

Economic Growth, Markets and the Rule of Law: Brief Considerations on the Brazilian Case

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ABSTRACT

The existence of markets that operate smoothly is an important factor influencing a nation's economic growth. Furthermore, an effective judicial system is a necessary condition for markets to function well. Therefore, it is reasonable to expect a positive relationship to exist between income per capita and adhesion to the rule of law. This conjecture is corroborated here in a sample of 110 countries in 2016. Additionally, the data show that the rule of law is relatively weak in Brazil, suggesting that an improvement of the Brazilian judicial system is a potential growth-enhancing reform.

KEYWORDS

Rule of law, markets, per capita income, growth

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1. INTRODUCTION

In his classic book *The Wealth of Nations*, Adam Smith (1776) argued that free markets are an important catalyst of prosperity. This conclusion is the most influential legacy of that multifaceted work. However, the book also contains another message that has not received the same attention by economists: the existence of an efficient judicial system as a necessary condition for persistent economic development.¹

This article undertakes empirical and theoretical analyses of the possible relationship between economic growth and legal institutions. In line with Smith's vision, I conclude that a nation's adherence to the rule of law is an important element to determining its per capita income. In the particular case of Brazil, the evidence suggests that an overhaul of legal institutions can contribute to sustained economic growth.

The study begins with analysis of the relationship between per capita income and the rule of law in a sample of 110 countries in 2016. The data on per capita income were obtained from the World Bank, while the rule of law variable is measured by the Rule of Law Index calculated by the World Justice Project (WJP).² I detect two important empirical regularities: (i) a positive relationship exists between the strength of the rule of law and per capita income; and (ii) as these two variables increase, the rule of law becomes more relevant to explain the behavior of per capita income.

I then interpret these regularities in light of economic theory and the empirical evidence documented in previous studies. The first of them is easy to grasp: since the good functioning of the markets is important for economic growth, and markets do not operate effectively without a solid legal structure, greater prevalence of the rule of law operates to induce growth. The second is that a country's weak adherence to the rule of law hampers the functioning of markets, causing them to become less relevant to determine the generation of income. This opens room for other factors (such as geography, culture, etc.) to play a more prominent role in the process in question. Therefore, the rule of law is less relevant to determine per capita income when it is weaker.

In countries with weak rule of law, the judicial resolution of disputes tends to be slower or even impossible. This phenomenon can adversely affect economic activity through at least three channels. The first is the impact on the financial markets, because the transactions carried out in the financial market require enforceable contracts.

The analysis of the other two channels is a bit more subtle. This topic is discussed in detail in Sections 4 and 5. The central element of this problem consists of the fact that firms that operate in countries with stronger rule of law tend to have lower costs than their peers in settings with less legal certainty. To understand this point, consider the situation of a hypothetical Brazilian company. To lease office and/or factory space, the firm will have to contract lease guarantee insurance, while a similar firm in another country will not have to incur this expense because the eviction process is fast and certain. More generally, since the relations involving suppliers, producers, distributors and consumers are governed by contracts, it is easy to conclude that the need for lease guarantee insurance is but one of the ways that legal uncertainty can increase production costs. These higher costs constitute the second channel by which weak rule of law adversely affects economic activity.

The third channel is related to comparative advantages. Since these are determined by relative costs, weak legal institutions act as a barrier for a country to develop comparative advantages, especially in the production of goods that depend on long and/or complex productive chains, because these chains require a larger number of contractual relationships.

In the specific case of Brazil, its rule of law index is slightly lower than average and marginally higher than the median of the sample. This means that there exists space for the country to improve its legal system. Since there is a rising relationship between the strength of the rule of law and per capita income, a reform of the country's legal institutions can boost its per capita income. Additionally, the empirical evidence suggests that the gain would not be negligible.

The rest of the paper is organized in six more sections. In Section 2, I discuss the relevant literature, while in Section 3 I analyze the statistical data and in Section 4 I interpret the empirical evidence. In the fifth section, I study the effects of weak rule of law on economic activity, followed by Section 6, which briefly discusses the possible impacts of a reform of the Brazilian legal system on per capita income. I present my final considerations in Section 7.

2. RELATED LITERATURE

There exists a long tradition in Economics that associates the good operation of markets with efficiency and growth. In this respect, Smith (1776) stated persuasively that the existence of free markets is essential for prosperity and well-being. Friedman (1962) presented arguments corroborating Smith's reasoning. Additionally, the development of the general equilibrium theory during the twentieth century established that competitive markets allocate resources efficiently.

However, markets do not operate in an institutional vacuum. Their adequate functioning requires a legal structure, i.e., laws and courts to enforce them. As mentioned, Adam Smith himself discussed this issue. Despite this, as correctly observed by Cooter and Schäfer (2012, preface), the field of Economics virtually did not communicate with the discipline of Law until the second half of the twentieth century. Only after the publication of the important article "The Problem of Social Cost" (Coase, 1960) did Law and Economics emerge as an important field for research.

Although often not explicitly announced, markets also exercise an important role in the modern literature on growth. Various works, such as Acemoglu and Robinson (2012), have analyzed the relevance of institutional factors for economic performance. Furthermore, Acemoglu, Johnson and Robinson (2005, subsection 2.1.1) clearly argued that institutions affect growth through their impact on markets. Rodrik (2005, subsection 5.1) presented a similar argument. De Haan, Lundström and Sturm (2006) conducted a survey of empirical works and concluded that the available evidence suggests that policies that promote the good functioning of markets tend to boost growth.

A channel through which the rule of law can influence economic activity is its impact on the decisions of firms to produce or purchase inputs. This problem, known as make-or-buy in the literature, has been widely studied by researchers in the areas of industrial organization and business strategy. Besanko, Dranove, Shanley and Schaefer (2010) provided a competent and accessible treatment of this topic.

One of the key reasons why Oliver Hart received the Nobel Prize for Economics in 2016 was his analysis of how the impossibility of a contract to cover all contingencies (incomplete contract approach) affects various economic decisions, including whether to make or buy. Part of Section 5 is based on Hart's approach, but instead of focusing on incompleteness, I analyze the effects of the efficacy (in the sense of enforceability) of contracts on this decision.

Da Ros (2015) showed that in relation to international standards, the Brazilian judicial system enjoys generous funding. Nevertheless, Brazil's Rule of Law Index is smaller than the average of the 110 countries in the sample considered and substantially lower than two other South American countries (Chile and Uruguay). Therefore, a reform of the legal system should be undertaken without worsening the problem identified by Da Ros.

The question studied in this essay is related to the problem of the impacts of the origin of the legal system on growth and other economic variables. In simplified form, there are basically two legal systems: common law and civil (or code) law, the latter of which can be divided into various traditions (e.g., German, French and Scandinavian). Brazil has a civil law system based on the French tradition.

Mahoney (2001) presented evidence that nations with common law legal systems tend to grow more rapidly than others. La Porta, Lopez-de-Silanes and Shleifer (2008) discussed this question in detail. Although concluding that the evidence presented by Mahoney needs some qualifications, they found the common law system to be associated with better economic results than the French civil law one. On the other hand, Milhaupt and Pistor (2008) argued that the literature on the economic effects of the origin of the legal system had not given proper attention to factors (that vary from one country to another) such as the degree of centralization of the legislative process and the judicial system, the functions performed by legal rules in support of economic activities, and the economic and political nature of the process of creating and applying the laws. In their view, these factors are potentially more relevant to economic growth than the legal system's origin *per se*.

The discussion described above opens the door to question whether strong rule of law is unique to countries with a specific legal heritage. The specific question is whether strong rule of law can only exist in countries with legal systems derived from common law. If the answer is yes, then countries, like Brazil, whose legal systems are based on code law will have difficulty enjoying the benefits associated with the strong rule of law. As discussed below, the evidence from database studied in this essay, at least partially, belies this negative scenario.

Of the 30 countries with the highest Rule of Law Index, 20 have civil law systems. Thus, it can be concluded that the rule of law is not a privilege of countries with common law systems. However, a qualification is necessary. The countries, like Brazil, that follow the French tradition hold eight of the top 30 positions, and only Holland (also influenced by the German tradition) and Belgium are among the top 20.

In general lines, the debate over how to enhance Brazilian growth hinges on two positions. One group of economists advocates the enactment of various macroeconomic reforms to enable balancing the public accounts, while the other group supports microeconomic and regulatory changes to improve the competitiveness of Brazilian companies. The book organized by Giambiagi and Almeida (2017) is representative of this latter vision. The former view is represented by Bresser-Pereira, Oreiro and Marconi (2016), according to whom stronger growth requires a macroeconomic policy that leads to a weaker real exchange rate, because that will increase the competitiveness of the industrial sector and thus the rate of GDP growth.

This paper is complementary to both approaches. The conclusions presented here suggest that a reform of the country's judicial institutions can positively impact the per capita income. Although Giambiagi and Almeida (2017) cover a wide range of potential policies, they do not specifically discuss judicial reform. On the other hand, in the view of Bresser-Pereira et al. (2016), industry has a central role in growth. And as discussed in Section 5 here, that sector would probably benefit from enhancement of the rule of law in Brazil.

3. ECONOMIC DEVELOPMENT AND THE RULE OF LAW: SOME EMPIRICAL REGULARITIES

In this section I undertake a brief investigation of the empirical relationship between the level of economic development and the strength of the rule of law. The first step of this analysis consists of discussing the indicators employed to measure the variables in question.

In line with the standard procedure in the growth literature, I adopt per capita income to measure economic development. The data in this respect come from the World Bank (in U.S. dollars, Atlas method) for 2016.³ To quantify the strength of the rule of law, I use the Rule of Law Index, calculated by the World Justice Project (WJP). For the purpose of this section, it is sufficient to state that: (i) this indicator assumes values in the interval $[0,1]$; and (ii) the higher its value, the stronger a country's rule of law is. More detailed information about this variable is available in Appendix A.

The 2016 version of the Rule of Law Index of the WJP contains data on 113 countries. The World Bank makes available the per capita income of 110 of those nations, which compose the sample studied here. Appendix B contains the complete list of these 110 countries.⁴

It is necessary to establish some notation. The letters L and y denote, respectively the Rule of Law Index and per capita income. When pertinent, I use a subscript to denote the country, where i corresponds to a generic country. A bar above a variable indicates it represents the corresponding sample mean.

Some descriptive statistics of L and y are reported in Table 1.⁵

Table 1
Descriptive Statistics

Variable	Mean	Median	Standard Deviation	Maximum	Minimum	Asymmetry	Kurtosis
y	13,775	6,500	16,922	82,330	320	1.7047	2.3305
L	0.5762	0.5386	0.1403	0.8868	0.3251	0.5560	-0.5895

Source: author's calculations.

Because the focus here is on Brazil, and the fact that the USA is often used a benchmark and Brazil is often compared with the other BRICS countries, Table 2 below presents the statistics of these countries.

Brazil's per capita income is slightly below one-sixth that of the USA. Both the per capita income and Rule of Law Index of Brazil are greater than the respective medians but below the corresponding means. Brazil is very near the median of the ranking of the Rule of Law Index and slightly above it when considering the order defined by the variable y_i .

Table 2
Brazil, USA and other BRICS countries

Country	L		y	
	Value	Ranking	Value	Ranking
Brazil	0.5538	52	8840	45
USA	0.7391	18	56,180	3
South Africa	0.5861	43	5,480	62
China	0.4813	80	8,260	48
India	0.5129	66	1,680	89
Russia	0.4530	91	9,720	42

Sources: World Bank, WJP and author’s calculations.

The relationship between per capita income and the rule of law is illustrated in Figure 1. The points referring to Brazil and the USA are indicated with a square and triangle, respectively. The graph also contains a regression line, estimated by the ordinary least squares method⁶, relating the two variables.

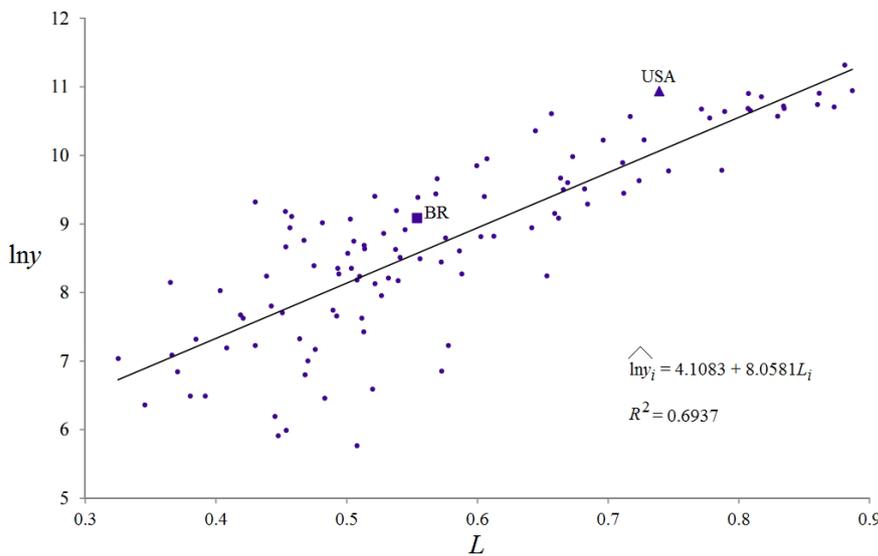


Figure 1. Per capita income (*y*) and rule of law (*L*).

Of course, this figure alone is not sufficient to make any inference about the direction of a possible causality relationship between the two variables. Nevertheless, it is possible to identify some relevant facts. The rest of this section is dedicated to this discussion.

There is a positive relationship between the variables. However, this trivial observation is far from exhausting the implications of the figure. Of particular note is the absence of any points in the extreme northwest of the graph. Hence, there is no country that simultaneously has high per capita income and weak rule of law. Likewise, the absence of points in the extreme southeast implies there is no country with low per capita income and strong rule of law.⁷

As indicated in Table 1, $\bar{L} = 0.5762$. The visual inspection of Figure 1 suggests that the points where $L \geq \bar{L}$ in general are nearer the least squares regression line than points that satisfy

the condition $L < \bar{L}$. In other words, the level of the rule of law is apparently a more accurate predictor of per capita income for countries with relatively high L than those with a relatively low value of this variable. This observation is investigated in the next paragraph.

The first step is to partition the data into two subsamples, one of them composed of countries where $L_i < \bar{L}$ and the other of countries where $L_i \geq \bar{L}$. Then the ordinary least squares method is used to estimate the equation:

$$\ln y_i = \alpha + \beta L_i + \varepsilon_i \tag{1}$$

for the two subsamples. The results are presented below (Table 3).

Table 3
Estimation of equation (1) by subsamples (partition by the mean)

Subsamples	Observations	α	β	R^2	MSE
$L_i < \bar{L}$	66	4.1188	8.0195	0.2383	0.7442
$L_i \geq \bar{L}$	44	4.3528	7.7356	0.6397	0.2811

Source: author's calculations.

The difference between the estimated values of β of the two subsamples is modest. The same applies to the parameter α . Additionally, both R^2 and the mean squared error (MSE) suggest that equation (1) tends to generate more accurate forecasts of y when the values of L are relatively higher.

In summary, the brief statistical analysis in this section identified two important empirical regularities (ERs):

ER1: A positive relationship exists between L and y .

ER2: As L grows, the relationship mentioned above becomes stronger, in the sense that the fraction of y that is explained by equation (1) grows.⁸

4. INTERPRETATION OF THE TWO EMPIRICAL REGULARITIES

The objective of this section is to apply the economic science to the analysis and comprehension of the two empirical regularities identified in the previous section. The relationship between markets and economic growth, which was briefly discussed in Section 2, has a central role in the arguments presented next.

4.1. INTERPRETATION OF ER1

The markets do not operate in an institutional vacuum. Among other factors, good functioning requires a solid legal structure. To illustrate this point, imagine the following hypothetical situation.⁹ Company E is the owner of a real asset (e.g., a real property) that it wants to rent for one month, while company F wants to use the asset for that period. The rent will be paid at the end of the month. Suppose that E and F are domiciled in a country without any justice system. Thus, if F does not pay the rent owed, it does not suffer any penalty. The figure below (Figure 2) illustrates the situation faced by E and F as represented by game theory.

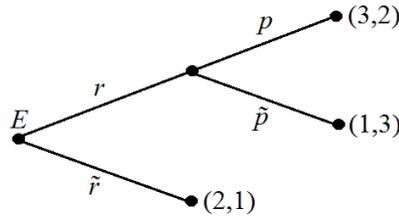


Figure 2. Rental in a country without a justice system.

Player E chooses between renting (r) and not renting (\tilde{r}) the asset. If it follows the second course of action, the game ends. If it rents the property, then F enjoys the asset and at the end of the period will choose between paying (p) and not paying (\tilde{p}) the rent. The game ends after F implements its action.

The payoffs specified in Figure 2 correspond to the order attributed by each player to the three possible outcomes of the game. Consider the standpoint of E . For this player, the best scenario is that where it rents the property (r) and F pays the rent (p). Its payoff in that context is equal to 3. The worst alternative is that where it rents the property (r) and F does not pay the rent (\tilde{p}). A payoff of 1 is attributed to this alternative. Finally, the scenario where E does not rent the property is, from its standpoint, an intermediate result. Thus, its payoff is 2. In the case of player F , the most beneficial situation is that where it rents the property and does not pay the rent. Thus, its payoff is 3 if it plays \tilde{p} after E plays r . It is assumed here that F prefers to use the property and pay the rent to not using it. For that reason, the payoff of F when using the asset and paying the rent is equal to 2, while if E chooses not to rent the property, the payoff of F assumes the value 1.

The game is solved by backward induction. Consider the situation of F . He will obtain payoff of 2 if he plays p , while the choice of action \tilde{p} will produce a payoff of 3. Hence, if he has an opportunity to play, he will choose \tilde{p} . In the case of player E , he can choose \tilde{r} and receive payoff of 2. If he opts for r , then F will choose \tilde{p} , causing the payoff of E to be 1. Therefore, \tilde{r} is the optimal choice of E and the property will not be rented.

The payoffs of E and F in the outcome described above are, respectively, 2 and 1. Note that if E played r and F played p , then the agents would have obtained the payoffs specified in the vector (3,2). Hence, the result of the game is inefficient, since there is a combination of actions (i.e., r and p) that allow higher payoffs for both players. I next show that the introduction of an effective judicial system eliminates the inefficiency identified here.

Suppose that if F uses the asset and does not pay the rent, an external agent (a court) will apply a penalty (for example, a fine) so that for F , the choice of \tilde{p} is less attractive than p . Formally, let x be a real number less than 2. In this new context, the strategic interaction between the players E and F can be represented by the figure below (Figure 3).

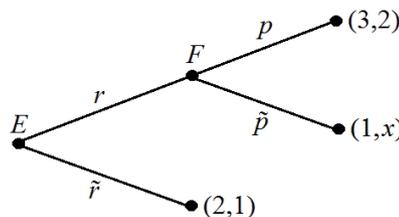


Figure 3. Rental in a country with a justice system.

Since $x < 2$, F will implement p if it has the opportunity to play. Thus, if E chooses r , his payoff will be 3. On the other hand, if he chooses \tilde{r} , then he will receive a payoff of 2. Therefore, in equilibrium, E and F respectively choose r and p .

In summary, the justice system allows economic agents to commit to implementing certain actions and imposes penalties for deviations from what was previously arranged by contract. This modifies the strategic relationship between the players so that a better outcome can be attained, from the viewpoint of all the parties involved, than what can be achieved in the setting without legal guarantees.¹⁰

The example above illustrates how the existence of a judicial system enables the realization of transactions that otherwise would not happen. The good functioning of a market economy requires that agents engage in secure transactions. Hence, it can be concluded that the existence of an effective legal framework allows a greater volume of transactions, provides a better allocation of productive resources, and encourages the accumulation of physical and human capital, among other benefits. In other words, an effective court system leads to higher income and social welfare.

It is important to bear in mind that an effective justice system is not only relevant for a small fraction of transactions or those that are highly complex (e.g., the construction of a large hydroelectric project). Even exchanges that at first glance are very simple require a sophisticated legal structure. For illustration, consider the purchase of a cup of espresso coffee at a lunch counter with payment in cash. This is one of the simplest transactions among those that occur in the contemporary world. However, even this transaction is far from being simple from a legal standpoint. The interaction between the seller and buyer of the final product is the exchange of cash for a product with low value. However, the productive chain of the cup of coffee requires a considerable number of contracts. First consider the coffee beans. Their producer (farmer) probably obtained one or more loans and certainly relied on labor, transportation, storage, and packaging. Then the coffee shop has to purchase the machine to brew the coffee, pay the electricity bill and rent the premises. All the items described above (which by no means exhaust the list) require contracts that are effective only in the presence of a legal structure.

Indeed, it is not a trivial task to identify a transaction that occurs routinely in the modern world that does not rely on a strong legal framework. Consequently, the good functioning of the contemporary economy requires a sophisticated legal system.

The explanation above contains the elements necessary for interpretation of ER1 (i.e., the variables L and y are positively related). Since economic activity requires the existence of a legal structure, it is not surprising that the greater a country's adherence is to the rule of law, the better its economy will tend to function. Therefore, higher values of L are associated with higher values of y .

4.2. INTERPRETATION OF ER2

As was the case of ER1, the understanding of ER2 is based on the fact that the good functioning of markets depends on a solid legal structure. For illustration here, consider a hypothetical society that existed some five thousand years ago. Its members engaged in hunting, fishing and farming. The markets were very rudimentary, so that the few transactions that took place were by barter. A justice system, if existing, was very primitive. In that context, random factors such as soil and climate quality and availability of water, animals and fish, etc., were the main determinants of production and wealth.

Obviously, the example above is an extreme case where the level of per capita income is governed mainly by random factors. Nevertheless, it illustrates an important point: factors like climate and availability of natural resources tend to be more important to determine per capita income for countries where the markets do not function adequately. And this tends to be the case precisely in countries with weak rule of law. Consequently, it is natural for the capacity of L to explain y to grow with higher L .

5. IMPACTS OF WEAK ADHERENCE TO THE RULE OF LAW ON THE ECONOMY: AN OVERVIEW

In this section, I undertake a preliminary examination of the effects of weak rule of law on the economy. More specifically, I address some of the questions related to the financing of economic activity, the efficiency of firms and the determination of comparative advantages.

The most obvious channel through which weak rule of law can adversely affect economic activity is the impacts on obtaining credit. Firms can be financed either by outside capital (debt) or internal capital (equity). Both options require a solid legal structure. Loans and financing are governed by contracts, while the rights of shareholders (especially minority ones versus controllers) are specified in laws as well as corporate documents (bylaws, shareholders agreements, etc.). Therefore, both forms of financing require a legal structure with enforceable laws and contracts.

Various studies have investigated the relationship between economic growth and the health of the financial sector. Levine (2005) reviewed this literature and found empirical evidence strongly in favor of the hypothesis that markets and financial institutions are important determinants of economic growth. The combination of this fact with the argument developed in the preceding paragraph allows concluding that the financial system is one of the channels through which adherence to the rule of law influences countries' per capita income levels.

The make-or-buy decision is another route through which L can influence y . For instance, consider the situation of a newspaper published in a given city. The publisher will need to decide on how to distribute the printed edition to subscribers: create a department responsible for delivery (make) or contract a logistics firm (buy). The decision to make will require hiring workers with all the complications of labor relations, while the choice to buy will demand durable interaction with the delivery firm. In both cases, in one way or the other the publisher will need to engage in contractual relationships.

Although contracts are necessary either to produce or purchase, the relative strength of the rule of law will affect the attractiveness of one option in relation to the other. Suppose that it is less expensive to outsource the delivery operation. However, that option can have the disadvantage of less reliability, in the sense that delivery failures can be more likely due to the absence of direct control over the workers. The typical solution for this type of problem is to include a clause in the contract stipulating a fine for delivery failures exceeding a preset level considered acceptable by the publisher. Obviously, the effectiveness of that solution depends on the speed and effectiveness of the judicial system. In a country where the rule of law is relatively strong, the publisher will tend to choose to contract a delivery service to save money. On the other hand, if the value of L is relatively low, the optimal choice will be to create an in-house delivery department.

Although simple, the example above illustrates an important point: make-or-buy decisions are affected by the relative efficacy of the judicial system. In a society with weak adherence to the rule of law, firms can make decisions that are different from those that would be optimal if the

value of L were higher. Consequently, companies that operate in countries with weak rule of law will tend to have higher costs.

This last conclusion has implications for the determination of competitive advantages, since these depend on relative costs. Let R and S be two hypothetical countries, both of which have large oil reserves. Furthermore, $L_R < L_S$. The question that arises is: which country will have a comparative advantage in refining the crude oil? Well, the refining of petroleum is a complex process. It requires constructing refineries, storing the crude oil, producing the various derivatives and distributing them, etc. All along this chain there are make-or-buy decisions. Therefore, the cost of refining will tend to be higher in R than S .

This example illustrates a more general principle: it will be hard for a country with weak rule of law to have a comparative advantage in producing a good that has a relatively long and complex productive chain. Obviously, this applies to the great majority of manufactured goods. This point will be discussed in more detail in the next two paragraphs.

The occurrence or not of the deindustrialization of the Brazilian economy has been the topic of much debate among researchers. For example, Oreiro and Feijó (2010) argued that this phenomenon was already under way at that time. Additionally, Faleiros, Silva and Nakaguma (2016) provided evidence, referring to the 1996-2011 period, of falling average labor productivity in Brazilian industry, leading to lower participation of goods produced locally in domestic consumption of manufactured goods. On the other hand, Nassif (2008) stated that, at least for the period after 1990, there was no loss of importance of industry in Brazil. Bonelli and Pessôa (2010) presented a similar argument.

It is outside the scope of this paper to undertake a detailed analysis of this theme. However, the fact that contracts are more relevant in complex productive activities suggests that industry is one of the sectors that would benefit the most by enhanced rule of law.

6. A PRELIMINARY ANALYSIS OF THE IMPACT ON PER CAPITA INCOME OF A REFORM OF THE JUDICIAL INSTITUTIONS IN BRAZIL

The objective of this section is to investigate the impact on per capita income in Brazil should a reform manage to raise the country's Rule of Law Index. However, before starting this exercise, it is necessary to present some preliminary considerations.

The analysis presented in Section 2 was focused on the correlation between y and L . The two empirical regularities enunciated at the end of that section say nothing about a possible relationship of causality between the two variables. Indeed, it is known that correlation does not imply causality. Thus, for the exercise to be relevant, it is first necessary to establish that L "causes" y in the following sense: governmental action can positively affect the value of L and that change will have impacts on y . So, the government (understood here as the combination of the executive, legislative and judicial branches) is able to alter the legal framework to affect the value of L . Additionally, the analysis developed in Sections 4 and 5 establishes that several economic variables would be affected by that change. More specifically, growth of L would tend to reduce the production costs and enable transactions that would not occur under the status quo.¹¹

Initially, I obtain a cap on the possible gain in terms of per capita income if Brazil succeeded in raising its Rule of Law Index to that of the United States. According to the data underpinning Figure 1, any nation that has the same level of adherence to the rule of law as the USA should

have, according to the prediction generated by the ordinary least squares regression line, yearly per capita income equal to US\$ 23,478.79.

As mentioned, this amount should be interpreted as an upper limit. There are various reasons for this. Among others, this number is 165.6% greater than Brazil's per capita income. Since that gain would be substantial, I prefer to adopt a more cautious stance and interpret the value of US\$ 23,478.79 as a very optimistic upper bound. Furthermore, the bivariate analysis carried out here does not control for various other factors that can affect y . For example, suppose that to finance the legal and judicial reforms necessary to raise the value of L to the level of the USA, the Brazilian government had to raise the tax burden substantially. This might well reduce the impacts of a stronger rule of law on per capita income.

Despite this reservation, it is necessary to mention that additional evidence exists that this type of reform can indeed lead to a substantial gain of per capita income. Consider Chile, which is the only country in South America to serve as a model to assess the effects of such reform.¹² The data suggest that the strong rule of law in that country corresponds, on average, to per capita income 67.6% higher than Brazil's. Additionally, among all the countries in the sample where $L_i > L_{USA}$, the lowest per capita income is equal to US\$ 17,570. This amount exceeds Brazil's per capita income by 98.8%.

In summary, the evidence presented in this paper suggests that Brazil could substantially raise the growth of y if it could raise L considerably. If not, the country would be a notable exception to the international experience.

7. FINAL CONSIDERATIONS

The objective of this paper consisted of examining the relationship between adherence to the rule of law and the level of economic development of nations. I initially conducted an empirical investigation of the relationship between the Rule of Law Index computed by the Word Justice Project (WJP) and the per capita income of 110 countries in 2016. The results indicated the existence of a positive correlation between the two variables. Additionally, I found that higher values of the Index are associated with greater capacity to explain per capita income.

These two empirical regularities were interpreted in light of the current theoretical and empirical knowledge of economics. The markets do not operate in an institutional vacuum. Their functioning requires economic agents to enter into a welter of contractual arrangements, and these are more effective with stronger rule of law. Based on the evidence that the good functioning of markets is one of the engines of economic growth, it is natural for a relationship to exist between the WJP Index and per capita income.

The interpretation of the second empirical regularity is based on an extension of the argument presented in the preceding paragraph. In countries with less solid and effective legal institutions, the functioning of markets is hindered, so they are less relevant to determine income levels. Consequently, other factors, including random ones (such as availability of natural resources and wars) play a more relevant role. In turn, this causes the WJP Index to be less able to explain the behavior of per capita income.

I also analyzed the impact of weak rule of law on economic activity. The effects of fragile judicial institutions on financial markets and the consequent adverse effects on growth have been widely addressed in the literature. However, in this paper I raise the possibility that countries with weak rule of law are unlikely to achieve comparative advantages in the production of goods that have relatively long and/or complex production chains.

Brazil's level of adherence to the rule of law is substantially lower than that of developed countries like the USA, United Kingdom, or Japan. The combination of the empirical evidence discussed here with economic theory suggests that reforms to improve Brazil's judicial system could enhance the growth of the country's per capita income.

In conclusion, Lucas Jr. (1988) stated that at the moment one begins to reflect on the various implications resulting from fact that economic growth occurs at faster or slower rates, it becomes extremely difficult to think about any other question. An analogous situation may exist here: at the moment one perceives how strongly economic activity depends on the legal structure, it becomes hard not to think about the potential benefits Brazil could obtain if it improved its legal institutions.

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CONFLICTS OF INTEREST

The author declares there are no conflicts of interest that could have affected the development of this paper.

NOTES

- 1 Smith clearly expressed this vision in Chapter III of Book V: “Commerce and manufactures can seldom flourish long in any state which does not enjoy a regular administration of justice; in which the people do not feel themselves secure in the possession of their property; in which the faith of contracts is not supported by law; and in which the authority of the state is not supposed to be regularly employed in enforcing the payment of debts from all those who are able to pay. Commerce and manufactures, in short, can seldom flourish in any state, in which there is not a certain degree of confidence in the justice of government.”
- 2 Section 3 and the Appendix A contain additional information about the WJP and its Rule of Law Index.
- 3 Data available at the website <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD>.
- 4 The reader might ask whether it would be possible to include other years in the sample. That would reduce the number of countries studied, because in 2015 the number of countries included by the WJP was smaller. And more importantly, the values of the Rule of Law Index are not easily comparable from one year to the next. The WJP’s website recommends caution when performing intertemporal comparisons.
- 5 Appendix B contains the frequency distributions and histograms of L and the natural logarithm of y .
- 6 I used the ordinary least squares method (without correction of the standard deviations or any other type of adjustment) in all the estimates carried out in this paper.
- 7 According to Milhaupt and Pistor (2008, p. 5), “many countries have achieved remarkable economic growth with legal systems that do not live up to the rule-of-law ideal.” However, the data analyzed here suggest that a strong rule of law is a necessary condition for a nation to grow sufficiently to become one of the wealthiest in the world. Indeed, among the countries with per capita income in the highest decile of the sample, the value of L of the USA is equal to 0.7391, while $L > 0.8$ for all the other countries.
- 8 In Appendix C, I show that these empirical regularities are robust to other ways of dividing the sample. Another important question is their robustness to the introduction of control variables. I leave it to future studies to obtain a detailed response to this question. In any event, it should be mentioned that the conclusions of Mendonça and Fonseca (2012) shed some light on that matter. Utilizing control variables, they presented evidence that an increase in the rule of law tends to reduce (with statistical significance) corruption in emerging countries, while this effect is not significant for richer countries. Additionally, they concluded that corruption has an adverse impact on GDP per capita and that it tends to be stronger in developing than in developed countries. The combination of these two conclusions suggests that: (i) as in the case of ER1, there is a positive relationship between the level of rule of law and GDP per capita; and (ii) just as for ER2, the nature of the relation between L and y depends of the country’s degree of development.
- 9 The example analyzed here is similar to that discussed by Baird, Gertner and Picker (1994, pp. 54-56).
- 10 It should be mentioned that the example addressed here applies not only to the rental of a real assets. Similar analysis is valid in various other contexts, such as the purchase of goods in installments, purchase of goods with payment before delivery and bank loans.

- 11 According to Acemoglu et al. (2005), the institutions determine growth. In turn, Jones (2016, p. 51) stated that economic success is affected by the “rules that are put in place”. Likewise, Cooter and Schäfer (2012, p. 12) argued that “better law can promote innovation and increase a nation’s wealth.” The analysis performed here follows the reasoning of those authors.
- 12 Besides Brazil, the sample contains nine other South American countries. Of them, only Argentina, Chile and Uruguay have a stronger rule of law than Brazil (Argentina’s is essentially equal to Brazil’s). Uruguay’s index is very near that of the USA, a country with which Brazil has been compared.
- 13 Additional information about the Doing Business project is available at the website <http://www.doingbusiness.org>.

APPENDIX A: THE RULE OF LAW INDEX

Here I discuss the origin and properties of the Rule of Law Index. In general, the information presented and discussed here is available in WJP (2017) and at the website <https://worldjusticeproject.org/>. Exceptions are mentioned as they occur.

The indicator was created by the World Justice Project (WJP). This entity was founded in 2006 as a presidential initiative of the American Bar Association. In 2009, the WJP was separated from the Bar Association and became an autonomous organization. Its main objective is to promote the rule of law worldwide.

The Rule of Law Index is a quantitative tool that seeks to measure the adherence of each country to the rule of law. The data for 2016 are available in WJP (2017), as well as at the website <https://worldjusticeproject.org/our-work/wjp-rule-law-index/wjp-rule-law-index-2016/current-historical-data>. This was the sixth edition of the Index, which has annual frequency.

The Rule of Law Index is calculated based on the following eight subindices: (1) Constraints on Government Powers; (2) Absence of Corruption; (3) Open Government; (4) Fundamental Rights; (5) Order and Security; (6) Regulatory Enforcement, (7) Civil Justice; and (8) Criminal Justice. In turn, these subindices have divisions. For example, subindex (3) has the following components: (3.1) publicity of laws and government data; (3.2) right to information; (3.3) civic participation; and (3.4) complaint mechanisms.

Each component of a subindex receives a score in the interval $[0,1]$, where 1 corresponds to the strongest possible adherence to the rule of law. The score of each subindex is the simple arithmetic mean of the scores of its components. Finally, the value of the Rule of Law Index is given by the simple arithmetic average of the scores of the eight subindices.

The score of each component of each subindex is assigned based on interviews conducted with a fraction of the inhabitants of each country and also with local specialists. To compute the index for 2016, a total of 110 thousand interviews were conducted among members of the public and 2.7 thousand with experts. The data collected are submitted to reliability and sensitivity tests, which, according to the information at the website <http://worldjusticeproject.org/methodology>, counts on the participation of the Econometrics and Applied Statistics Unit of the European Commission's Joint Research Center.

As a consequence of the procedures described above, the Rule of Law Index assumes values in the interval $[0,1]$. The greater the value, the stronger the rule of law is of the country under analysis.

According to Versteeg and Ginsburg (2017, p. 101), the WPJ Rule of Law Index is the most comprehensive indicator of adherence to the rule of law. The reason is that it has the broadest definition of the rule of law by covering the widest range of aspects (absence of corruption, indicators of criminality, protection of property rights, etc.) among similar indicators available.

I conclude this section with a brief analysis of the performance of the WPJ's Rule of Law Index in comparison with other related metrics. Versteeg and Ginsburg (2017, p. 102) compared it with the governance index of the World Bank and the rule of law indices of the Heritage Foundation and Freedom House. With the exception of the last one, they found the correlation coefficient between any pair of indicators was higher than 0.95. Furthermore, the correlation coefficient of the Freedom House indicator with the others was greater than 0.78.

The indicators of the Doing Business project¹³ are very popular among researchers in the area of economics. For this reason, I used them to perform a similar exercise to that conducted with the WPJ Index. Among the 10 items of the Doing Business index, three are clearly related to the concept of rule of law: enforcing contracts; resolving insolvency; and protecting minority

investors. I denoted these respectively by EF, RI and PMI. The table below presents the correlation matrix for 2016 of these variables with *L* (the WJP’s Rule of Law Index).

Table 4
Correlation Matrix

Variable	L	EF	RI	PMI
<i>L</i>	1			
<i>EF</i>	0.578	1		
<i>RI</i>	0.658	0.487	1	
<i>PMI</i>	0.490	0.483	0.564	1

Source: author’s calculations

The three pairwise correlation coefficients between the Doing Business indicators are 0.487, 0.483 and 0.564. The coefficients of *L* with *EF* and *RI* are greater than those values, while the coefficient between *L* and *PMI* (0.490) is lower than the greatest of the three values. Hence, it can be concluded that the correlations of *L* with *EF*, *RI* and *PMI* are as a general rule greater than the pairwise correlations of the Doing Business indicators.

The results presented in the previous paragraph and the conclusions of Versteeg and Ginsburg (2017) discussed above suggest that the WJP’s Rule of Law Index is a metric of the rule of law consistent with the other indicators currently available. Additionally, as pointed out by those authors, the WJP’s index is a broader measure of countries’ levels of the rule of law.

APPENDIX B: FREQUENCY DISTRIBUTIONS AND HISTOGRAMS

Table 5
Frequency distribution of L

L	Frequency	
	Absolute	%
0.3000-0.3599	2	1.82
0.3600-0.4199	9	8.18
0.4200-0.4799	19	17.27
0.4800-0.5399	26	23.64
0.5400-0.5999	14	12.73
0.6000-0.6599	9	8.18
0.6600-0.7199	11	10.00
0.7200-0.7799	6	5.45
0.7800-0.8399	9	8.18
0.8400-0.8999	5	4.55
Total	110	100

Source: author's calculations.

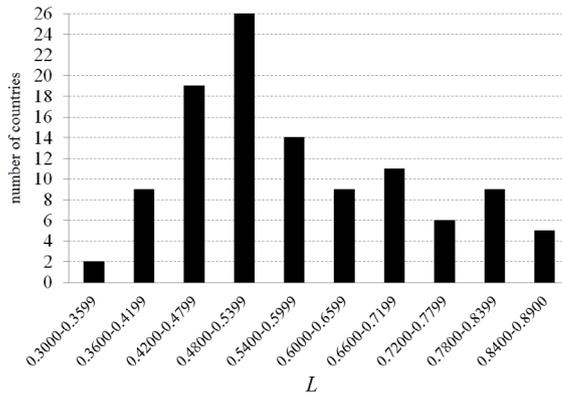


Table 6
Frequency distribution of ln y

ln y	Frequency	
	Absolute	%
5.5000-6.0999	3	2.73
6.1000-6.6999	6	5.45
6.7000-7.2999	10	9.09
7.3000-7.8999	10	9.09
7.9000-8.4999	17	15.45
8.5000-9.0999	20	18.18
9.1000-9.6999	17	15.45
9.7000-10.8999	8	7.27
10.3000-10.8999	14	12.73
10.9000-11.4999	5	4.55
Total	110	100

Source: author's calculations.

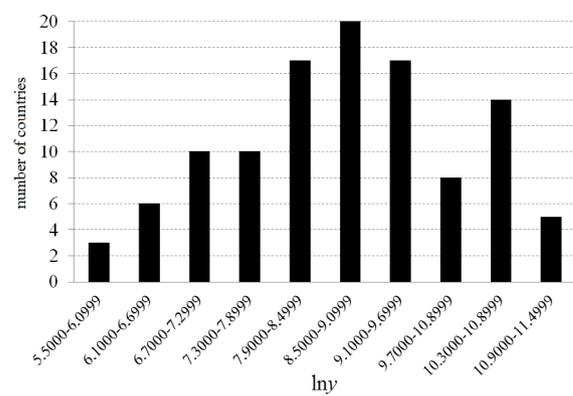


Figure 4. Histograms of L and $\ln y$.

APPENDIX C: ROBUSTNESS OF ER1 AND ER2

In this appendix I examine whether the two empirical regularities identified in Section 3 also hold when the sample is partitioned differently than done in that section. The sample was divided by the median \tilde{L} of the Rule of Law Index and by its quintiles.

The table below reports the results when the sample was partitioned based on \tilde{L} .

Table 7
Estimation of equation (1) by subsamples (partition by the median)

Subsample	Observations	α	β	R^2	MSE
$L_i < \tilde{L}$	55	4.3764	7.4180	0.1657	0.7774
$L_i \geq \tilde{L}$	55	4.4318	7.6301	0.6539	0.3366

Source: author’s calculations

Except for the number of observations in each group, none of the values are substantially different that the counterparts in Table 3. Therefore, the same reasoning used in Section 3 can be applied to conclude that both ER1 and ER2 are consistent with this alternative partition of the sample.

The table below presents the results obtained when the data were divided into quintiles of L .

Table 8
Estimation of equation (1) by subsamples (partition by quintiles)

Subsample	Observations	α	β	R^2	MSE
1 st quintile	22	4.7601	6.4098	0.0665	0.8276
2 nd quintile	22	9.2104	-2.5230	0.0025	0.7975
3 rd quintile	22	3.2767	9.6910	0.0658	0.5619
4 th quintile	22	2.1504	11.1558	0.3007	0.4176
5 th quintile	22	5.8875	5.8217	0.4595	0.1170

Source: author’s calculations

Other than the second quintile, the estimate of β is always positive. However, in this quintile the value of R^2 is also very close to zero. Thus, except for the subsample in which there apparently is no strong relationship between y and L , these two variables are positively related. In other words, ER1 is confirmed in the results presented above. With respect to ER2, two observations are in order: (i) the value of MSE decreases with increasing quintiles of L ; and (ii) the value of R^2 is nearly zero in the first three quintiles and grows in the fourth and fifth quintiles. Consequently, ER2 is also consistent with the results presented in Table 8.

Afghanistan; Albania; Antigua and Barbuda; Argentina; Australia; Austria; Bahamas; Bangladesh; Barbados; Belarus; Belgium; Belize; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Cambodia; Cameroon; Canada; Chile; China; Colombia; Costa Rica; Cote d'Ivoire; Croatia; Czech Republic; Denmark; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Estonia; Ethiopia; Finland; France; Georgia; Germany; Ghana; Greece; Grenada; Guatemala; Guyana; Honduras; Hong Kong; Hungary; India; Indonesia; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kyrgyzstan; Lebanon; Liberia; Madagascar; Malawi; Malaysia; Mexico; Moldova; Mongolia; Morocco; Nepal; Netherlands; New Zealand; Nicaragua; Nigeria; North Macedonia; Norway; Pakistan; Panama; Peru; Philippines; Poland; Portugal; Romania; Russia; Senegal; Serbia; Sierra Leone; Singapore; Slovenia; South Africa; South Korea; Spain; Sri Lanka; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Suriname; Sweden; Tanzania; Thailand; Trinidad and Tobago; Tunisia; Turkey; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States; Uruguay; Uzbekistan; Vietnam; Zambia; Zimbabwe.