

## **Growth and institutional changes: a historical evolution**

*Crescimento e mudanças institucionais: uma evolução histórica*

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RESUMO: Este artigo destaca o fato de que a teoria neoclássica não pode explicar o processo de mudança econômica. Em um mundo incerto e em constante mudança, uma teoria baseada em modelos de equilíbrio estático é de pouca ajuda. Colocamos as instituições no centro da compreensão dos sistemas econômicos, uma vez que constituem sua estrutura de incentivos. Assim, a mudança econômica é em grande parte um processo intencional criado pelas percepções dos indivíduos sobre as consequências de suas ações. Essas percepções, provenientes das crenças dos indivíduos, combinam-se com suas preferências. No final, não será construída uma teoria dinâmica da mudança econômica, mas será feita uma tentativa de compreender a ligação entre as instituições e o crescimento econômico, o processo de mudança, e desenvolver pressupostos, dentro de seus limites, capazes de melhorar o ser humano, o meio ambiente e os resultados econômicos.

PALAVRAS-CHAVE: Mudança institucional; crenças; crescimento; incerteza; instituições; racionalidade; teoria do jogo.

ABSTRACT: This paper highlights the fact that neoclassical theory cannot explain the process of economic change. In an uncertain and ever-changing world, a theory based on static equilibrium models is of little help. Whereas we have placed the institutions at the centre of the understanding of economic systems, since they constitute their incentive structure. Thus, economic change is largely an intentional process created by individuals' perceptions of the consequences of their actions. These perceptions, coming from the beliefs of individuals, combine with their preferences. In the end, a dynamic theory of economic change will not be built, but an attempt will be made to understand the link between institutions and economic growth, the process of change, and to develop assumptions, within its limits, capable of improving the human environment and economic results.

KEYWORDS: Institutional change; beliefs; growth; uncertainty; institutions; rationality; game theory.

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## INTRODUCTION

Understanding the process of economic change allows us to explain the different behaviors of past and present economic systems; to understand the history of the growth of some economies such as the United States and Europe, and also the fate of the lack of development of other economies such as those of sub-Saharan Africa<sup>1</sup>. This makes it easier to understand the past and to improve the economic performance of the future.

The analysis of the neoclassical theory does not provide any contribution that could explain the process of economic change, since it is a static theory, a theory of general equilibrium. It is certainly not a new criticism that traditional economic theory is based on static equilibrium models, which do not take time into account, in the sense of historical change and innovation<sup>2</sup>. A classic theme of the Austrian school, from von Mises to von Hayek, which not only pointed out that the equations of economic equilibrium do not take time into account, since they unrealistically postulate the simultaneous interdependence of all variables, but also argues that this lack has resulted in the inability to adequately treat money, competition, market imperfection and the role of knowledge (Hayek 1937). Keynes (1936, 307) was also of the same opinion; in fact, he stated that economic decisions are always uncertain, since they are made from an invariable past, but they are aimed at an indeterminate future. For Keynes, time was not just a succession, but uncertainty and indeterminacy.

The concept of uncertainty can be dealt with from Knight's (1921) and Keynes's (1921) works. According to them, the risk represents a context in which it is possible to indicate a probability distribution of the results, whereas uncertainty is a condition in which there is no such probability distribution. According to Arrow (1951) and Lucas (1981) it is not possible to develop theories under conditions of uncertainty.

Individuals continually strive to make their environment as predictable as possible. Heiner (1983) defined uncertainty as the origin of predictable behaviour. He refers to institutional innovation to reduce the difficulties encountered in the decision-making process, through the development of a set of rules in order to restrict the range of choices. By enclosing choices in a narrower range of actions, institutions are able to improve the ability of individuals to control the environment in which they operate. Agents' beliefs and institutions can reduce the various levels of uncertainty in order to make the environment more predictable. But if the uncertainty seems to have diminished, the environment in which humanity operates that we have before us today is much more complex than before and, despite the progress made, the understanding of this environment remains very limited. Understand-

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<sup>1</sup> For more on this subject, see North (2006, 217-221).

<sup>2</sup> Voegelin already wrote in 1925 that steady-state economy is a 'contradictio in adjecto'.

ing scenarios that are constantly evolving implies new theories, or an advancement of existing ones.

Having highlighted these limits, we can now observe how individuals modify the environment over time to make it more predictable. According to North (2006, 37), uncertainty can be classified by different degrees: 1) Uncertainty that, given the existing stock of knowledge, can be reduced by more information; 2) Uncertainty that can be reduced by modifying the institutional framework; 3) Uncertainty that implies a re-development of old beliefs; 4) Residual uncertainty which forms the basis of non-rational beliefs.

This paper will seek to understand the link between institutions and economic growth<sup>3</sup> and the process of change, in order to develop assumptions that can improve the human environment and economic performance.

## TRANSFORMATIONS AND REDUCTION OF UNCERTAINTY

The increase in information on the characteristics of a specific activity has led to an improvement in forecasting capacity (Morselli 2018b, 514-517). For example, in the 15th century, the introduction of marine insurance, which concerned the collection and comparison of information about ships, their cargoes, destinations, journey times, shipwrecks and related compensation, allowed uncertainty to become a risk, and was an important factor in the growth of European trade in the early modern age (North 2006, 37-38).

The change in the institutional framework, a key factor in reducing environmental uncertainties over time, implies changes in the structure of incentives. This is the main tool used by individuals to transform their own environment. Historically, institutional change has changed the benefits obtained from cooperative activities (e.g., the introduction of mandatory contracts), developed incentives for innovation (patent laws) and reduced transaction costs in the markets (introduction of laws to reduce contract enforcement costs) (Morselli 2017).

According to Greif (2006), the response of individuals to new scenarios depends on how new they are and on the cultural heritage of the actors. If they are well equipped with this heritage to cope with the new contexts, they are able to implement responses that make the environment more predictable.

Although the uncertainty of the natural environment has diminished over time, the remaining part that defines non-rational beliefs still plays a major role nowadays, as well as throughout human history. Secularised beliefs and ideologies are the two most important factors in changing society, one example being the history of the rise and fall of the Soviet Union (Morselli 2015).

So, we have analyzed the different degrees of uncertainty highlighted in the

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<sup>3</sup> For example, some authoritative studies consider institutions as one of the engines of economic growth (Chong, Calderón 2000; Acemoglu *et al.* 2001; Rodrik *et al.* 2004).

introduction, trying to trace a path that can produce a more predictable environment. Changes in the environment will inevitably produce a new context, which we are unprepared to deal with in the light of our experience of the past. The way in which institutions and beliefs from the past influence current choices plays an extremely important role. Communities that, on the basis of past experiences, face innovative change with suspicion, contrast with those whose heritage gives them a favourable predisposition to change; in these cases there are different shared mental models of the participants, and our ideas and beliefs formalize the decisions we make, which keep bringing about changes to the environment in which we live.

## BELIEFS AND INSTITUTIONS

Understanding the process of change starts from the awareness that the individual has an imperfect knowledge of reality. Therefore, the development of beliefs establishes the individual choices, which subsequently shape the changes in the contexts of the environment.

In order to better understand the human environment, it is particularly important to overcome the assumption of perfect rationality<sup>4</sup> with regard to complex situations that involve the presence of uncertainty. Individuals are placed in contexts where all participating agents have imperfect information, and the reaction to the actions of other actors is also imperfect. Both the imperfect information and the imperfect reaction are at the basis of the nature of uncertainty, the presence of which cannot be avoided. It is also pointed out that the application of the principle of rationality is not adequate to explain the relationship between the external environment and the human mind. Most rational choices are only partly the result of individual reasoning, but they come from the process of forming thought in a social and institutional scenario. In fact, Satz and Ferejohn (1994) state that rational choice theory works in contexts where the choice is limited.

The effort underway is to try to achieve an improvement in knowledge of the complex interaction between cognitive processes, belief building and institutions. According to North (1994, 362-363):

Learning involves the development of a structure through which one can interpret the different signals received by the senses. The initial framework of such a structure is genetic, but the subsequent scaffolding is the result of the experiences made by the individual: experiences that come both from the natural environment and from the linguistic-socio-cultural one.

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<sup>4</sup> Perfect rationality has as its reference the *homo oeconomicus*, the foundation of neoclassical economy and *laissez-faire*. It presents the concept that each individual was able to order his or her preferences in a rational manner, to be perfectly informed about the current state of the world, and all possible future states, to act following objectives of maximisation of benefits and/or minimisation of costs (Blume, Easley 2008).

The structure consists of categories, i.e., classifications that evolve gradually, from early childhood, to organize our perceptions and store traces of analytical results and experiences in our memory; by building these classifications, we develop mental models to explain and interpret the environment, usually in ways that change according to our objectives. Both categories and mental models evolve to reflect feedback from new experiences, which sometimes strengthens our initial models and categories, and at other times brings about changes; this is what we call, in short, learning. Therefore, mental models can be continuously redefined through new experiences, including contacts with the ideas of others.

The learning process is unique to each individual, but it is also true that a common cultural/institutional structure leads to shared beliefs and perceptions. For this reason, a common cultural heritage provides the means to diminish the diversity of mental models that in a society are specific to each person, and constitutes the vehicle for intergenerational transfer for unifying perceptions (Denzau, North 1994).

According to von Hayek (1990, 143) beliefs are the result of mental constructions in the light of the interpretation provided by the senses, i.e., that we do not reproduce reality, but construct classification systems to interpret the external environment.

Hutchins (1995, 354), states that it is not possible to fully understand the cognition process, without clarifying the key role played by culture and history, and also points out that they cannot be integrated into a context where the abstract properties of minds belonging to isolated individuals are privileged. The main objective must be to place cognitive activity not in a predefined scenario of surrounding conditions, but in a more extensive dynamic process of which the cognition of the individual is only a part. Only by ensuring this objective is it possible to demonstrate that human cognition is not only conditioned by culture and society, but is itself a social and cultural process.

In the light of this, when dealing with cognitive change, the socio-material environment where thought occurs must be considered in the analysis. For North (2006, 59), culture is an adaptive process, able to accumulate partial solutions to the problems that have been encountered most frequently in the past. This statement highlights the important cognitive role played by social institutions. An efficient interrelation of individual beliefs and social contexts can make it possible to implement a set of mechanisms through which culture and social institutions operate directly in explaining the process of economic change.

There is a strong relationship between belief systems and institutional structure. Beliefs include the representation of the human environment, whereas institutions represent the structure that individuals impose on that environment. If there are opposing beliefs, institutions will manifest the beliefs of those who are able to implement their own choices (Bendor, Swistak 2001). According to Loasby (1999) the foundations of society are formed by the beliefs of its members. It is also important to highlight the work of Greif (1994) on the effects of beliefs on economic

results. In the comparison between Genoese and Islamic merchants, during the Mediterranean trade in the 11th and 12th centuries, he realized the differences existing in their organizational structure. These differences came to light from the clash between beliefs of individualistic behaviour and beliefs of collectivistic behaviour. The Islamic merchants, in order to favour their collective action, had created a network of social communications within the group, but such a network was not able to favour the exchange, which came from the increasing size of the markets. Whereas, the Genoese, in order to ensure the compliance with the agreements, had introduced bilateral mechanisms of application which provided for the formation of organizations of a legal and political nature, allowing a more efficient trade. Therefore, the performance of an economic context comes from agents who are constrained in their choices by the combination of beliefs, institutions and structures from the past; and beliefs represent the initial path in order to understand the process of economic change.

## INSTITUTIONALISM AND GAME THEORY

At the time of its development, game theory was placed within the paradigm of rational agents, and utilitarianists, reasoning in the context of methodological individualism and had an ahistorical and decontextualized nature. Among the contributions to this placement there are the game rules that are considered given, i.e., they are exogenous (Chavance 2010, 76).

Nevertheless, if we take into account the important issue of coordination or cooperation and repeated games involving evolutionary processes, it is possible to link game theory to institutions (Walliser 1989)<sup>5</sup>. When repetitive games are involved, players are inclined to develop new implicit rules, norms, conventions and institutions based on a social agreement, which will be passed on to subsequent generations of players, thus constituting mechanisms aimed at providing information on the possible actions of other agents (Schotter 1981).

However, in such approaches there are some problems, namely the initial rules of the game are given and influence the new rules that emerge from the process of evolution or learning. The analysis of the institutions, therefore, implies a circular reasoning, linked to the absence of a concept of hierarchy or historicity of the rules. However, this does not detract from the fact that game theory has a considerable influence on certain trends of institutionalist economics. Moreover, game theory is sometimes also applied to historical experiences or institutions. In this respect, it is

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<sup>5</sup> We also remember the study by Axelrod (1984), where players face each other in a series of direct matches, as in the prisoner's dilemma, and the choice not to cooperate gives a better result than the choice to cooperate, whatever the choice of the other player; but if both players decide not to cooperate, the result is worse than if both decide to cooperate. In the case of non-repeated play, the equilibrium solution is the choice not to cooperate. In the case of repeated games, on the contrary, if each player remembers how the other behaved in previous match situations, there may be willingness to cooperate.

possible to highlight the comparative institutionalist analysis by Aoki (2000) and Greif (2006), which aims to compare institutions or national historical systems.

Aoki's theory is based on the concept that institutions represent forms of equilibrium within game theory. He states that there are three different approaches: institutions are identified in the players; institutions as rules of the game; institutions are the result of equilibriums or beliefs related to the games. According to Aoki, the concept of institutions as equilibriums has the merit of considering them endogenous (Aoki 2000, 141). As Field (1979) pointed out, it is not possible to create a game model that lacks institutions. Actually, every game model requires pre-existing human institutions, therefore Aoki (2001, 26) states that game theory, which is the basis of the institutionalist analysis, needs to be integrated by historical and comparative indications, and adds that the institution is a system of shared beliefs which reproduces itself autonomously and which concerns the modes in which the game is implemented.

An equilibrium identified as an institution can also be represented explicitly. But such representation will have the characteristic of an institution only if individuals consider it to be so. Thus, law and regulations are not institutions if they are not recognized and respected. If, for example, the State prohibits the import of certain goods, but one is convinced that it is sufficient to pay bribes to customs officers to circumvent the law, and suppose that this practice materializes, then it is the practice of bribes that is considered as an institution, instead of legislation being considered ineffective (Aoki 2000, 13).

In his comparative institutionalist analysis, Aoki (2001, 87) takes into account the example of the Silicon Valley model, the Japanese model of the central bank, and thinks that the effectiveness of an exchange governance mechanism can be strengthened by the institutionalization of a particular mechanism in the same economic system. Moreover, he adds that the institutional diversity of the different countries will not be erased by the process of globalisation; on the contrary, this diversity is beneficial because the different institutions interact in a competitive way and the national contexts will continue to adapt to the changes in the global and technological environment<sup>6</sup>.

Turning to Greif (2006, 153), he is a supporter of comparative historical institutionalist analysis, as he thinks that it is a tool for reducing the existing gap between the evolutionary perspective of the old institutionalist economy and that of the new institutionalist economy, which basically considers the deliberately established institutions<sup>7</sup>.

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<sup>6</sup> The work of Rosenberg and Birdzell (1986) and that of Hall and Soskice (2001) highlight the differences among different areas of the world to explain the faster development of Western economies. Recent research includes research on the variety of capitalism, which analyses the different institutional structures of developed countries, using historical-sociological-empirical analyses.

<sup>7</sup> For an in-depth analysis of old institutional economics and new institutional economics, see Morselli (2018a, 658-660).

Greif (1998) shows interest in institutions that constitute spontaneous results, since they are based on an external sanction; the proposed approach takes into account the historical process and combines studies of game theory with empirical, historical and comparative analyses. As we have seen, Greif compares Genoese merchants (individualists) with Muslim merchants (collectivists), who traded in the Mediterranean area in the 11th and 12th centuries. The Muslim merchants created communal communication networks in order to act collectively, which, however, proved to be not very effective for relations with merchants of different ethnic origins. Whereas the Genoese merchants developed bilateral mechanisms of control with a limited level of communication, which produced formal organizations and policies designed to follow and sanction the established agreements, favouring the enlargement of the exchanges. In the end, the Genoese merchants replaced the Muslim ones; therefore, it is noted that the cultural values influence the institutions and, consequently, the performances. For this reason, Greif (1994) thinks of institutions as a system that includes rules, beliefs and organizations. Moreover, Nelson (1995) considers institutions as a set of socially learned and shared values, norms, beliefs, meanings, symbols, customs and standards, such as to outline a series of behavioural expectations accepted in particular contexts of action.

## RATIONALITY AND GAME THEORY

Developments in game theory have made it possible to broaden its scope. Before the historic work of Harsanyi (1967), one was convinced that to use game theory the matrix of earnings should be common knowledge. The novelty of Harsanyi is to formulate games with incomplete information in such a way that they can be analysed as games with complete information. In this way the theory has been extended from perfect information to imperfect information games; from two-player games to n-player games; from zero-sum games to non-zero-sum games; from transferable utility games to non-transferable utility games.

The main theme being questioned is rationality. According to Aumann (1987), in game theory it is not necessary to assume that players are rational. This would seem to be a paradoxical statement if we consider that rationality was the foundation of game theory. However, the interface between rationality and irrationality represents an extraordinary challenge for the new frontiers of game theory, since there are particular contexts that could not be analysed while maintaining the reference to pure rationality. If we suppose that each player is rational in all the possible states that are faced with a strictly positive probability (i.e., a strategy that manifests itself as maximizing utility, in view of the information), what can be said about the distribution of n strategies? Is it possible to think that the assumption of rationality implies that the distribution has a particular form?

Aumann's model does not have a normative content. Rather, it limits itself to suggesting some useful advice to the players; the players behave as they wish, and their strategies are supposed to be given. It's a description of how one should re-



ally behave in situations marked by interaction. We must, then, ask ourselves what the implications of the assumption of rationality are in situations of interaction and where they can lead us. Aumann's answer is that these assumptions lead to correlated equilibria. It is not that it is the players who consciously choose a correlated equilibrium to conform to, but rather that it is the equilibrium to which an external observer can think that it should lead the distribution of the implemented strategies.

But if we reject the assumption of rationality what result would be achieved? Aumann, in the wake of Harsanyi (1967) and von Neumann and Morgenstern (1944), limits himself to analysing the epistemic model as a case of limited rationality, in a framework that allows the use of rationality that also includes irrationality.

Let us now see the representation of the model. An information system does not provide us with a simultaneous representation of the uncertainties of each player. Each player makes a certain final choice in favour of a pure strategy, a choice based on what he knows, or believes, about the other players. Therefore, on the state of information the player knows his own choice, but does not know the choices of others, he can only have beliefs about them, and above all he does not know their information state. For reasons of simplicity, the model chooses a finite set of individual information states and defines, as conjecture, the probability distribution. It is known that conjecture is related to the information states of other players, whereas belief is a deductive conjecture of the beliefs of others, and the hierarchy of beliefs comes from the information system and is not given exogenously. We can say that a player is rational for each state of information, if the strategy chosen, for each state, is maximizing the utility calculated on the basis of the belief in the state. The  $n$ -correlations of the information states that specify all the relevant parameters are called 'states of the world'. It can also be assumed that there is a probability distribution  $p$ , on the states of the world  $w$ , called a common a priori probability. It is in this context that we have the assumption of information systems in which certain players are irrational in certain states of the world, and what it implies in the behavior of players in these states of the world in which all players are rational, and if this allows us to solve certain paradoxes of rationality related to early induction. It is necessary to start from the concept of common knowledge. A context in which all players know an 'event', knowing that everyone else knows it as well. It will be said that an 'event' is of mutual knowledge if all the players know it.

Such situations fall within the scope of rational choice theory in the field of interaction, starting with the prisoner's dilemma in repeated games, in which all the Nash equilibria incite to defection at every round. What is proposed in Aumann's model is a scheme in which all players are rational, but without this rationality being common knowledge. Mutual knowledge is possible, but of a finite degree lower than common knowledge, which implies 'reasonable' behaviours that are very different from rational behaviours in common knowledge (Megiddo 1986).

One can think that each player has only one information state associated with each of his strategies as well. There is an a priori probability, which provides strictly positive probabilities to the different states and zero probabilities for the

other cases. A probabilistic process can be verified that pushes to rational behaviours on the basis of the distribution of anticipated probability. As in the case of the prisoner's dilemma, by introducing extremely weak irrationality probabilities, one can, in a game repeated one hundred times, justify the cooperation from the 85th to the 90th round and even more, with a defection that manifests itself more frequently as it approaches the 100th. This analysis provides an explanation for the very vague concept that if you have to play a rational game, it is not intelligent behaviour to start irrationally from the beginning of the game.

As for the analysis of irrationality, Aumann uses the phrase 'average irrationality'. From a formal point of view it can be defined for each player  $k$ , taken separately, in the following way: for each of the information states of  $k$ , the probability of this state is multiplied by the difference between the gains obtained in this state and the maximum gain that the player could obtain by changing his strategy; then these values are added for the set of information states of  $k$ . This measure of irrationality will have to be useful to compare the different approaches of the quasi-rationality theme; from Radner's  $\gamma$ -rationality (1979), to Kreps's, Milgrom's, Roberts's and Wilson's perturbations (1982).

There is also a problem of defining irrationality; it is, in fact, possible that the overall state of information could lead us rationally to irrationality. We start from repeated Nash's game theory, in which the possibility of some behavioural irrationality can incite a player to play in such a way as to push the other player to define a mutually useful behaviour. As a rule, rational players tend to imitate the behaviour of irrational players. Situations that result in better results for those who imitate. In some ways, you could say that rational players simulate irrationality to force others to play properly. Using these assumptions, you can achieve Nash equilibria in games that are perturbed in gains and contained in extremely small sets. Let's now consider situations in which, on the one hand, the rationality of the players is a mutual knowledge of a degree lower than common knowledge. Let us assume, on the other hand, when players are not rational, that they implement a specific strategy or a strategy contained in a specific set (Aumann and Sorin 1989).

As a rule, for any degree of mutual knowledge, players will be encouraged to implement mutually beneficial strategies, even if seemingly irrational. Reasoning presupposes a configuration in which perturbation is beneficial to all. What seems relevant is that all recent work moves in the perspective of a limited rationality. Pure rationality can only take on a full meaning in a very broad context that includes irrationality. Therefore, in the real world rationality and irrationality coexist, as is right, in the continuous relationship between absolute and relative on the ground of knowledge.

## INSTITUTIONS AND ECONOMIC DEVELOPMENT

According to North (1981), in *Structure and change in economic history*, incentives are the main link between institutions and economic development. The insti-

tutional matrix is not limited to economic institutions alone, but also includes political and legal institutions. The set of interdependent rules of each economy conditions its evolution depending on the historical path followed, as well as its performance in terms of long-term growth. Moreover, North states that there are efficient institutions in a political system with incentives for the efficient creation and protection of property rights.

In particular, North analysed the diverging paths of France and Spain, on the one hand, and England and the Netherlands, on the other, between the 16th and 18th centuries, in terms of economic development. In the example of the first two countries, the continuing need for earnings led the State to grant the companies some monopolies and to withdraw private property rights, causing economic stagnation in France and decline in Spain. While, in England and the Netherlands, the interests of the merchant class created a set of institutions capable of providing favourable incentives for trade, thanks to the protection of property rights.

In Europe, the lack of a political and economic order allowed the formation of an environment conducive to economic growth and human freedom. In such a decentralised competitive environment, several paths have been taken, some of which have worked as in the case of the Netherlands and England, whereas others have not shown positive results, as in the cases of Spain and France. One important aspect, which determined that particularly creative environment, concerns competition among separate political entities. Europe was politically fragmented, but had both a common belief structure derived from Christianity and a network of information and transport that allowed scientific and technological advances in one area to spread to other contexts (North 2006, 179).

Pirenne (1910) described the political and economic order of the Netherlands. He concentrated his analysis on the creation of the institutional infrastructure, weakened by corporate bonds and conflicts between the aristocracy and the citizens for the control of politics. For Pirenne, the municipal democracies of the Middle Ages were made up of privileged individuals who did not know the ideal of freedom and equality for all. This form of government was pragmatic in character and was not marked by claims of democracy and egalitarianism, so it was a completely different democracy from contemporary ones. The change described here is an incremental process, built on the basis of the pre-existing institutional framework, as well as being bound by the structure of beliefs. It is to this process of institutional evolution that Pirenne refers in his description of the way in which the various political and economic organizations have developed and interacted with each other.

England's development was marked by economic growth and by forms of freedom and beliefs that differed from continental Europe. The characteristic of insularity made it less exposed to conquest, so it did not need to have a permanent army. In this context, the Norman conquest, the only exception to the English invulnerability against external attacks, had created a more centralized feudal structure than any other on the continent. However, the Crown could not restrict the freedom of the barons or that of merchants and vassals. In England, too, the political institutions differed from those of the other countries of the continent. What

was most evident was the uniqueness of the English parliament, i.e., there was only one parliament for the whole country, compared to the existence of regional governments as in Spain, France and the Netherlands. There were also no divisions into commoners, clergy and nobility (Maitland 1963, 175).

The different evolution of the Netherlands and England on the one hand, and of Spain and France on the other, is due to the different contractual forces that succeeded in expressing the members of parliament on the one hand and the sovereigns on the other, and to the three reasons that underlie them: 1) advantages for parliamentary groups deriving from the fact that the state supervised the protection of property rights; 2) availability of alternatives to the sovereigns in power; 3) economic structure that determined the revenues of the various taxes. The central role of the belief structure should also be highlighted. Western society inherited the initial common belief structure from the Latin civilization; but this structure evolved differently according to the various parts of Europe, as a consequence of the different experiences. In both the Netherlands and England these experiences encouraged the evolution of the belief structure in directions that led to perceptions of freedom that can be considered modern; on the contrary, the Spanish experiences favoured not only a dislike for economic activity but also the beliefs underlying the medieval hierarchical order (North 2006, 187-188).

The evolution of the belief structure in England is analysed by Hexter (1992), by comparing the medieval freedoms in England in 1500 with the Petition of Right approved by Parliament in 1628. Access to medieval freedoms was determined by the hierarchical structure of society, and therefore those who were subject to constraints such as slaves, vassals, servants and other individuals in some way dependent, were excluded from such access; differently, the Petition of Right established for all English a set of rights guaranteed by law, a law promulgated by parliament. This change in the perception of the rights of individuals, from the medieval vision linked to social status to the vision of the 17th century that considers the English as individuals born free, reflects the evolution of the belief structure between 1500 and 1628. The favourable combination of this belief structure with the particular conditions existing in the Netherlands and England determined the institutional evolution of the economic and political spheres, favouring those cultural changes that produced not only the Protestant reform, but also an evolution of the belief structure such as to encourage behaviour oriented towards economic growth and the development of freedom. The different circumstances in Spain and France, on the other hand, allowed the belief structure in these countries to evolve in ways that consolidated the existing institutional structure, holding back both economic growth and political and civil liberties (North 2006, 188-189).

## THE ROLE OF INSTITUTIONS IN AN ECONOMIC GROWTH MODEL

In order to define, from a theoretical point of view, the role played by the institutions within a model, the Solow (1956) has been taken into consideration.

Precisely, the model analysed is that of Tebaldi and Mohan (2008), who develop the Solow model including the institutions. This model examines the effect of the quality of the institutions on the level of the product and on the growth rates of the production. Specifically, Tebaldi and Mohan have changed the function of aggregate production and the equation of capital accumulation of the Solow model, to allow the study of the effects of the institutions on economic performance. In the model in question, goods are produced through technology with constant returns to scale and offered in a market marked by perfect competition. Institutions play a major role in determining factor productivity and technology adoption, which is why output ( $Y$ ) is produced using the following production function:

$$Y = f[A(T, t) K(t, T) L(T, t)] \quad (1)$$

where  $L$  represents labour,  $A \geq 1$  is an index that indicates the level of technology,  $K$  is capital,  $T$  is an index that specifies the quality of institutions and  $t$  is time.

Let us assume that the economy taken as a reference has a stock of exogenously produced technology that grows at a constant rate  $g$ ; and assuming that the growth rate of the workforce and the labour participation rate are constant over time, then  $\frac{L}{T} = n$  where  $n$  is the population growth rate.  $T$  is considered constant and is normalised between 0 and 1. Therefore  $T$  is equal to 1 for those countries with the best institutions,  $T$  is equal to 0 for those countries with the worst institutions.

Institutions are able to influence the use of available technology and the productivity of physical capital. As Tebaldi and Elmslie (2008) state, institutions in poorer countries can hinder the use of available technologies and limit efficiency. Thus, good institutions increase technological efficiency, and increase both labour and capital productivity.

Tebaldi and Mohan (2008) say that the elasticity of production in relation to capital is influenced by institutions. In particular, efficient institutions increase the productivity of capital, thus indirectly affecting production and investment. Therefore we have:

$$Y = K^{\alpha T} (AL)^{1-\alpha T} \quad (2)$$

where  $0 < \alpha < 1$ . By defining  $y = \frac{Y}{AL}$  and  $k = \frac{K}{AL}$  we are able to rewrite the production function in the following way:

$$y = k^{\alpha T} \quad (3)$$

by combining the equation (3) to the capital accumulation function we obtain:

$$\dot{k} = sk^{\alpha T} - (\delta + n + g)k \quad (4)$$

equation (4) indicates that the economy will converge to an equilibrium growth path where:

$$\frac{\dot{y}}{y} = \frac{\dot{k}}{k} = 0$$

This allows to solve equation (4) for the stock of capital in the steady state:

$$k^* = \left[ \frac{s}{\delta+n+g} \right]^{\frac{1}{1-\alpha T}} \quad (5)$$

where  $k^*$  indicates the steady state of variable  $k$ . Equation (5) specifies that institutions have a positive effect on the stock of capital in the steady state and consequently on the level of output per worker. In particular, better institutions ( $T$ ) increase capital accumulation, which increases investment, and this implies higher capital in the steady state ( $k^*$ ) and output per worker ( $y^*$ ). However, in the long run, the growth rate of output per worker is still determined by the speed of technological progress. By defining  $\hat{y} = \frac{\dot{y}}{y}$  and considering that  $\frac{\dot{k}^*}{k^*} = 0$  and by log-differentiating equation (3) we have:

$$g\hat{y} = \frac{\dot{\hat{y}}}{\hat{y}} = g \quad (6)$$

then that model indicates that countries are richer or poorer because of their technology. Equation (5) means that rich countries should have better institutions than poorer countries. Equation (6) means that there should be no effect of the quality of institutions on the long-term growth rate. Therefore, institutions have effects on output levels, but not on its growth rate.

Another version of the model identifies the effects of institutions on technology and the productivity of capital. Tebaldi and Moham rewrite the production function:

$$Y = A^{T-1} K^{\alpha T} (AL)^{1-\alpha T} \quad (7)$$

Equation (7) incorporates the effects of institutions into a Solow production function. The model is resolved by defining  $y = \frac{Y}{A^T L}$  and  $k = \frac{K}{A^T L}$  allowing the production function to be written in terms of actual work:

$$y = k^{\alpha T} \quad (8)$$

the equation of capital accumulation is given by:

$$\frac{\dot{k}}{k} = s k^{\alpha T-1} - (\delta + n + Tg) \quad (9)$$

this model presents a steady-state solution in which  $\frac{\dot{k}}{k} = 0$ . Therefore we have:

$$k^* = \left[ \frac{s}{\delta+n+Tg} \right]^{\frac{1}{1-\alpha T}} \quad (10)$$

This extended model means that institutions have an effect on the level of long-term production and the growth rate of output per worker. By defining  $\hat{y} = \frac{\dot{y}}{y}$  and knowing that  $\frac{\dot{k}}{k} = 0$ , log-differentiated equation (7) generates:

$$g\hat{y} = \frac{\dot{\hat{y}}}{\hat{y}} = Tg \quad (11)$$

The model therefore implies that the growth rate of output per worker is determined not only by technological change, but also by the quality of the institutions. A given economy can have the technology, but its institutions (if they are not efficient) can hinder the adoption of technologies and decrease the productivity of production factors. The effect of institutions on output per worker comes not only from its impact on the state of technological efficiency, but also from its effect on capital accumulation. Institutions influence the marginal product of capital and consequently investments and capital accumulation. Specifically, since the ratio  $\frac{y}{k}$  is constant in the steady state, Tebaldi and Moham derive equation (8) in relation to  $K$ , so we have:

$$MP_k \frac{\partial y^*}{\partial k^*} = \alpha T k^{\alpha T - 1} = \alpha T \frac{y^*}{k^*} > 0$$

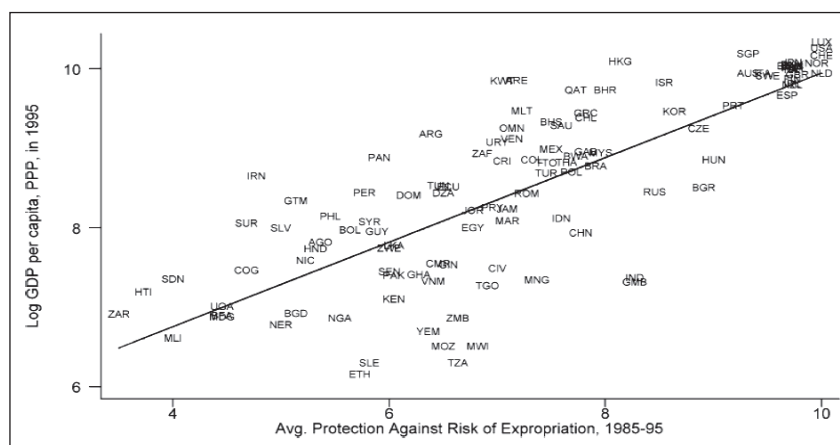
This means that the improvement of the quality of the institutions has a proportional impact on the marginal production of capital in the steady state. In particular, efficient institutions increase investment returns which, as a result, increase capital accumulation. The result obtained is consistent with empirical studies that state that capital accumulation is indirectly influenced by ‘bad’ institutions (Mauro 1995).

## THE RELATIONSHIP BETWEEN ECONOMIC INSTITUTIONS AND GROWTH

Figure 1 shows the relationship between the logarithm of the per capita GDP in 1995 and an important measure of the quality of institutions relating to property rights (Average protection against risk of expropriation). This tool is very important, since economic agents lose the incentive to invest their resources when they are deprived of these property rights. Figure 1 also shows that countries with more secure property rights have, on average, a higher per capita income. Therefore, it is shown that greater protection by institutions against the risk of expropriation increases a country’s income and wealth.

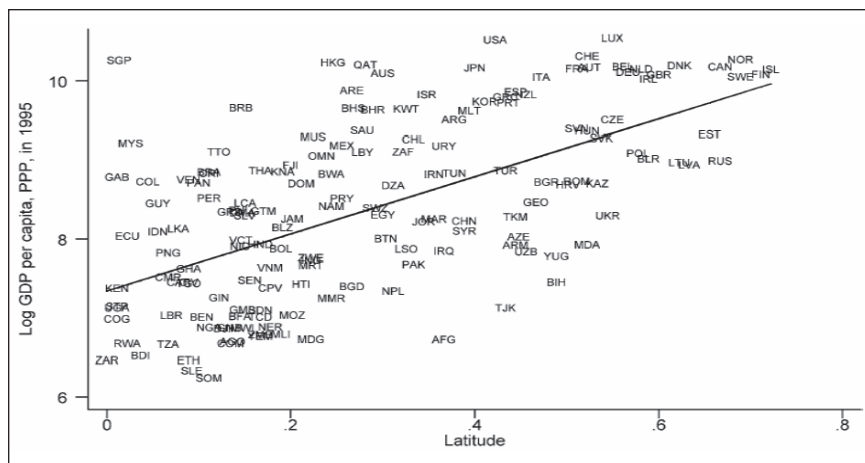
However, there are some problems related to this inference. The first concerns the existence of a reversibility between cause and effect, so that only those countries that are rich are able to have a structure that protects property rights. The second problem concerns the deviation of the omitted variables; in fact, this regression does not include other variables that could affect a country’s income, such as its geographical position. The latter appears to have a positive correlation with the per capita income of a country (Figure 2).

Figure 1: Relationship between economic institutions, as measured by average expropriation risk 1985-1995, and GDP per capita



Source: Acemoglu (2009, 124).

Figure 2: Relationship between latitude (distance of capital from the equator) and income per capita in 1995



Source: Acemoglu (2009, 125).

In this situation, however, causal reversibility between the two variables does not exist, since it would be reasonable to affirm that the geographical position affects income and not vice versa. However, the analysis remains reductive, if we consider only one variable to explain the dynamics of development.

The question then is whether it is possible to explain the relationship between economic institutions and a country's performance without the use of econometric models. In this sense, there is a way forward, and that is to observe those historical



events in which the institutions have made a process of change. The colonization that has occurred since 1500 in most of the world by European countries, gives us a good example of how it is possible to change an environment and institutions. While geography remained constant, Europeans initiated a series of changes both in economic institutions and in the organisation of societies.

A reasoning related to the impact of colonialism on economic institutions concerns 'the reversal of fortune', i.e., that historical evidence has shown that there has been a reversal in the prosperity of the former European colonies.

Empirical studies by Acemoglu, Johnson and Robinson (2001-2002) analysed the relationship between economic institutions and economic growth. Scholars argue for the so-called 'reversal of fortune', i.e., among the countries colonised by the European powers over the last 500 years, those that were relatively rich in the 16th century have become poor. The relevant discovery is that the economic prosperity of the past, measured by urbanisation and population density, was not linked to geographical factors. On the contrary, they argue that this reversal reflects changes in institutions resulting from European colonialism.

Another study to be highlighted is that of La Porta, Lopez-de-Silanes and Shleifer (2008), where the authors analyze the importance of colonial rule in relation to financial development as a proxy for investor protection. They focus on how legal institutions have been introduced in the different colonial powers, highlighting how differences between legal systems based on British common law and French civil law provide different degrees of investor protection. Their estimates show that the civil-law economies, compared to common-law ones, have less investor protection<sup>8</sup>. However, Nunn (2009) and Mahoney (2001) have shown that the origin of law also correlates with other features of different countries, such as labour market conditions and economic growth.

Neoclassical growth models have tried to demonstrate that differences in per capita GDP levels are due to capital accumulation and productivity (Solow 1956). Hall and Jones (1997) state that each element of the production function contributes in a certain percentage to the difference in output per worker and therefore in GDP among countries. Specifically, their analysis, which is based on the results of neoclassical growth models, empirically identifies the extent to which the elements that fall within the production function (human capital, physical capital and productivity) contribute to output differences, calculating the contribution of the productivity element as a residual factor.

However, Hall and Jones do not share the results of recent growth theory models (among which is Barro and Sala-i-Martin's 1992), which state that long-term per capita income levels will converge, as differences in growth rates would only be transitory. This is because the countries that first had a higher growth rate

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<sup>8</sup> Levine, Loayza and, Beck (2000) state that the common law system is more suited to the evolution of economic reality. They noted that greater investor protection was related to greater development of financial markets and faster economic growth.

than the others would first find their steady-state level, since their growth would decrease over time and would then be reached in the long run by the countries that had less capital accumulation and less rapid initial growth and which would then have a faster growth. Hall and Jones' analysis is different, not determined in an exogenous way, because the accumulation of physical and human capital and productivity, which have a direct influence on economic growth, would be conditioned by social infrastructure and, therefore, countries with weak or non-existent institutions, fragile process of strengthening contracts, weak property rights, trade barriers, would be unable to converge towards advanced countries.

What is most interesting is what determines capital accumulation and the difference in productivity among the different countries, which according to Hall and Jones is attributable to the country's social infrastructure, which is considered an endogenous variable. The comparative analysis from country to country, on the determinants of inputs and productivity, is analysed by comparing the various countries of the world with the countries of Western Europe. The latter, according to both scholars, are the countries that before any other have introduced certain economic institutions and adopted certain policies, in order to offer incentives that can accumulate both capacity to individuals, and capital, and produce output to businesses. In the absence of such institutions and, therefore, of social infrastructures, there are some distortions that produce production inefficiencies, favour underdevelopment and hinder the processes of capital accumulation, the acquisition of technical skills, invention and technology.

From the analysis presented, it is evident that the institutions, besides having a positive link with economic growth, present themselves as endogenous in the context of economic processes. In fact, economic institutions are considered fundamental variables in the process of economic development, not only by heterodox economists, but also by those who support neoclassical theses, such as, for example, Maddison (1995). Development should be considered as a process that begins with institutional change, and that allows the replacement of those institutions that are not able to ensure growth. As Kuznets (1973) states, the transformation from an underdeveloped country to a developed one depends, substantially, on the change of values and balance of power among the various social groups. This must make it possible to overcome the resistance of crystallised values and beliefs that hold back economic growth.

## CONCLUSIONS

The evolution of market economies is based on the existence of institutions, and the lack of institutions, or their malfunctioning, is a brake on economic growth.

We have seen how the progress of the Western world is an example of a success story, in which the evolution of beliefs, modified by experience, has brought about changes that have supported economic growth. An efficient economic model includes a set of economic institutions that provide incentives so that individuals and

organizations can devote themselves to productive activity. The formation of an environment that achieves an effective price system must be accompanied by the creation in each market of an institutional framework, in order to produce efficient results; defining, also, a system of property rights that ensures low transaction costs in the production and exchange of goods and services.

In order to better understand the role of institutions in society, it is necessary, first of all, that they incorporate the intentionality of our conscious mind. The structure of both the individual markets and the entire political and economic system is a human creation whose functioning is neither automatic nor natural. Moreover, in order to be efficient, the structure must be continuously reformed in its fundamental parameters of technology, information and human capital. In the absence of externality, imperfect and asymmetric information, and opportunistic behaviour, it is possible to think that the price system is capable of dealing alone with the economic complexities of change. But such a vision does not take into account aspects of human behaviour and also the way in which men interpret their ever-changing world, with particular regard to the interaction between economic changes and political changes. According to Hayek (1937), an effective recipe for dealing with new situations is to maintain an institutional structure that allows experimentation by trial and error. Such a structure implies both a variety of institutions and organizations that allow the pursuit of alternative policies, and the availability of adequate tools to eliminate unsuccessful solutions. To avoid unsatisfactory results, a first step is to measure transaction costs in the various factor and product markets; then, it is possible to go through the reasons that caused an insufficient economic performance, until the origin in the institutional structure is identified. High transaction costs may prevent the production of certain goods and services, which, given a certain number of factors, could have been a source of profit. For this reason, it is desirable to understand the potential prospects of an economy that allow, in the face of a decrease in transaction costs, to configure an expansion of the variety of goods and services. Moreover, in order to improve the institutional structure, it is necessary to identify the origin of this structure. Understanding the past of a society is essential to make a change achievable; we need to know the belief structure on which existing institutions are based and also the margins within which the belief system may be available to changes that are able to develop more efficient institutions.

It is clear that the central theme of our study is institutions, and the way in which they are shaped by individuals to reduce uncertainty. To do this, it is important to have a political and economic system that allows for continuous experiments in situations of uncertainty, eliminating over time the institutional adaptations that are not able to solve the new problems.

The analysis shows that there is no fixed formula for achieving development. No economic model can take into account all the complications of the economic growth of a society, since the mechanisms of growth tend to change according to the circumstances, reflecting the different cultural heritage and the different geographical and economic contexts. Before starting a process to change a society, it is necessary to

know its characteristics, and to have a clear understanding of the difficulties of institutional change, in order to be able to successfully implement this change.

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