

# THE IMPACT OF THE INSTITUTIONAL DETERMINANTS OF THE INFORMATION EFFICIENCY ON THE FINANCIAL MARKETS

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## **Abstract:**

*Our research is based on two pillars: the institutional quality and the information efficiency. We consider that there is a link between these two variables and they strongly influence each other. Both variables are unobservable, latent variables, and their measurement cannot be done directly, but through some estimators. Arguments such as portfolio management, capital flows, financial stability lead us to affirm that solving problems economically is not enough in order to have an efficient information market, and here comes the important role of the institutions that have to ensure quality. We aim to empirically test and present the link between the information efficiency index and the quality of the public institutions.*

**Keywords:** *efficiency, public institutions, quality, bayesian method*

**JEL Classification:** *C11, D02, D6, D40, D53, G28, O43*

## **Introduction**

According to lately literature, the institutions "provide" the rules of the game in a society in the sense that they succeed in establishing a potential for long-term growth, equilibrium and efficiency in a country. As a rule, countries with positive aspects of the rule of law are powerful countries where the business climate is favorable, with property rights and social norms being market-friendly. Attracting investment, the efficient use of human capital, they are both aspects that result from an increase of long-term performance. The quality of an institution depends on several aspects, ranging from the country's history, geography, ethnicity, and natural resources. Often, all these aspects cannot be influenced by the political decisions that are being made.

Also, taking into account the historical aspects, we can say that in some cases it is necessary to look behind for a full understanding of the impact resulting from actions that are nowadays felt. The institutions require a longer maturing time, and the dependence of a state, for example, it is felt long after it goes into another stage. According to Chanda and Putterman (2007), countries with a longer history of self-government are more likely to have better-developed economic institutions. There is an index measuring "the history of self-government," i.e. the duration of each country's independent statehood.

Another aspect mentioned above, that can diminish the result of the consolidation of the institutions, is represented by the society being divided by ethnic or linguistic lines, according to Alesina et al (1999). In a divided society, the integration is more ungainly, and the degree of trust is more difficult to obtain by different ethnic or political groups, and the process by which the parties agree is often stodgier and slower, involving plenty of time and resources, and the direction of the reforms needed to consolidate an economic country will bear delays on these issues.

Some of the authors asserts that the confidence of these society factions at the level of government and institutions is much smaller than in a more compact society. A commonly used indicator to measure the division is the index of ethnic fractionation (Wacziarg et al., 2003). The indicator shows the probability that two people from the same country, randomly chosen, belong to different ethnic groups. Countries with higher fraction clues are expected to have weaker economic institutions.

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The geography of a country is also a factor with a profound impact on the economic development of a country. Countries endowed with difficult climate zones and land may experience lower growth and translate into high transport, disease, and low productivity in agriculture. Sachs (2003) states that levels of per capita income, economic growth and other economic and demographic aspects are linked to climate, disease ecology and coastal distances.

Robinson, Acemoglu and Johnson (2005) claim that geography primarily affects the development through its impact on the economy and political institutions. Hall and Jones (1999) claim that countries at a considerable distance from Ecuador may have stronger economies, as the climate can also encourage the economy.

The land is also of particular importance in case we take into account the costs of trade and investment for non-seaside countries that have more rough land. On the other hand, difficult conditions can encourage the development of the institutions, aiming to compensate higher transaction costs.

Another factor affecting the institutional development would be the abundance of natural resources relative to the size of the economy. The abundance of the natural resources can lead to a weakening of the democratic and economic institutions as Boix (2003) and Guriev et al (2009) associate this abundance of resources with a "curse".

Karl (1997) believes that in countries with rich natural resources, ruling elites might present attitudes opposed to the democratization and consolidation of the economic institutions as stronger institutions such as rule of law or corruption control, as they involve checks and balances that make it difficult to use natural resources properly.

Casson et al., (2010) illustrate in a paper how informal institutions have the power to impact the formal institutions on quality and the way they can work together and lead to a better development of an economy.

Some think that institutions are either able to promote the development of a country, or they can hinder their development. Rodrik (1999) also claims that social conflicts can also be considered as causes of a lack of persistence in growth rates, and thus he explains the collapse of the mid-1970s for several countries. Rodrik backs his theory that countries with a high living standard have seen massive declines after 1975 due to inequalities and poor institutional quality. Prior to Rodrik, Kaldor (1971), Kuznets, (1973); Nelson and Winter (1974); North (1990) support the idea of the importance of the institutions.

The quality of institutional services may also depend on issues such as: the independence of justice, property rights, quality of political leadership, etc. and also the capacity of economic and social actors to exert pressure in order to eliminate and change the inadequate institutions and the quality of service.

The institutional environment is determined by the legal and administrative framework where individuals, companies and governments interact in order to generate wealth. The importance of a solid and equitable institutional environment has become increasingly apparent during economic crises.

The quality of the institutions has a strong impact on competitiveness and growth. The investment decisions and production organization play a key role in how companies distribute the benefits and bear the costs of the development strategies and policies. For example, landowners, corporate or intellectual property owners are not willing to invest in improving and maintaining their property if their rights as owners are not protected.

Alonso and Garcimartín, (2013) establish certain criteria for assessing the quality of an institution together with the determinants, and will determine the concept of institutional quality. According to the results obtained, it is noted that a high development of the institutions, automatically implies a high-quality level of the institutions.

## 1. Research Methodology

### 1.1 Bayesian method of estimation (BMA)-general considerations

The Bayesian Average Model provides an empiric support for the thesis according to which the factors considered for estimating the quality of public institutions can also be associated with various estimates of the information efficiency. The Bayesian method produces a linear regression that combines dependent variables with different coefficients, constructing a weighted average with all of them. The Bayesian method estimates support environments from the posterior probabilities of the model that comes from Bayes' theorem:

$$p(M_Y|y,X) = \frac{p(y|M_Y,X)p(M_Y)}{p(y|X)} = \frac{p(y|M_Y,X)p(M_Y)}{\sum_{i=1}^{2^k} p(y|M_i,X)p(M_i)} \quad (1)$$

To use the Bayesian model, Raftery (2005) provides a basic idea presentation. It is assumed that a deduction about  $\Delta$  is being followed and we have some D data. Taking into consideration several statistical possibilities for this M1, ....., Mk. The number of models can go up to large dimensions, and if only regression models are taken into account, but we are not convinced of the possible p predictors we can include, many models can be taken into consideration.

The Bayesian statistics all present uncertainties in terms of probability and deductions, by applying basic rules of probability calculation. From the application of the total probability law, the BMA posterior distribution of  $\Delta$  is:

$$(2)$$

,where  $p(\Delta | D, M_k)$  is the posterior distribution of  $\Delta$  given by the model  $M_k$  and  $(M_k | D)$  is the posterior probability that  $M_k$  is the correct model chosen from one of the models considered to be correct.

The Bayesian Averaging Model belongs to the field of modern applied statistics that provides data analysts with an effective tool for discovering promising models and obtain estimates of their posterior probabilities through the Markov Monte Carlo chain (MCMC). These probabilities can still be used as weights for predictions and average model estimates of interest parameters. As a result, the variation components due to the model selection are estimated and accounted for, contrary to the practice of conventional data analysis (eg, the gradual selection of the model). In addition, the variable activation probabilities can be obtained for each variable of interest.

Empirical evidence of the superiority of the predictive performance of the model is found in Raftery et al. (1997), Fernandez et al. (2001a, b) and Ley and Steel (2009). Fernandez et al. (2001b) uses the Bayesian method in growth regressions. The posterior probability is very common among models, so BMA is recommended despite of a single model.

Bayesian methodology was also used by Garratt et al. (2003) to predict the probability in the context of a structural vector to correct the errors of an economy. The method was also used for Brock et al. (2003) for Macroeconomic Policies and for inflation modelling by Cogley and Sargent (2005). The inflation forecast with BMA was also tested by Eklund and Karlsson (2007) and Gonzalez (2010). Eklund and Karlsson propose the use of predictive procedures in achieving the average of the model, despite the standard BMA.

## **1.2. Advantages and disadvantages of the method**

Considering the standard BMA, we notice that there are also different approaches to the BMA, and the differences are the use of different a priori. Undertaking, choosing the right priorities is a critical aspect for finding conclusive analyzes.

As advantages of using the Bayesian method, we mention:

1. the natural and principal variant of combining pre-information with data within a robust theoretical framework. Past information about a parameter may be included, and previous distributions may be formed for future analysis.

2. Provides inferences that are conditional and accurate, without relying on asymptotic approximation. Insufficient sampling inference occurs in the same way as if it had a large sample. Bayesian analysis can also estimate any function of the parameters directly without using the plug-in method (a way of estimating functions by linking estimated parameters to functionalities);

3. It complies with the principle of probability (likelihood). If two distinct sampling patterns give probability proportional functions, then all inferences must be identical to the two models. Classical inference does not generally follow the principle of probability;

4. It provides a "convenient" setting for a wide range of models, such as hierarchical models and lack of data. The MCMC, together with other numerical methods, makes traceable calculations for virtually all parametric models.

The Bayesian estimation method is an indispensable tool of the economy, used to address some uncertainties about the model. Although a well-founded model in theory, the Bayesian Model Averaging also has some sensitivities about assuming priorities, so it is necessary to investigate the effect of different structures of priors.

Disadvantages of the method:

1. There is no way, the right way to choose a prior. Interpretation of Bayesian results requires skills to "translate" subjective beliefs into a predefined mathematical formula. The generated results may be misleading;

2. Can produce posterior distributions that are strongly influenced by a prior.

## **1.3 Test results**

The global influence will test the quality of public institutions can exercise according to the theory of the financial markets. In order to make an estimation of this index, we build a synthetic variable, namely the one of the information efficiencies and the quality of public institutions, within a Confirmatory factor analysis approach. Next, we will get a global quality indicator for each of the 38 markets under study.

Through the confirmation factor analysis (CFA), it is tested in a complex way if analysis elements are associated with various factors. Using CFA, modelling of structural equations is used to test a measurement model by which the connections between observed and unobserved (latent) variables can be evaluated. After testing, we will analyse the impact of observed variables on the latent ones and also the correlation between the two types of variables.

The quality of institutions is estimated to be a latent variable within a structural equation modelling model (SEM). The R system is the lavaan package 0.6-3.1313, the acronym used for latent variable analysis. Testing through the lavaan interface makes it possible to provide a collection of tools for the purpose of exploring and estimating latent variables through factor analysis, structural and transversal equations, as Skrondal and Rabe-Hesketh (2004), Lee (2007) and Muth ' en (2002).

Following testing, the following results were obtained:

**Table no. 1** Institutional quality predictors coefficients

Voice and Accountability	1
Political Stability and Absence of Violence	0.873*** (0.11)
Government Effectiveness	1.118*** (0.091)
Regulatory Quality	1.113*** (0.106)
Rule of Law	1.139*** (0.1)
Control of Corruption	1.105*** (0.104)
Robust Comparative Fit Index (CFI)	0.988
Robust Tucker-Lewis Index (TLI)	0.982
Loglikelihood user model (H0)	-137.826
Akaike (AIC)-informational criterion	297.653
Bayesian (BIC)	315.666
Sample-size adjusted Bayesian (BIC)	281.272
Robust RMSEA	0.108

Source: own processing

Taking into account the quality indicators of the model (Robust Comparative Fit Index, the Robust Tucker-Lewis Index (TLI), the Loglikelihood user model (H0), the Akaike (AIC), the Bayesian (BIC)), we may say that these indicators of institutional quality form a unitary dimension.

Next, we will test the existence of a non-linear connection between the information efficiency index calculated according to Kristoufek's connection with the estimation of the quality of public institutions based on the structural cohesion model in the previous table.

**Table no. 2.** The connection between the information efficiency index and the quality of the public institutions

	Coef.
The quality of public institutions	-0.283*** (0.057)
The quality of public institutions ^2 (squared)	0.182*** (0.007)
(logarithm) likelihood function	-51.916
Variance (residual)	0.8999

Source: own processing

In this situation there is a regression equation with the dependence represented by the global index of efficiency and the explanatory variables as the institutional estimator and its square.

### Final remarks

There is a non-linear connection between the quality of the public institutions and efficiency. Thus, a higher-level shift in the quality of the institutions contributes to increasing the efficiency (reducing the deviations of the efficiency estimates from their reference level).

It is noted that after reaching a certain critical threshold, the shocks at the level of public institutions can increase the inefficiency.

Based on these results, one can assume an overturned U-shaped curve effect induced by variations in the quality of the public institutions and policies over the information efficiency of the considered financial markets.

Thus, an initial shock of the quality of the public institutions and policies leads to an increase in the deviations of the information efficiency estimates from their reference levels (at a decrease in the estimated overall level based on the methodology proposed by Kristoufek).

Subsequently, once the institutional quality exceeds a certain "critical threshold", its stabilizing effect on information efficiency begins to act: for higher levels of institutional quality, higher levels of efficiency are shown.

It is also noted that on the whole, the amplitude of the stabilizing effect of the institutional quality exceeds about three times the negative impact of a shock associated with the increase of this quality.

The results obtained can be corroborated with the non-uniform impact of the different components of public policies and institutions as shown in the first part of this study from the results obtained in several dimensions, the most significant being the Efficiency of Governance, Corruption Control, Participation and responsibility, followed by the rule of law. All these dimensions are important for the configuration and functioning of the economic part, for the success of the economic policies.

As a result, we can note that the quality of the institutions that tends to grow, with positive effects on the risk profile of the investor's trading profile, but if the shock at the level of policies and institutional factors is too high, there is a feeling of uncertainty surrounding the legislative framework and changing the investor risk profile, contributing to the diminishing of the information efficiency of the financial markets.

The financial markets are affected by the information asymmetry related to the market participants' inequality in accessing and interpreting data. The interpretation of data is a difficult process, and hence derives the change in the investor's risk profile, which is a palpable assumption in relation to changes in its environment and at the level of the institutions. As well as the results of our research, Hong, Kubik and Stein (2004) show that efficiency is influenced by the community in which we live, and institutions claim a very important role in the investment process.

The efficiency of the public institutions is able to bring benefits through several channels:

- They diminish the information asymmetries as they transmit to the investors, information about market conditions, goods and services;
- They reduce the risks as they define and apply property rights and contracts, determining who gets them;
- They restrict the actions of politicians and interest groups, making them accountable towards the citizens.

The internal inflation, unsustainable levels of external and internal debt, exchange rate volatility or inappropriate conduct of macroeconomic policies will lead to loss of investor and consumer confidence. Without effective institutions, markets cannot function properly. Their high quality can bring along a good functioning of the economy. The quality of the institutions has long been recognized as an important component of a well-functioning market. Market activities involve investor interaction, and institutions can help reduce the uncertainties resulting from incomplete information about the behaviour of other individuals in this human interaction process. Therefore, institutions can have a significant impact on the economic activities in general.

Comparative literature studies conducted on the quality of institutions over a long period of time - World Bank (1993), Transparency International (2010), Freedom House (1972) proved that mainly, the economic growth results from improved regulatory infrastructure, civil service, a more efficient government administration, and a professional public service. In short, consolidated democracies and free societies tend to have effective public governance and institutions and ensure greater social welfare and economic development.

An efficient, robust and predictable framework helps the overall economic development of financial statements, contributing to risk reduction, which demonstrates that institutional determinants have a considerable impact on this process. Investors' attitude to risk is changing and there is an increasing tendency to prefer personal autonomy instead of being guided by others. Investors are courageous and start to build individual businesses and activities, which increases financial market transactions.

Institutions have an essential role and must be seen as channels of transmission of values that capture societal structural changes, changes that we will highlight in the next research that we will undertake.

As further directions of research we aim to analyse the relationship between informational efficiency and other variables such as the GNI per capita, government expenditures, and other indicators.

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