MODELS OF DECISION-MAKING UNDER CONDITIONS OF RISK

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Abstract

Economic activity is subject to risks. The risks will be manifested regardless of the period and the activity carried out. However, we need to make decisions that support economic (macroeconomic) developments whether or not risks arise.

Here, for example, are phenomena that happen and that determine the reduction of economic results. We can mention the economic-financial crisis we can consider the restriction of the activity or the abdication from the fundamental law of the market, i.e. the correct ratio that must be established in the market between supply and demand. All this shows that special risks can occur.

Here, another risk is that of the migration of a significant number of people from Romania, who have found jobs, usually seasonal, in other markets, based on the European Union Directive on free movement of persons.

From this point of view, decision-making must be based on knowledge of the risks, the conditions for triggering them and how action can be taken to mitigate those effects which can be triggered easily.

In this article, the aim was to substantiate the conditions under which decisions can be taken in the face of economic or macroeconomic risks.

For this we used a methodology based on logic, the correlation between statistical variables, the occurrence of surprising events, all studied using the index method and the comparison method in time and space.

Models of decision-making in risky conditions have become a necessity today in the sense that no analysis and no perspective plan can avoid the existence and occurrence of risks over time, a context in which it is necessary to study the conditions in which these decisions must be made.

Keywords: *risk, crises, economic results, decisions, models and statistical methods*.

JEL classification: *C13, J20, J60*.

Introduction

This article focuses primarily on the analysis of decision-making under operational and financial risk, as a result of assessing the underlying risks, such as money laundering, financing of extremist activities or the risk of migration.

I have given only a few of these and explained them in detail in the article to find that the dynamics and mobility of the workforce within the European Union are particularly important but are also complicated by the fact that they are subject to European Union directives , clearly, the free movement of goods and persons. From this point of view, a series of risks appear in trade, a series of divergences between the participating states appear in intra-community relations, all of them being subordinated to a risk.

Migration is tracked, but it concerns two distinct sides. Economic migration from some less developed countries, with a lower income system to other much better organized markets. Migration within the European Union is foreshadowed in the future by 2060 at an increase and this is also associated with a possible migration from the continents of Africa and even Asia, which will cause some inconvenience to the population of the European continent.

The article discusses extensively and proposes the statistical, mathematical and econometric relationships that must be taken into account in conducting studies on risk-taking decision-making. Making decisions at risk is an imperative necessity of the present. It is essential to identify the nature of the risk, the association with other risks and then the estimation on a precise basis of the losses that may be associated with the onset and manifestation of these risks.

The article includes some graphs and tables that are important from the point of view of analysis, to form the image of the possibility of risks and, hence, the need to calculate the parameters based on which to limit these risks that I mentioned.

Literature review

Micro or macroeconomic management involves decision-making, in accordance with the provisions of the forecasted studies, so as to ensure the most consistent economic growth. It is known that the evolution of any socio-economic phenomenon is accompanied by the appearance of risks. These risks are triggered when certain conditions arise. Therefore, in establishing the strategies of economic and social evolution, attention must be paid to identifying the possibility of these risks and to provide for mitigation measures, if not to avoid the occurrence of foreseeable risks. In this sense, a number of specialists, researchers or academics have paid attention to the study of

these aspects, the occurrence and manifestation of risks, the creation of the framework so that decisions are taken in risky conditions. Anghelache, C., Anghel, M.G., Deacon, A. and Lilea, F.P. (2017) published an extensive study on operational risk, addressing issues regarding the use of analysis and control models to predict the onset of this risk, while providing control measures to limit the effects. Anghelache, G.V., Bodo, Gv. and Soica, R. (2019) published a study on the analysis of banking risks and dealt with the statistical-econometric possibilities of identifying and limiting them, according to the provisions of the Basel Accords. In turn, Blum, J. (2010) published an article dealing with the analysis of the provisions of the Basel II Agreement, in terms of measures to be taken to avoid and limit the effects of banking risks. Blundell-Wignall, A. and Atkinson, P. (2010) paid attention in a study conducted to the need to analyse the provisions of the Basel III Agreement in order to take measures to limit the size of capital depending on existing market liquidity. Diaconu, A., Avram, D., Badiu, A., Burea, A. and Popovici, M.D. (2017) dealt in an article with operational risk analysis, and Hurduc, N. (2011) conducted an extensive study on Basel III standards on capital consolidation in the banking system, to prevent the onset of specific risks. Also, Manole, A., Anghel, M.G. and others (2016) published an analysis of financial risk analysis models. Of course, other authors, domestically and internationally, have paid attention to the study of these issues.

Methodology, data, results and discussions

We will analyse decision-making under operational and financial risk as a result of assessing the risk of money laundering and terrorist financing in Romania as a result of migration between 2008-2018. We will also further analyse a socio-economic component that produces and generates in the chain, like a harmonic oscillator, a series of risks with major macroeconomic implications. Although it has existed since the beginning of mankind, registering in time only new changes and forms, migration, as a right to move has been recognized worldwide by adopting the Universal Declaration of Human Rights.

Free movement of labour was one of the first rights granted to citizens of the Member States of the European Union.

If initially following the Treaty of Rome of 1957, which laid the foundations of the European Economic Community consisting of the six founding states, there has been a significant increase in migration within it, due to the large number of Italian workers, who in the years' 60 were moving to the other five Member States, the Amsterdam Treaty would change the perception of ensuring the free movement of persons.

Subsequently, it was decided to create an area of freedom, security and justice at the level of the European Union, within the Tampere European Council (1999).

The next important moment to be noted in terms of immigration policy was the Hague Program.

Community policy on migration, equal treatment and the promotion of diversity has been governed by Directive 2000/43 / EC5 and Directive 2000/78 / EC6 respectively.

In Romania there were three periods of high intensity migration, respectively:

• between 1971-1981, an internal migration when over two million people migrated from the village to the city.

• immediately after 1989, when about 100,000 Saxons and Swabians in just three years emigrated permanently to Germany.

• the post-December emigration abroad, temporary or for indefinite periods of time has known a special magnitude with the elimination of visas for Romanians in the Schengen area, reaching in 2018 the threshold of 5.5 million Romanians.

United Nations experts say in a report that Romania has the fastest growth rate of migrants in a state that has not faced a war.

According to the National Institute of Statistics (INS), in recent years the population of Romania has steadily decreased, reaching that in 2014 there are less than 20 million inhabitants, identical to the existing population in 1966.

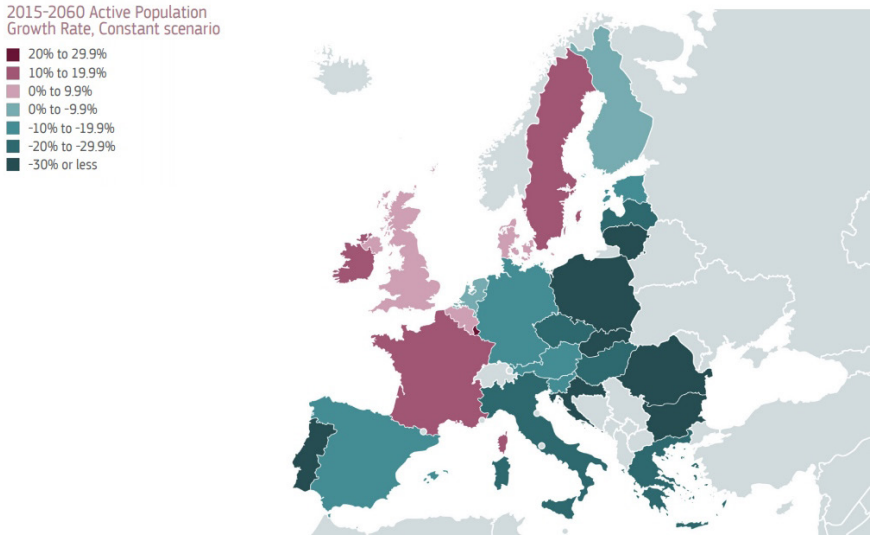
A real effect of migration, with major risks and implications at the macroeconomic level, is the demographic decline.

A recent report by the European Commission presents a series of demographic scenarios, the effect of population migration both in Romania and in other countries within the EU.

Regarding Romania, in the case of maintaining the population of approximately 200,000 emigrants per year, the population would be reduced to 13.8 million, respectively a loss of 30% of pollution by 2060, compared to 19.7 million in 2015.

Migration dynamics and labour mobility within the European Union

Graph 1



Source: Eurostat and CEPAM

The Organization for Economic Co-operation and Development (OECD) presented in Berlin a new study on global migration, its impact and effects in countries of origin and emigration, categorizing migration as a result of globalization.

Scenario of migration dynamics within the European Union between 2015-2060

Chart 2

Relative population change (in %) between 2015 and 2060 (projection) in selected EU Member States, by scenario

Note: Countries are ranked by the relative importance of the impact of intra-EU mobility on their population (double intra-EU mobility scenario – no intra-EU mobility scenario) from positive to negative.

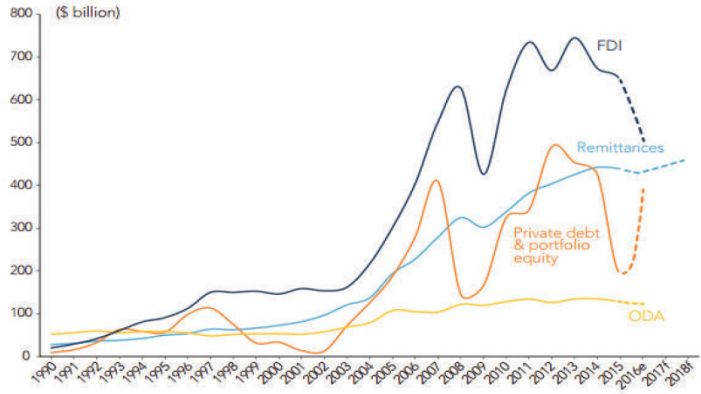
Source: Eurostat and CEPAM

A complex definition of migration is given by the World Bank. In the case of countries of origin, evolved macroeconomic policies are needed to overcome the effects of labour migration.

Remittances are a consequence of migration, being strongly rooted in time, observing their importance and economic benefits.

Evolution of the volume of remittances, development funds and private capital flows

Chart 3

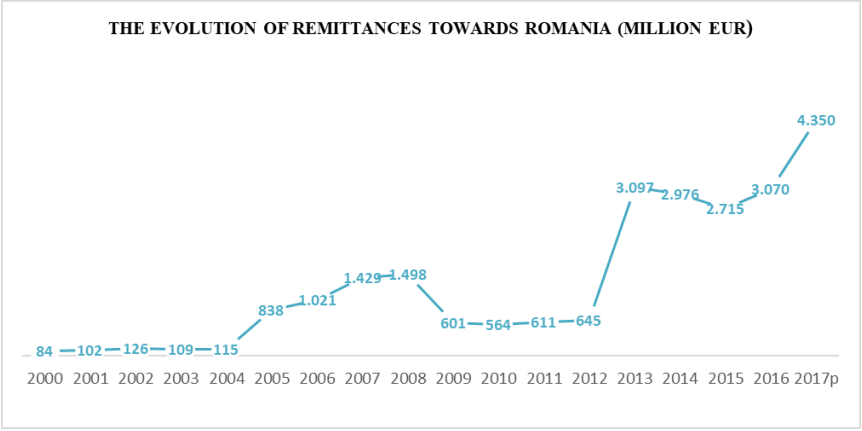


Sources: World Bank staff estimates; World Development Indicators. See annex A for data and forecast methods. Note: FDI=foreign direct investment; ODA=official development assistance.

The increase in the value of remittances has been achieved over time. Romania is among the countries of the European Union, with a percentage of 39% of the non-banked population and 40% representing people at risk of poverty, considered to be the highest percentages of an EU state.

The evolution of remittances to Romania

Chart 4

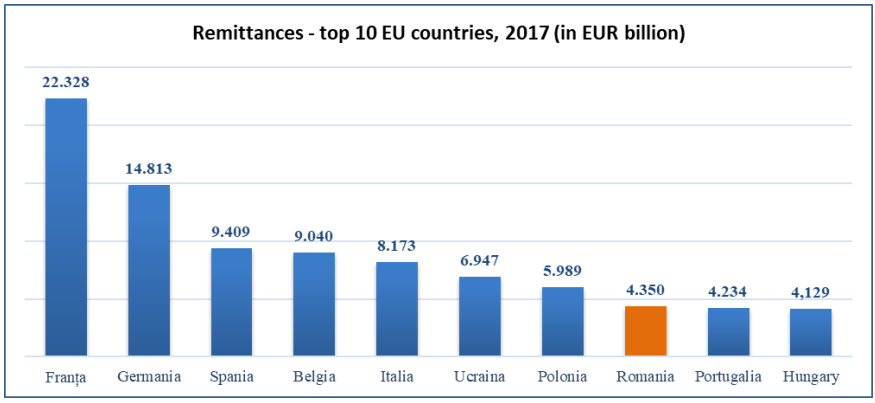


Source: World Bank, remittance flow, Bilateral Remittance Matrix 2017

Romania is in the top 10 EU countries in terms of the volume of remittances received.

Top 10 EU countries by volume of remittances received in 2017

Chart 5



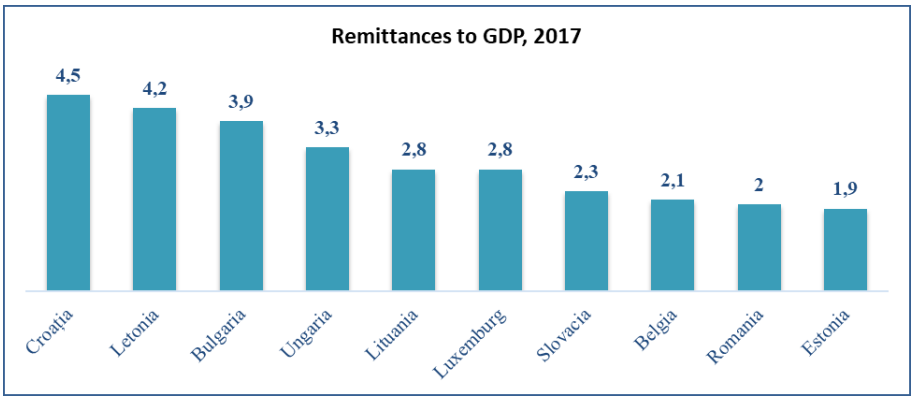
Source: World Bank - Bilateral Remittance Matrix, 2017

As can be seen in the previous graph, in which Romania's position was highlighted especially in another colour, we occupy the eighth place with a total annual volume of remittances, in 2017, of 4.350 billion euros.

This important source of external funds for the Romanian economy in 2017 represented 2% of GDP:

Remittances relative to GDP, in 2017

Chart 6



Source: World Bank, World Development Indicators, remittances as% of GDP, 2017

Poverty is a complex phenomenon and a number of factors that influence the poverty of an individual or the entire household deserve to be studied in order to better understand this concept. The main determinants of poverty are economic, social or demographic in nature and need to be analysed at the country and especially region level, as there are differences in the poverty indicators present in a developed country compared to those in the developing country. .

Poverty measurement involves a detailed and different analysis, the selection of appropriate indicators and their interpretation must be carefully done so that the results reflect as realistically as possible the situation of a person, a household and not only, an entire region. Poverty reduction policies can thus be adopted depending on existing pressures at regional level.

Traditional poverty measures use various monetary indicators, but non-monetary ones help to understand poverty as a whole.

➢ ***Methods of measuring poverty***

Poverty measurement methods include:

• incidence of poverty - percentage of the population that cannot buy their daily basket. The calculation relationship is:

$$H = \frac{q}{n},$$

where: H (headcount index), n –total population, q - poor population

• depth of poverty - estimates the resources to bring the poor to the stable poverty line:

$$PG = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z-y_i}{z}\right],$$

where y- represents the income or expenses of the household; z - the poverty line set

• severity of poverty - expresses the inequality between poor people and the established poverty line:

$$P2 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z-y_i}{z}\right]^2,$$

the formula used is individual.

Thus it is used to determine both the impact of remittances on economic developments and poverty reduction.

We mention a series of indicators that denote the impact of remittances on poverty reduction and implicitly on economic growth. Among the main macroeconomic determinants of remittances are: macroeconomic factors, income level in the host country, income level in the country of origin, inflation in the country of origin, interest rate and exchange rate.

We use the following relationships to estimate the impact of remittances:

$$Y_{i,t} = \beta_1 R_{i,t} + \beta_2 X_{i,t} + \alpha_i + u_{i,t}$$
$$P_{it} = f(R_{it}, Y_{it}, I_{it}, O_{it}, \pi_{it})$$

where: i represents the country and t the time period,
Y_{it} logarithm of GDP / capita,
$R_{i,t}$ remittance rate in GDP.

Matrix X, is a set of control variables, having an influence on economic growth and development, respectively:

- inflation π_{it}, measured as an annual percentage change in the consumer price index;
- opening O_{it} for international trade;
- other GDP flows, measured as the ratio between capital inflows and GDP
- P_{it} – poverty measured as a logarithm

• I_{it} - investment measured as logarithm of gross capital formation (percentage of GDP):

$$P_{it} = f(R_{it}, Y_{it}, I_{it}, O_{it}, \pi_{it})$$

The effect of remittances on poverty alleviation can be estimated by quantifying expenditures by estimating the function:

$$Log(u_i) = \alpha + \sum \beta_j X_{ij} + \varepsilon_i$$

where: $\mathcal{E}_i$ – is the independent error, with normal distribution;
ui – represents the expense / capita;
X_{ij} – vector explanatory variables on migrant remittances and economic shocks that may occur.

It has been statistically shown that the greater or lesser amounts of money sent weekly / monthly / annually, by emigrants, following work abroad, families left at home can also contribute to economic development, but can also be subject to operational risk / less known and publicized financial laundering, or in some cases unwanted terrorist financing.

This phenomenon, more and more present in our lives, is also known and monitored by Romania, which applies the European directives transposed both in Law no. 129 / 11.07.2019 and in Law no. 656/2002.

In applying these regulations, IP-type institutions (payment institutions) that provide money transfer services must assess the risk posed by the two laws for the company's operations and decide how to mitigate it. Risk assessment is the analysis of potential hazards and vulnerabilities from this perspective to which the institution providing this type of service is exposed.

➢ ***The risk of preventing and combating money laundering***

A comprehensive risk prevention and anti-money laundering risk assessment (PCSB) to assist the management of a payment institution in recognizing and assessing the inherent risks associated with its money transfer services, in order to develop policies and procedures to limit these risks and the effective management of residual risks requires the development of PCSB policy manuals and procedures, which is a key outcome of this process, which will be updated regularly, annually or whenever legislative changes occur.

The inherent risk is the risk associated with a business, product, service, customer or geographical location before the existing control measures are implemented.

Preventive controls are implemented to limit the inherent risk. These consist of CC (Client Knowledge) and Supplemental Client Knowledge (MSCC) policies and procedures detailed in the Money Laundering Prevention and Control (PCSB) policy manuals and procedures, together with their application to staff (training, examinations) offsite / onsite, stress tests) and technology (evaluation of system filters and operating rules, real-time monitoring of transactions).

Inherent risk - Preventive controls = Residual risk

Residual risk is the risk that remains after the implementation of preventive controls.

A risk-based approach is one of the most effective ways to protect against money laundering and terrorist financing.

A key objective of PCSB policy manuals and procedures is to establish risk-based preventive controls through CC and MSCC in order to reduce residual risks as much as possible.

Conclusions

From the study and analysis of the aspects contained in this article, a series of conclusions can be drawn. First of all, the whole activity, not only the economic one but also the daily one, is subject to risks. Risks occur by chance, usually when there are causes that can trigger them, stimulate them.

In this sense, an important element in micro and macroeconomic management strategies is to make an anticipated study of the possibility of risks, trigger times, the effects they propagate, and then establish measures to prevent the onset of risks or at least the effects that the risks entail.

Decisions made at risk are according to Turkey's conception, which says that crime at the level of a society also appears to be normal, a normality, i.e. those risks will be triggered and evolve, conjugate and produce negative effects on the results obtained in the economic or macroeconomic system. Therefore, the conclusion that emerges is that the study of the spread of risks is not sequential but a continuous process, which must be taken into account at every moment when special operations are initiated, operations that can bring negative effects on the national economy.

Another conclusion is that, as a rule, many of these causes that determine the risks are represented by the managerial activity itself, which is often not subordinated to the purpose of ensuring a smooth evolution but, through certain measures, can determine some generating causes, determinants of risks.

For example, because this issue is still relevant, the budget rectification and the redirection of additional amounts in territorial profile is not done according to a calculation algorithm that highlights the needs of each local community, the possibilities of intervention and, in this way, to mitigate the occurrence of risks. These allocations by rectification are made after a series of small interests, although they appear large in front of others, political, social or perhaps out of sentimentality.

That is why preventing and combating money laundering is a necessity to eliminate this scourge that manifests itself at the macroeconomic level or perhaps at the microeconomic level.

Finally, we can recall that the residual risk is the risk that remains after an implementation of preventive controls, which are done accurately, but still cannot identify all the conditions and possibilities of risks.

From this point of view, going back to the title, we have to weigh a lot, so that when we make decisions we have to keep in mind the maintenance of known or unknown risks that may be triggered in the future.

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