,3	0,7	0,3	0,9	0,8	0,3
A10	0,8	0,4	0,5	0,8	0,3	0,7	0,4	0,4	0,7	0,5
A11	0,7	0,3	0,2	0,3	0,2	0,7	0,1	0,5	0,7	0
A12	0,4	0	0,2	0,3	0,7	0,5	0,3	0	0,4	0,8

For Russia

$M$	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0,8	0,6	0,4	0,3	0,3	0,2	0,4	0,7	0,5	0,4
A2	0,9	0,7	0,6	0,4	0,6	0,4	0,5	0,3	0,6	0,3
A3	0,6	0,5	0,8	0,9	0,8	0,6	0,2	0,7	0,3	0,1
A4	0,6	0,7	0,2	0,1	0,7	0,5	0,6	0,5	0,3	0,1
A5	0,7	0,7	0,2	0,7	0,6	0,6	0,7	0,6	0,6	0,4
A6	0,8	0,8	0,8	0,8	0,6	0,6	0,2	0,9	0,8	0,1
A7	0,7	0,9	0,7	0,2	0,5	0,4	0,1	0,8	0,2	0,1
A8	0,8	0,8	0,8	0,3	0,8	0,4	0,3	0,7	0,2	0,1
A9	0,6	0,3	0,3	0,7	0,3	0,6	0	0,8	0,7	0,3
A10	0,7	0,4	0,7	0,7	0,3	0,7	0	0,6	0,7	0,3
A11	0,6	0,2	0,2	0,3	0,2	0,5	0	0,3	0,3	0
A12	0,3	0	0	0	0,2	0,3	0	0	0	0,5

Let's determine the effect that a cause produces on itself and through another relation effect/ cause, so that in all effects will be accumulated a result of a direct cause and a result produced through an indirect way.

A square matrix  $A$  is made where the "causes" are placed as the rows and columns. The causes represent the actions that have to be done to participate in globalization process. The experts are asked to give their opinions about the incidence of each cause on the others. The valuation is made in  $[0;1]$ .

For Spain

A	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	1	0,7	0,6	0,5	0,8	0,4	0,3	0,7	0,1	0,2	0,3	0
A2	0,7	1	0,4	0,7	0,7	0,6	0,7	0,7	0,1	0,6	0	0,4
A3	0,6	0,2	1	0	0,4	0,6	0,8	0,2	0,2	0,4	0,4	0
A4	0,7	0,6	0,4	1	0,6	0,1	0,5	0,7	0	0,3	0	0
A5	0,8	0,8	0,7	0,7	1	0,6	0,2	0,8	0,4	0,7	0	0,5
A6	0,5	0,3	0,8	0,3	0,2	1	0,8	0,2	0,6	0,7	0,3	0
A7	0,2	0,1	0,7	0,1	0,1	0,2	1	0,2	0,5	0,2	0,3	0
A8	0,6	0,2	0,4	0,3	0,1	0	0,6	1	0,1	0,2	0,3	0,2
A9	0,3	0,1	0,7	0,1	0,6	0,7	0,6	0	1	0,8	0,5	0,6
A10	0,3	0,2	0,8	0,2	0,6	0,8	0,7	0	0,8	1	0,6	0,6
A11	0,2	0,1	0,6	0	0,4	0,2	0,5	0	0,5	0,7	1	0
A12	0,1	0	0	0	0,3	0	0	0	0,5	0,6	0	1

For Russia

A	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	1	0,7	0,7	0,4	0,6	0,3	0,3	0,5	0,1	0,2	0,3	0
A2	0,6	1	0,6	0,5	0,6	0,4	0,5	0,6	0,1	0,5	0	0,2
A3	0,5	0,1	1	0	0,4	0,6	0,8	0,2	0,2	0,4	0,4	0
A4	0,6	0,5	0,5	1	0,4	0	0,3	0,5	0	0,2	0	0
A5	0,7	0,7	0,6	0,5	1	0,4	0,4	0,6	0,4	0,6	0	0,3
A6	0,5	0,3	0,7	0,1	0,2	1	0,7	0,2	0,6	0,7	0,3	0
A7	0,2	0	0,7	0	0,1	0,2	1	0	0,5	0,2	0,3	0
A8	0,7	0,4	0,3	0,1	0,1	0	0,5	1	0,1	0,2	0,3	0,2
A9	0,4	0,2	0,7	0	0,4	0,4	0,4	0	1	0,7	0,5	0,4
A10	0,3	0,2	0,8	0,1	0,4	0,5	0,5	0	0,8	1	0,6	0,5
A11	0,1	0	0,5	0	0,2	0,1	0,3	0	0,4	0,5	1	0
A12	0,3	0	0	0	0,1	0	0	0	0,3	0	0	1

A new square matrix  $B$  is made by means of fuzzy cause-effect relations where both rows and columns represent "effects" taken from the matrix  $M$ . The experts are asked to give their opinions about the impact of each effect on the others.

For Spain

B	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
B1	1	0,9	0,7	0,7	0,6	0,8	0,7	0,8	0,8	0,6
B2	0,9	1	0,5	0,7	0,8	0,4	0,7	0,9	0,4	0,3
B3	0,4	0,6	1	0,8	0,7	0	0	0,8	0,5	0
B4	0,8	0,7	0,7	1	0,6	0,5	0	0,9	0,6	0
B5	0,7	0,5	0,6	0,6	1	0,2	0	0,7	0,2	0
B6	0,8	0,6	0,6	0,7	0,5	1	0,8	0,9	0,8	0,3
B7	0,8	0,8	0	0	0	0,8	1	0,8	0,7	0
B8	0,9	0,9	0,8	0,9	0,7	0,8	0,8	1	0,8	0,2
B9	0,8	0,8	0,7	0,6	0,6	0,7	0	0,8	1	0,5
B10	0,4	0	0	0	0	0,4	0	0,4	0	1

For Russia

B	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
B1	1	0,7	0,6	0,5	0,6	0,7	0,7	0,7	0,7	0,5
B2	0,7	1	0,3	0,5	0,6	0,4	0,4	0,7	0,4	0,3
B3	0,3	0,4	1	0,7	0,7	0	0	0,6	0,5	0
B4	0,6	0,6	0,7	1	0,6	0,4	0	0,7	0,6	0
B5	0,5	0,5	0,5	0,6	1	0,2	0	0,6	0,2	0
B6	0,6	0,4	0,6	0,7	0,3	1	0,6	0,7	0,6	0,3
B7	0,7	0,5	0	0	0	0,6	1	0,7	0,5	0
B8	0,8	0,6	0,6	0,8	0,6	0,7	0,6	1	0,8	0,2
B9	0,7	0,7	0,4	0,5	0,4	0,6	0	0,7	1	0,3
B10	0,2	0	0	0	0	0,2	0	0,4	0	1

Basing on the fuzzy matrixes of incidence such as  $M$ ,  $A$  and  $B$  and in order to get accumulated effects of the 1 and 2 generation a new fuzzy matrix of incidence  $M^* = A \circ M \circ B$  is obtained by maximin convolution between  $M$ ,  $A$  and  $B$ . The results are the following:

For Spain

M*	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,6
A2	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,6
A3	0,8	0,8	0,8	0,9	0,8	0,8	0,8	0,9	0,8	0,6
A4	0,9	1,0	0,7	0,7	0,8	0,8	0,9	0,9	0,8	0,6
A5	0,9	0,9	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,6
A6	0,9	0,9	0,8	0,9	0,8	0,8	0,8	0,8	0,9	0,8
A7	0,8	0,8	0,8	0,8	0,7	0,8	0,8	0,8	0,8	0,6
A8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,6
A9	0,9	0,9	0,8	0,9	0,7	0,8	0,8	0,9	0,8	0,6
A10	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,6
A11	0,7	0,7	0,7	0,7	0,6	0,7	0,7	0,7	0,7	0,6
A12	0,7	0,6	0,6	0,6	0,7	0,6	0,6	0,7	0,6	0,8

For Russia

M*	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0,8	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,5
A2	0,9	0,7	0,6	0,6	0,6	0,7	0,7	0,7	0,7	0,5
A3	0,8	0,8	0,8	0,9	0,8	0,7	0,7	0,8	0,8	0,5
A4	0,7	0,7	0,6	0,6	0,7	0,6	0,6	0,7	0,6	0,5
A5	0,7	0,7	0,7	0,7	0,6	0,7	0,7	0,7	0,7	0,5
A6	0,8	0,8	0,8	0,8	0,7	0,7	0,7	0,9	0,8	0,5
A7	0,8	0,9	0,7	0,8	0,7	0,7	0,7	0,8	0,8	0,5
A8	0,8	0,8	0,8	0,7	0,8	0,7	0,7	0,7	0,7	0,5
A9	0,8	0,7	0,7	0,8	0,7	0,7	0,7	0,8	0,8	0,5
A10	0,8	0,7	0,8	0,8	0,8	0,7	0,7	0,8	0,8	0,5
A11	0,6	0,6	0,6	0,5	0,6	0,6	0,6	0,6	0,6	0,5
A12	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,3	0,5

To find the effects of the 2 generation let's separate from accumulated effects of  $M^*$  the direct effects given in  $M$ . In this case a simple algebraic difference  $M^* - M$  is made.

For Spain these cells are the following: (9;2) the effect of "Creation and support in the development of research centres" on "Increasing of exports/ imports" with 0,7; (12;8) the effect of "Social protection measures in migration area" on "Competitive position in international markets" with 0,7; (8;4) the effect of "Expansion of trade and transport networks" on "New technologies in production processes and management"

with 0,6; (8;9) the effect of "Expansion of trade and transport networks" on "Globalization of science and technology" with 0,6; (11;7) the effect of "Adoption of environmental protection policies" on "Security in financial transactions" with 0,6; (11;10) the effect of "Adoption of environmental protection policies" on "Migration processes" with 0,6; (12;2) the effect of "Social protection measures in migration area" on "Increasing of exports/imports".

For Russia these cells are the following: (9;7) the effect of "Creation and support in the development of research centres" on "Security in financial transactions" with 0,7; (10;7) the effect of "Cooperation in international projects to promote science and technology" on "Security in financial transactions" with 0,7; (7;4) the effect of "Improving the quality of products and services" on "New technologies in production processes and management" with 0,6; (7;7) the effect of "Improving the quality of products and services" on "Security in financial transactions" with 0,6; (7;9) the effect of "Improving the quality of products and services" on "Globalization of science and technology" with 0,6; (11;7) the effect of "Adoption of environmental protection policies" on "Security in financial transactions" with 0,6.

For Spain  $M^* - M$

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0,1	0	0,3	0,5	0,2	0,5	0,2	0	0,3	0
A2	0	0	0	0,4	0	0,3	0	0,4	0	0
A3	0,1	0,3	0	0	0	0,1	0,4	0,1	0,5	0,5
A4	0,1	0	0,4	0,5	0,3	0,2	0	0,2	0,5	0,5
A5	0	0,1	0,4	0,2	0,3	0,1	0	0,1	0,1	0
A6	0,1	0,1	0,1	0	0,2	0,1	0,5	0	0	0,2
A7	0,2	0,1	0	0,5	0,4	0,1	0,4	0	0,5	0,5
A8	0,1	0	0,2	0,6	0,1	0,1	0,1	0	0,6	0
A9	0,2	0,7	0,5	0,3	0,4	0,1	0,5	0	0	0,3
A10	0	0,4	0,3	0	0,5	0,1	0,4	0,4	0,1	0,1
A11	0	0,4	0,5	0,4	0,4	0	0,6	0,2	0	0,6
A12	0,3	0,6	0,4	0,3	0	0,1	0,3	0,7	0,2	0

For Russia  $M^* - M$

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A1	0	0,1	0,3	0,4	0,4	0,5	0,3	0	0,2	0,1
A2	0	0	0	0,2	0	0,3	0,2	0,4	0,1	0,2
A3	0,2	0,3	0	0	0	0,1	0,5	0,1	0,5	0,4
A4	0,1	0	0,4	0,5	0	0,1	0	0,2	0,3	0,4
A5	0	0	0,5	0	0	0,1	0	0,1	0,1	0,1
A6	0	0	0	0	0,1	0,1	0,5	0	0	0,4
A7	0,1	0	0	0,6	0,2	0,3	0,6	0	0,6	0,4
A8	0	0	0	0,4	0	0,3	0,4	0	0,5	0,4
A9	0,2	0,4	0,4	0,1	0,4	0,1	0,7	0	0,1	0,2
A10	0,1	0,3	0,1	0,1	0,5	0	0,7	0,2	0,1	0,2
A11	0	0,4	0,4	0,2	0,4	0,1	0,6	0,3	0,3	0,5
A12	0	0,3	0,3	0,3	0,1	0	0,3	0,4	0,3	0

These causal relations have not been taken into account by the experts, it is the case for the cells with 0,7 level or have been considered too weak, the case of the cells with 0,6 level.

The results of the maximum accumulated incidence or the optimal way of incidence of the cause  $a_i$  to the effect  $b_j$  for two countries are the following.

For Spain: A9-A9-B8-B2; A12-A12-B5-B8; A8-A8-B8-B4; A8-A8-B8-B9; A11-A11-B1(B6)-B7; A11-A11-B1-B10; A12-A12-B1(B4,B6,B9)-B2.

For Russia: A9-A9-B1-B7; A10-A10-B1-B7; A7-A7-B8-B4; A7-A7-B1-B7; A7-A7-B8-B9; A11-A11-B1-B7.

## V. CONCLUSIONS

The technique proposed in this study for recovering forgotten effects in the field of foreign economic policy of a country such as the valuation of actions aimed at its integration within a global commercial and socio-political framework has obtained a wide interest.

The necessity of a precise analysis of the exterior position of a cooperating country and the preferences in the policies aimed at its incorporation into a common market is one of the most complex and unavoidable target.

This model specifies the actions/causes that should be performed and that would result in a higher accumulated incidence to the aspects that are proper for each country in its foreign economic policy.

This tool for an economic analysis could be used both in government macroeconomic policy and in a small company that plans to do an economic cooperation with other countries.

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