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GEOGRAPHY, INTERNATIONAL TRADE AND INSTITUTIONS: AN ECONOMETRIC ANALYSIS OF THE BRICS

Geografia, comércio internacional e instituições: uma análise econométrica dos BRICS

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Introduction

After two decades of intense debate about the determinants of economic development, with authors examining the variables that characterize geography, institutions and international trade, BRICS countries were left behind. Thus, in order to fill this gap, this paper uses econometrics of panel data to analyze the economic performance of these developing nations. Mainstream economists have run into serious problems to deal with these particular determinants within the traditional endogenous growth model, and they have not come up with an agreement, so they keep trying to figure out who is the "winner of this competition". Empirical evidence shows that there is not a unique explanatory determinant, and recognizing which of them can provide the best understanding depends on the particularities of each case (ROS, 2013). Examining BRICS as a group of countries demonstrates that these specific developing nations share some remarkable features. They are rapidly-growing nations with a vast amount of land and growing participation in international trade. So, empirical tests are feasible and desirable in order to understand their recent development. However, they are also different in many aspects, mostly in terms of institutional characteristics. Thus, our goal is to find out if the econometrics of panel data can shed some light on this ongoing debate.

The aim of this paper is twofold. It seeks the understanding of the recent history of the BRICS and to empirically test the importance of the omitted determinants of growth (geography, institutions and

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international trade) in the case of these five countries. The World Bank, the IMF and various research institutes have been gathering information about the five states over the last decades. Our empirical model tests if these determinants have had impact on their income per capita. The empirical section uses the Hausman-Taylor estimator to pool both cross sectional data (time invariant data such as geography measures) with time series data (time variant measures such as indices from the World Bank). Section 2 presents the context that explains how BRICS arose as a group. Section 3 gathers the main branches of literature regarding the effects of the three deep determinants of growth and presents our independent variables. This sets the stage for our empirical results. Section 4 explains the model, the data, and the Hausman-Taylor estimation procedure that makes using recent World Bank institutional measures a possible panel dataset. Finally, section 5 discusses the results in the context of our discussion, and section 6 presents the conclusion.

BRICS

Developing an approach linked to international relations' hegemonic stability theory, the Italian economist Giovanni Arrighi (2010) attempted to explain the evolution of the international system through a succession of hegemonies between which it is possible to identify some transitional periods, which initiate with what the author himself calls a "signal crisis" and end with a "terminal crisis", that demarcates a new period of hegemony.

With the debacle of the Soviet Union, we could envision, given the American triumph in the Cold War, the rise of a new unipolar era, that is to say the enshrinement of the Pax Americana. After a power gap left by the British downfall at the beginning of the twentieth century, the post-1991 signalized that another hegemonic cycle of Arrighi's theory was taking place. Even though, since the symbolic milestone of the September 11 attacks in New York, the possibility of an American long-term prevalence was tightly contested by many analysts, including Jim O'Neill, researcher on global economics at Goldman Sachs. That was the context when he, in 2001, attached, to Brazil, Russia, India and China, the label BRIC: emergent nations with a high economic growth potential which could complement or undermine Western dominance. Only in 2003, however, O'Neill made a deeper analysis of the aforementioned group. With a prediction that the four BRIC economies would overcome the GDP of G6 countries in 2050, the term became popular and reached an influence network that transcends the financial sphere.

O'Neill's classification has surely eased the creation process of a political group. Since 2005, with the invitation of Russian chancellor Sergey Lavrov for an informal meeting on the backstage of the United Nations General Assembly (UNGA), a series of formal and informal gatherings among heads of State and ministers has taken place, and its apex can be portrayed by the "BRICS summits", hold annually since 2009.

Furthermore, it could be said that the process of cooperation between BRIC countries began in the field of international finances, taking into account the dissatisfaction with the anti-democratic processes adopted by the World Bank (WB) and the International Monetary Fund (IMF) for selecting their managers and, in addition, with the anachronistic IMF quota system. The consensus which was reached in this domain

led to efforts of cooperation in other sectors, such as education, public health, agriculture, defense, cooperatives and judiciary system. It is within this perspective that Stuenkel (2015) identifies a spillover process, different, however, from Haas's neofunctional[4] concept, since it is not related to interest groups outside the government willing to guide the integration process.

In 2010, with South Africa's entry to the bloc, BRIC became BRICS and, hence, consolidated itself as a political group, deviating from the criterion envisioned by O'Neill, who expressed dissatisfaction with this admission. South Africa, without a large population or an expressive economic growth as other countries, such as Nigeria and Indonesia, represented an African leadership provided of a remarkable amount of soft power due to the building of solid democratic institutions since the end of the apartheid regime. Thus, this recent enlargement strengthens the bloc's bargaining power in multilateral negotiations.

Alongside the fifth BRICS Summit, in 2013, the release of the idea of building a group's development bank by India was the necessary boost toward the bloc's effective institutionalization. Under this scenario, in the sixth Summit, in 2014, the Bank's creation was formalized. The so-called New Development Bank was endowed with a $100 billion initial authorized capital and a $50 billion subscribed capital. It was decided to allocate its headquarters in Shanghai; furthermore, the first president would be Indian. Moreover, the partnership decided to create a Contingency Reserve Arrangement as well, also provided with a $100 billion initial capital and addressed to tackle liquidity crises due to short-term difficulties in the balance of payments, analogously to IMF. A conspicuous difference between these two new institutions concerns the members' participation quotas; whilst all the five partners contribute with the same amount in the case of the Bank and, hence, have the same voting power, their financial contributions and voting rights are unequal in the Contingency Reserve - China is the most important shareholder, and South Africa the least.

In spite of the described process of institutionalization cooperation, many analysts remain skeptical with respect to prospects for the deepening of integration between the five countries. The main critique concerns the lack of cohesion among members: three democracies (Brazil, South Africa and India) contrast with two authoritarian regimes (China and Russia); two permanent members of the United Nations Security Council (China and Russia) with three candidates to a seat; and three nuclear weapons states (China, Russia and India) with two supporters of the disarmament (Brazil and South Africa).

Nonetheless, it is necessary to notice that, regardless of prospects for political integration, the group remains as a unique focus of attention of the international society due to its rising participation in the world economy. Even in the face of a recessive scenario for three of its members (Brazil, South Africa and Russia), in large part due to the extension of the 2008 financial crisis through the fall in commodities prices, the features of these countries which have inspired confidence about their future and spread O'Neill's label are still valid, remarkably for BRIC and less intensely for South Africa, which, as we explained, joined the group more for political reasons than for its economic potential. After all, our

[4] Neofunctionalism, in International Relations, supports the idea that increasing integration between states in one economic sector leads to the deepening of integration in further sectors.

argument is that they are anchored in what we can call deep determinants of growth: geography, institutions and international trade (PERRY; SCHONERWALD, 2012).

Geography, International Trade and Institutions

Approaches that consider geography, institutions and international trade as determinants of economic growth consist in a promising– but already robust – trend in the current literature. Indeed, referring to an extensive literature review as well as to econometric tests, important studies, such as those of Acemoglu, Johnson and Robinson (2001), Rodrik, Subramaniam and Trebbi (2002), Sachs (2003), Rodrik (2004), Perry and Schonerwald (2012) and Mitton (2016), have recently sought to articulate these factors in order to cope with the problem of finding out what are the deep motivations of growth. It is in the light of this important trend in literature that this paper has been conceived.

The impact of geography on the development of nations has been widely discussed by the Academia. Jared Diamond (1997) explained the role played by geography in ruling the primacy of some peoples in agriculture. Hence, the ones who used to live in fertile regions, with more nutritive food and economically useful animals, have always had some advantages. This has allowed labor specialization and the invention of steel and weapons and tools made of this alloy - key elements of the wealth of developed societies.

Specifically, regarding economic growth, Rodrik (2004) affirms that there are two ways by which geography exerts its influence: one is direct and another indirect. There is wider divergence among scholars with respect to the significance of the first mechanism, albeit many authors attach geographic determinants to the economic performance with no intervenient variables, such as Sachs (2003) by his malaria ecology index. The indirect effects of geography through institutions, however, reach greater agreement in the academia. The environment where an institutional evolution is inserted plays an eminent role in the comprehension of this process. In this way, it is possible to understand the inverse relationship between the abundance of natural resources and the institutional quality established by Sala-i-Martin and Subramanian (2003).

In this study, we employ distance from the Equator as the first geographic variable, in concert with Rodrik, Subramanian and Trebbi (2002), who have identified a positive relationship between latitude and the institutional quality. Furthermore, it is not possible to neglect the existence of a long-lasting academic tradition in Economics and Social Sciences related to geographic determinism, which identifies proximity to the Equator as an obstacle for prosperity. Jeffrey Sachs (2000), for instance, explains why the temperate zones are wealthier than the tropical ones by the higher agriculture productivity, the lesser propensity to diseases and the better provision of energetic resources, such as gas and oil.

Moreover, since the large population of BRIC countries, later BRICS, was one of the reasons for the long-term optimism which led to the spread of O'Neill's label, we employ it as the second geographic variable. After all, the idea that the larger the labor force, the wealthier a nation is, representing a crucial element for the national prosperity, is an ancient thesis that dates back to the mercantilists, such as Colbert.

Lastly, in addition to the indirect effect of geography on the economic development through institutions, we can also envisage it by international trade. According to the gravitational theory, the distance between two countries is a relevant factor to determine the trade flow, which, in turn, has effects on per capita income, as we mention further. This indirect effect through international trade is embedded in the variables chosen to reflect the third deep determinant of growth, that is to say international trade.

The second determinant are institutions. Their impact on economic development is related to Keynes's concept of expectations. Since investments are directly proportional to the confidence of the capitalists in an economy, the state is obligated to ensure a healthy environment for private initiative and to develop a regulatory mechanism able to tame the "animal spirits". In view of this, in 1989, the financial entities which represented Bretton Woods System drew up the Washington Consensus. It was believed that the commitment of national institutions to the free market model by means of tight fiscal and monetary rules, aside from other bulwarks such as intellectual property rights, economic deregulation, trade openness and privatizations, would achieve safety regarding private property rights and thus enhance capital attraction. This is mainly the approach of New Institutional Economics, of Douglass North and Ronald Coase. For them, this kind of institutions would diminish the transactional costs and, hence, foster economic growth.

If, on the one hand, institutional efforts to guarantee property rights are important, on the other hand they are not sufficient in a world that gets gradually more globalized. Reforms aiming to foster the effectiveness of government action, such as central bank and judicial independence and mechanisms to combat corruption, called by Rodrik (2004) as second-generation reforms, have increasingly obtained eminence in investment decision-making and in classifications of rating agencies.

Another relevant institutional component in determining economic growth is the degree of democracy. In a philosophical approach, there is the perception, rooted in Kant, that it would be possible to reach the world peace when the democratic republican model became universal; without war, we would be able to envisage an international environment where cooperation prevailed, what, in turn, would take place via the narrowing of economic ties among nations in a complex interdependence scenario (KEOHANE; NYE, 1977) fostering individual and collective gains.

The focus on democracy can also raise purely economic approaches, such as Acemoglu, Naidu, Restrepo and Robinson's (2015) work. According to these scholars, there is no evidence to affirm that democracy is an obstacle for the growth of less developed countries. Furthermore, democratization processes, despite the possibility of a short-term contraction, are able to increase GDP per capita by around 20% in the long term (25 years).

Therefore, we cannot neglect institutions as a deep determinant of growth. In our econometric test, we employ the rule of law index from the World Bank, which measures the normative strength of institutions, and contract intensive money (CIM), proposed by Clague, Knack and Olson (1999) to evaluate the safety of property rights through individual choices to allocate financial resources, as variables. Moreover, we also employ the annual rates of infant mortality- which allow us to measure the institutional

effectiveness by the performance of the polices aimed at combating this major social problem-, the political stability and absence of violence and control of corruption indices, calculated by the World Bank, and the financial risk, a component of the International Country Risk Guide (ICRG), published by Harvard Data verse with the goal of estimating the sanity of financial institutions.

Finally, international trade is the third deep determinant of growth. The commercial reality of each country is an essential factor to explain its income. According to Frankel and Romer (1999), trade has a positive and quantitatively robust effect on GDP, in spite of being only moderate statistically. Hence, evidence corroborate the liberal assumption, rooted in the comparative advantages theory and in the factor endowment theory, that trade openness is a propelling element for national income.

The same authors underline the eminent role played by geography in the determination of the tradable amount. Indeed, for them, the effect on trade is the only way geographic variables can affect income, what contrasts with the arguments exposed when we talked about geography and with the results of our econometric test. Their approach is based upon the gravitational theory, which relates inversely the amount of trade between two nations to the distance that separates them. In their work, stemming from this equation, a model for the global trade of a country is built, that is to say the estimation of the amount of trade a nation achieves with all its partnerships in the world. In this regard, it is possible to understand how the location of countries impact their propensity to commerce. For instance, insular nations such as New Zealand have fewer advantages in exchanging goods because of the high freight charges. Thus, the first commercial variable of our econometric model is the degree of openness of each country (the percentage of the international trade in relation to the GDP), which captures the results of trade policies, that can be more or less protectionists, and the indirect effects of geography.

Furthermore, we must remark that economic development is directly related to terms of trade. If a nation, in its trade relations, faces increasingly unfavorable terms, it is possible to envisage a trend toward the strangulation of the balance of payments and, hence, a scenario of macroeconomic instability. The importance of terms of trade was remarkably discussed by the structuralists from ECLAC, who used to argue that, as long as income elasticity of the imports was higher in the center than in the periphery, Latin American agricultural goods would continually lose its share in the composition of central countries' demand, generating a chronic instability which could not be solved by orthodox policies (SANTOS; OLIVEIRA, 2008). That way, we employ the real exchange rate as our second commercial variable, whose degree of depreciation reflects the competitiveness of national products abroad and, therefore, the sustainability of the balance of payments. Lastly, our third variable is the percentage of fuels in the exporting agenda of each country, since this index indicates the vulnerability of the balance of payments to fluctuating prices of energetic resources.

Table 1: Definition and Sources of the Variables

Geography	
Variable	Definition and Source.
Distance from the Equator Ln	Measured by calculating the distance from the Equator and dividing it by 90. Source World Bank (2019), also Gallup et al. (1998) and Hall and Jones (1999).
Population Ln	Total number of inhabitants in a country. Source: World Bank (2019).
Institutions	
Rule of Law	Rule of law is a common institutional measure used by the World Bank. It "measures the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence". Source: World Bank (2019).
Contract Intensive Money (CIM) Ln	Initially proposed by Clague (1999), it is based on a citizens' decision regarding the form by which they chose to hold their financial assets. It is a measure of the enforceability of contracts and the safety of property rights. Source: World Development Indicators, World Bank (2019).
Infant Mortality Ln	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year. Source: World Development Indicators, World Bank (2019).
Financial Risk Ln	The quality level of a country's financial system, a component of the international country risk. Source: International Country Risk Guide, Harvard Database (2019).
Control of Corruption	It measures the perception of patrimonialism, that is to say the use of the State apparatus with private aims. Source: World Bank (2019).
Political Stability and Absence of Violence	It measures the likelihood of government destabilization by unconstitutional or violent means. Source: World Bank (2019).
International Trade	
Real Exchange Rate Ln	Controls for terms of trade. The real exchange rate can be defined in the long run as the nominal exchange rate (e) that is adjusted by the ratio of the foreign price level (Pf) to the domestic price level (Pd). Rer=e(Pf /Pd). This data was taken from the WDI and calculated manually.
Fuel Exports Ln	Fuel exports as a percentage of total merchandise exports. Source: World Development Indicators, World Bank (2019).
Openness Ln	Openness index which was originally created by Sachs and Warner (1995) but has been updated by the World Bank. (Exports + Imports) /GDP. Source: World Development Indicators, World Bank (2019).

Source: Elaborated by the authors based on Gallup et al. (1998), Hall and Jones (1999) and the World Bank (2019).

It is also imperative to notice that, except geography, the deep determinants of growth face endogeneity issues. Institutional quality and trade patterns, aside from influencing economic performance, can be affected by it. The explanation for this relies on the pressure led by agents that contribute to growth toward pro-market institutions (Chang, 2011) and on the effects that growth exerts on imports and exports and, consequently, on the exchange rate. That way, the correlations identified by our econometric test may demonstrate a twofold causality for institutional and commercial variables, what we have sought to correct by employing instrumental variables, which, as noted by literature, consist in "a viable option for overcoming the endogeneity problems that plague this literature" (PERRY; SCHONERWALD, 2012, p. 71).

Results

In order to test the effect of the three determinants of growth on income per capita of BRICS countries from 1995 to 2015, we have chosen to employ Hausman-Taylor (see appendix A)[5] method. An important purpose in combining time-series and cross-section data is to control for individual-specific unobservable effects which may be correlated with other explanatory variables. An important benefit from pooling time-series and cross-section data is the ability to control for individual-specific effects-possibly unobservable-which may be correlated with other included variables in the specification of an economic relationship. According to Baltagi et al. (2003), the Hausman-Taylor estimators are consistent when there is endogeneity among the regressors; indeed, there is substantial bias in OLS and RE estimators and both yield to misleading inference, since the FE estimator is a consistent estimator but its disadvantage is that it does not allow the estimation of the coefficients of time invariant regressors.

Table 2 presents the variables as well as the descriptive statistics.

Table 2: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Per Capita Income Ln	110	8.023	1.011	5.914	9.651
Distance from Equator Ln	110	0.354	0.139	0.217	0.619
Population Ln	110	19.473	1.276	17.539	21.045
Exchange Rate Ln	110	1.719	1.070	−0.164	3.606
Openness Ln	110	3.712	0.381	2.750	4.289
CMI Ln	79	−0.129	0.119	−0.451	−0.037
Infant Mortality	105	3.303	0.619	2.104	4.350
Rule of Law	85	−0.277	0.369	−1.126	0.290
Financial Risk Ln	95	1.992	0.205	1.153	2.251
Political Stability	85	−0.583	0.469	−1.524	0.284
Corruption	85	−0.328	0.437	−1.088	0.761
Fuel Exports Ln	107	2.050	1.321	−1.435	4.266

Source: Elaborated by the authors.

In all our regressions on table 3, the direct effect of geographic variables (exogenous) is related to BRICS countries' GDP per capita. Statistically, population is (positively) significant at the 5 per cent level in two regressions and significant at the 1 per cent level in one. This corroborates the optimism of the scholars who envisaged an economic potential in the aforementioned group due to its large population, which gathers more than 40% of the world inhabitants. Distance from the Equator, however, is not statistically significant in any regression. We do not believe, even though, that this fact is inconsistent with the branch of literature that relates geography to growth, but a consequence of the continental size of the four BRIC countries, which combine, in the same state, regions of quite different latitudes.

[5] This is an issue in this paper because some data is time variant (institutions), while other data is time invariant (geography).

Table 3: Panel Regression Results

	Dep.Var.: Per Capita Income Ln		
	Hausman-Taylor	Hausman-Taylor	Hausman-Taylor
	(1)	(2)	(3)
Distance from Equator Ln	4.823	4.1499	6.1208
	(0.4452)	(0.432)	(0.4449)
Population Ln	1.7018***	1.3179**	2.2074***
	(3.6359)	(2.7083)	(3.2941)
Exchange Rate Ln	−1.0435***	−1.0772***	−1.0874***
	(-8.0533)	(-8.4136)	(-8.6664)
Openness Ln	0.2690	0.2702	0.2762
	(1.8053)	(1.8520)	(1.9255)
CIM Ln	1.8860**	1.2155***	1.9633*
	(3.0840)	(1.7546)	(2.4921)
Infant Mortality	−1.1459***	−1.2267***	−1.1454***
	(-11.2783)	(-11.380)	(-10.1405)
Rule of Law	0.0526	0.0073	-0.0851
	(0.3243)	(0.0457)	(-0.5166)
Financial Risk Ln	0.2285	0.2191	0.1876
	(1.90569)	(1.8615)	(1.6087)
Political Stability and Absence of Violence		0.1454	0.1507
		(1.8423)	(1.9436)
Corruption			0.1967
			(1.5912)
Fuel Exports Ln	−0.2539***	−0.2603***	−0.2772***
	(-7.0318)	(-7.3051)	(-7.7405)
Constant	-21.66114*	-13.8000	-31.5730*
	(-2.1285)	(-1.3303)	(-2.1877)
Chow Test (Pooled vs FE)	0.0000	0.0000	0.0000
Hausman Test (FE vs RE)	0.9168	0.9766	0.9835
Hausman Test (FE vs Hausman-Taylor)	0.9168	0.9766	0.9835
Breusch-Pagan Test (Pooled vs RE)	0.0832	0.1375	0.0529
Observations	57	57	57
Log Likelihood 1	35.9908	36.4944	36.7379
Akaike Inf. Crit.	−51.9816	−50.9889	−49.4758
Notes:	***Significant at the 1 percent level.		
	**Significant at the 5 percent level.		
	*Significant at the 10 percent level.		

Source: Elaborated by the authors

Our trade variables, in turn, also do not defy frontally the dominant assumptions in the Academia. In all regressions, the real exchange rate exhibits a positive significance at the 10 per cent level, confirming that fostering exports succeeds in stimulating production. The same way, the result suggested by literature for the percentage of fuels in the exports agenda was obtained; the regressions show this index is negative and highly[6] significant, proving that oscillations of prices of these resources in the international market make the economies vulnerable, less resistant and, hence, less capable of keeping a sustained growth.

[6] By highly significant, we mean significant at the 1 per cent level.

Although, the openness index did not achieve, in any regression, significance. We believe that it is possible to explain this result by the continental size of BRICS member countries and the remarkable reduction of poverty in the last years, what allowed the rise of a new middle class and, that way, a development strategy whose major player is the internal market.

When we analyze institutional variables, however, all the expectations based upon mainstream literature are countered. It would be hoped (taking into account mainstream literature) that institutions caring for private property rights intellectual property, fiscal responsibility, financial sanity and social welfare, following the recommendations from organisms such as the World Bank and IMF, kept a positive relationship with GDP per capita insofar, on the one hand, they produce an expectational environment propitious to investments and, on the other hand, are enacted in a growth context by pressure efforts from economic groups. These principles are taken into account in the indices of infant mortality, rule of law, CIM, political stability and absence of violence, control of corruption and financial risk.

With the aim of certifying that the obtained results are not due to a relationship of badly chosen variables, we have elaborated three regressions, adding new variables between them. This is also a means of avoiding that a single variable that could conceivably be endogenous drive the results, as Frankel and Romer (1999) have already proposed. That way, whilst the first one contains infant mortality, rule of law, CIM and financial risk, we have added political stability and absence of violence to the second one and also control of corruption to the third one.

Astonishingly, in no regression any of these variables is statistically significant. Thus, in spite of geography and international trade, the results for institutional variables challenge the established literature. We examine why.

Institutions: "A Point Outside the Curb"

First of all, momentarily ignoring failures of institutionalist theory, we present the inappropriateness of indices that measure the quality of institutions as an explanation for the lack of significance of our independent variables related to institutions. They evaluate the institutional structure from the viewpoint of Western liberal democracy, related to a constitutionalist view (rule of law), stable and consolidated financial institutions (CIM and financial risk), the ability to perform their functions efficiently and credibly (government effectiveness) and also the assurance of social rights. The question we will to raise is: in an absolutely diverse and plural world, do these variables, also employed by studies of various international organizations and in various academic works, really reflect a country's institutional predisposition to growth?

The fact is that the above-mentioned indicators do not succeed in measuring the respect for property rights (their main aim) and, hence, the way institutions relate to economic growth (ROS, 2013). There are, in the world economic history, many cases of authoritarian regimes, in which an independent and stable justice and financial system lacks, that, in the practice, were successful in protecting the property rights- even more than liberal democracies. A contemporary example is Singapore, a country where the

economic boom and the hardening of restrictive and eccentric laws, without guarantee of press freedom or impartial justice, have been coexisted for many years. In the same manner, Chile under Augusto Pinochet's government (1973-1990), in spite of being under a harsh and arbitrary dictatorship, tightly ensured private property and attracted a great amount of investment flows.

In the concrete case of BRICS, it is imperative not to set aside the Russia-China duality. Whilst in the latter private property is not legally recognized, as well as there is no independent judicial system, in contrast to the former, it is in China where the investors feel safer (Rodrik, 2014). This happens because of institutional arrangements built differently from the ones adopted by Western democracies and thus not embedded in the employed indicators. The Chinese government, in the 1980s, introduced the Township and Village Enterprises (TVEs), that is to say companies owned by local government with which national and foreign private enterprises establish partnerships and attain a share in the profits. In Russia, on the other hand, the formal constitutionalism contrasts with a wide incertitude in reality: a slow and corrupt judicial system thwarts the effective application of law and, consequently, undermines investor confidence.

It can be concluded, therefore, that the existence of means to ensure private property (and thus generate safety and good expectations to capitalists) confronting the assumptions implicit in the variables employed by our econometric model is an important factor in comprehending the unexpected results. Its explanatory power, however, is only partial. The problem cannot be fully understood without challenging the content of the premises of mainstream institutionalist theories, including NIE, of North and Coase.

Jaime Ros (2013) argues that one of the pillars of this branch of literature is the "invisible hand" tradition, whose roots are tied in Adam Smith. In this vision, a minimal state, with lean institutions and a restrict playing field, could align the social and individual return taxes and, hence, generate what the author calls a good social infrastructure. These postulates are embedded in the main indices that intend to measure the institutional quality since they are formulated by institutions, such as the World Bank, bound by a current of thought that, in spite of supporting the active role of the State in the development (through infrastructure works, for instance), advocates for fiscal austerity and market freedom. It is in the light of this reality that the formulation of indicators such as rule of law, control of corruption and government effectiveness must be understood. These axioms, however, have already been refuted by the economic thought.

Initially, Ros argues that, when there are market failures, no Pareto-optimal outcomes are accomplished through policies that maximize economic freedom. This would only happen under very specific conditions which are practically impossible in practice. This is an agreement between heterodoxy and the market failures orthodoxy. In addition, the author, based on Lipsey and Lancaster's second-best theory, emphasizes that even in the absence of a perfect market, not necessarily greater liberalism would generate greater allocative efficiency; in any case, allocative efficiency and growth are different concepts, and the former may not lead to the latter.

It is also possible to find empirical evidences for Ros's arguments. In the 90s, the compliance of Latin American countries to the institutional agenda enshrined by Washington Consensus, with

deregulations, privatizations and intellectual property legislation, meant low growth rates and grave difficulties in the terms of trade of these nations (Palma, 2004).

Therefore, in addition to the fact that most institutional indices do not succeed in measuring inviolability of property rights (a key element in attracting investments and generating economic growth), fails on the premises of institutionalist theory explain the startling results of our econometric model.

Conclusion

Using panel data for BRICS countries and applying the Hausman-Taylor estimator, we have found out that both geography and international trade matter for economic growth, in accordance with the assumptions in literature. Even though, institutions work at odds with the main tradition of the Academia.

From these results, it is clear that the institutionalist research focuses excessively on developed and Western nations and on their economic thought, neglecting particularities of economic thinking and practice of oriental or emerging countries. The mentioned mistakes are embedded in the main indices employed by international organizations and academic works and, hence, perpetuate the prescription of misguiding agendas to these nations, such as the Washington Consensus, and avoid the good understanding of the development of countries (such as China) facing dictatorships and economic policies that confront the logic of the free market.

In summary, a suitable institutional analysis must count for a global comprehension, recognizing the disparities among nations regarding the different roles assigned to the state. That way, antagonistic senses of democracy and the existence of distinct means to reach the same end (economic development) - the "many recipes" to which Rodrik (2007) refers - must be taken into account. Therefore, although econometric tests may be relevant tools to comprehend the multidimensionality of economic growth, a theoretical understanding of each variable used is unavoidable in order to reach a more accurate interpretation of the results obtained.

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APPENDIX A.

Hausman-Taylor method

Analysis of cross-section data alone can neither identify nor control for such individual effects. The following equations illustrate:

$$Y_{it} = X_{it}\beta + Z_i\gamma + \alpha_i + \varepsilon_{it} \qquad (i = 1,\ldots, N;\ t = 1,\ldots, T)$$

Where β and γ are k and g vectors of coefficients associated with time-varying and time-invariant observable variables respectively. The disturbance ε_{it} is assumed uncorrelated with the columns of (X, Z, α) and has zero mean and constant variance σ_ε^2 conditional on X_{it} and Z_i. The latent individual effect α_i is assumed to be a time-invariant random variable, distributed independently across individuals, with variance σ_α^2.

Hausman and Taylor (1981) explain that the OLS coefficient estimates from the transformed data (known as "within-groups" or "fixed effects" estimators) have two important defects: (1) all time-invariant variables are eliminated by the transformation, so that y cannot be estimated; and (2) under certain circumstances, the within-groups estimator is not fully efficient since it ignores variation across individuals in the sample. The first problem is generally the more serious since in some applications, primary interest is attached to the unknown coefficients of the time-invariant variables.

The Hausman-Taylor method uses assumptions about the correlations between the columns of (X, Z) and α_i. If we are willing to assume that certain variables among the X and Z are uncorrelated with α_i, then conditions may hold such that all of the β's and γs may be consistently and efficiently estimated. Intuitively, the columns of X_{it}which are uncorrelated with α_i can serve two functions because of their variation across both individuals and time: (i) using deviations from individual means, they produce unbiased estimates of the β's, and (ii) using the individual means, they provide valid instruments for the columns of Z_i, that are correlated with α_i.

Hausman and Taylor (1981) point out from the equation (1) the properties of conventional estimators in the absence and presence of specification errors of the form $E(\alpha_i \mid X_{it}, Z_i) \neq 0$. Thus

$$Y_{it} = X_{it}\beta + Z_i\gamma + \varepsilon_{it} \quad (2)$$
$$\varepsilon_{it} = \alpha_i + \varepsilon_{it}$$

where they believe that $E(\varepsilon_{it} \mid X_{it}, Z_i) = E(\alpha_i \mid X_{it}, Z_i) \neq 0$. Note that, somewhat unconventionally, X_{it} and Z_i denote TN x k and TN x g matrices respectively, whose subscripts indicate variation over individuals (i= 1,..., N) and time (t = 1,..., T). Observations are ordered first by individual and then by time, so that α_i and each column of Z_i are TN vectors having blocks of T identical entries within each i= 1,..., N.

The prior information the Hausman-Taylor procedure uses the ability to distinguish columns of X and Z which are asymptotically uncorrelated with α_i from those which are not. For fixed T, let

$$p\lim_{N\to\infty}\frac{1}{N}X_{1it}^{'}\alpha_i = 0 \qquad p\lim_{N\to\infty}\frac{1}{N}Z_{1i}^{'}\alpha_i = 0 \quad (3)$$

$$p\lim_{N\to\infty}\frac{1}{N}X_{2it}^{'}\alpha_i = h_x \qquad p\lim_{N\to\infty}\frac{1}{N}Z_{2i}^{'}\alpha_i = h_z$$

where $X_{it} = [X_{1it} \vdots X_{2it}]$ of dimensions $[TN\acute{}\ k_1 \vdots TN\acute{}\ k_2]$, $Z_{it} = [Z_{1i} \vdots Z_{2i}]$ of dimensions $[TN\acute{}\ g_1 \vdots TN\acute{}\ g_2]$, and the k_2, g_2 vectors h_x, h_z are assumed unequal to zero.

APENDIX B

Correlation matrix

	Income per capita Ln	Distance from the Equator	Population Ln	Exchange Rate Ln
Income per capita Ln	1.00000000	0.1433899	-0.40844378	-0.61099530
Distance from the Equator	0.14338988	1.0000000	-0.10288424	0.27518111
Population Ln	-0.40844378	-0.1028842	1.00000000	0.29936098
Exchange Rate Ln	-0.61099530	-0.61099530	0.29936098	1.00000000
Openness Ln	-0.19203972	0.5540754	-0.07508862	0.82590011
CMI Ln	-0.08836475	-0.8633993	0.05047724	0.04390953
Infant Mortality Ln	-0.39344028	-0.4242399	-0.50577779	0.23922263
Rule of Law	0.04254776	-0.7181593	-0.37624841	-0.02217261
Financial Risk Ln	0.05207380	0.3562632	0.37108814	0.21311804
Political Stability and absence of violence	0.04372151	-0.8198236	-0.19778409	-0.25062235
Control of Corruption	-0.09000237	-0.7199018	-0.47305254	-0.13731017
Fuel Exports ln	0.43783618	0.7699716	-0.55196360	-0.13547376

	Openness Ln	CMI Ln	Infant Mortality Ln	Rule of Law
Income per capita Ln	-0.19203972	-0.08836475	-0.39344028	0.04254776
Distance from the Equator	0.55407539	-0.86339935	-0.42423990	-0.71815931
Population Ln	-0.07508862	0.05047724	-0.50577779	-0.37624841
Exchange Rate Ln	0.82590011	0.04390953	0.23922263	-0.02217261
Openness Ln	1.00000000	-0.19932116	0.12539648	-0.09485985
CMI Ln	-0.19932116	1.00000000	0.52748339	0.85567229
Infant Mortality Ln	0.12539648	0.52748339	1. 00000000	0.72787462
Rule of Law	-0.09485985	0.85567229	0.72787462	1.00000000
Financial Risk Ln	0.06091308	0.57543724	0.01383978	0.39223905
Political Stability and Absence of Violence	-0.36408404	0.80585265	0.52584590	0.80561525
Control of Corruption	-0.23319735	0.72039410	0.80619944	0.87393120
Fuel Exports ln	0.32804815	-0.73375172	-0.25662384	-0.40312649

	Financial Risk Ln	Political Stability and Absence of Violence	Control of Corruption	Fuel Exports ln
Income per capita Ln	0.05207380	0.04372151	-0.09000237	0.4378362
Distance from the Equator	-0.35626319	-0.81982358	-0.71990179	0.7699716
Population Ln	0.37108814	-0.19778409	-0.47305254	-0.5519636
Exchange Rate Ln	0.21311804	-0.25062235	-0.13731017	-0.1354738
Openness Ln	0.06091308	-0.36408404	-0.23319735	0.3280482
CMI Ln	0.57543724	0.80585265	0.72039410	-0.7337517
Infant Mortality Ln	0.01383978	0.52584590	0.80619944	-0.2566238
Rule of Law	0.39223905	0.80561525	0.87393120	-0.4031265
Financial Risk Ln	1.00000000	0.29998051	0.17335031	-0.4322334
Political Stability and Absence of Violence	0.29998051	1.00000000	0.71333642	-0.4824951
Control of Corruption	0.17335031	0.71333642	1.00000000	-0.3583334
Fuel Exports ln	-0.43223341	-0.48249507	-0.35833341	1.0000000

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RESUMO

Este artigo discute o papel dos três determinantes profundos do desenvolvimento econômico (geografia, instituições e comércio internacional) nos países do BRICS (Brasil, Rússia, Índia, China e África do Sul) entre 1995 e 2015. Primeiramente, aponta-se a dificuldade de analisar se os determinantes funcionam ou não de forma simultânea, porquanto a maioria dos autores não concorda com a ideia de coordenação. Outrossim, considera-se que as instituições são muito diferentes entre esses países, especialmente no caso da China, que melhorou a renda per capita sem se enquadrar nos padrões dos Indicadores de Governança Mundial. Terceiro, o artigo apresenta brevemente a história recente do BRICS, aplicando o método de Hausman e Taylor (1981) para controlar o efeitodas variáveis endógenas e das invariantes no tempo. Conclui-se assim que, por um lado, a geografia e o comércio internacional têm sido importantes para explicar o desempenho econômico dos países do BRICS sem desafiar a literatura atual e, por outro, a influência das instituições, apesar de relevante, não corresponde às hipóteses enraizadas na literatura. China e Rússia são países com instituições específicas, portanto os resultados não acompanham os resultados anteriores sobre o papel das instituições, sugerindo que os indicadores podem ter tendência para a ideologia liberal.

Palavras-chave: Instituições, Comércio Internacional, Geografia.

ABSTRACT

This paper discusses the role of the three deep determinants of economic development (geography, institutions and international trade) in BRICS countries (Brazil, Russia, India, China and South Africa) from 1995 to 2015. First of all, we argue that it is difficult to point out whether or not the determinants work simultaneously, since most authors do not agree with the idea of coordination. Secondly, we raise the viewpoint that institutions are very different among these nations, especially in the case of China, which has improved per capita income without fitting in the standards of the Worldwide Governance Indicators. Third, we briefly present the recent history of the bloc and apply the Hausman and Taylor (1981) method to controls for endogenous as well as time-invariant variables. We conclude that, on the one hand, geography and international trade have been important to explain the economic performance of BRICS countries without challenging the mainstream literature; on the other hand, the influence of institutions, even though relevant, does not correspond with the hypotheses rooted in the literature. China and Russia are countries with particular institutions, so the outcomes do not follow previous results about the role of institutions, suggesting that indicators may be biased toward liberal ideology.

Keywords: Institutions, International Trade, Geography.