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Do institutions matter in Latin America?

A longitudinal analysis of institutional changes on Brazilian companies performance

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Abstract

Purpose – The purpose of this paper is to analyse the effects of institutional changes on business landscapes and companies performance in Brazil.

Design/methodology/approach – The authors have developed a multiple empirical strategy, including qualitative and quantitative methods. As a qualitative method, we used business landscapes to describe how clustered firm performance varies across industries. We collected return on equity (ROE) and equity data from Brazilian listed companies in a 24-years range, and compared three different 8-years institutional periods. As a quantitative method, the authors compared variance across periods and developed a panel analysis assuming fixed and random effects models.

Findings – The main results indicate that ROE differences among institutional periods in Brazil are relevant, indicating that there is an important institutional effect on performance and the impacts of those institutional effects may be different across industries. The impact of institutional changes seems to be considerable in understanding industry and firm performance. In addition, the improvement of the institutional framework increases the variance of firm performance around the mean.

Research limitations/implications – The limitations are related to the sample, classification treatment for missing values and outliers.

Practical implications – Managers should consider that institutional settings affect industries in a different manner when developing their strategies.

Originality/value – Despite the fact that the importance of industry, firm and time effects has been empirically examined, there is still an empirical gap concerning if and how institutional changes affect industries and the configuration of business landscapes.

Keywords Institutions, Emerging countries, Industry performance, Transient effects

Paper type Research paper

1. Introduction

Performance heterogeneity has been empirically investigated in a long range of variance decomposition studies. The tradition was introduced by [Schmalensee \(1985\)](#), but it was



Rumelt (1991) who consolidated this line of research, followed by many scholars. Main results reinforce the importance of firm effects. However, industry differences account for 2-20 per cent of total observed performance variance, what confirms that industry effects are still an important variable to business strategy. This line of research was recently also influenced by the new institutional theory (North, 1990), that shed some light on the influence of broader aspects on the overall context on companies, industries and countries. The variance decomposition articles have considered the role of institutions in two ways. First, they model industry transient effect that captures how year events affecting all firms are differently absorbed across industries. Transient effects are usually regarded as macroeconomic variations but one may argue that it could capture some effects of institutional change. In existing research, industry transient effects may account up to 10 per cent of total observed variance. Second, some variance decomposition studies have analyzed cross-country differences that proxy for the effect of institutional differences across countries. For example, Carvalho *et al.* (2009) analyzed the performance variance in Latin American countries and found evidences that the cross-country differences in their institutional settings played a significant role in producing observed country differences. However, to the best of our knowledge, there is no article combining an in-depth study on a single country institutional change with a quantitative analysis of the impact of the institutional change.

We propose that institutional changes affect the business landscape of a country. However, there is still an empirical gap concerning how institutional changes affect performance variation across industries. In this paper, we build different empirical strategies (qualitative and quantitative) to describe and assess how institutional change affects specific industry performance distributions. We use evidence from Brazil. The country has experienced several institutional changes during the past three decades, serving as a natural laboratory for this kind of study. From the hyperinflation era in the 1980s to monetary stabilization and liberalization in the 1990's, institutional change is an important part of business life in Brazil. Institutions are not taken for granted, but they are a managerial variable.

We advance empirical knowledge about institutions and industry effects by detailing and describing how these documented institutional changes affect specific industries in Brazil. The evidence from the Brazilian setting also shed light on how emerging economies' recent market institutional development affect businesses.

2. Theoretical framework

The importance of industry *vis-à-vis* other factors in describing firm performance has been studied in a stream of research called performance heterogeneity. The seminal papers were developed by Schmalensee (1985), Rumelt (1991) and McGahan and Porter (1997). Most of these studies analyzed the importance of industry, firm, corporate-parent, year and industry-transient effects. Although seminal works were based on techniques such as variance components analysis and analysis of variance (ANOVA), new techniques were introduced such as minimum norm quadratic unbiased equation (MINQUE), maximum likelihood and, lately, hierarquical linear model (HLM). Table I shows a summary of the results of relevant articles in variance decomposition.

From Table I, industry effects account for a relevant share in total observed performance heterogeneity, varying from 1.04 to 23.57 per cent. Industry transient effects indicate the extent to which industry averages are asymmetrically disturbed by

Table I.
Comparative
findings on variance
decomposition

Authors	Sample (no. for observation)	Database	Period	Dependent variable ^a	Model ^b	Year (%)	Industry (%)	Firm or BU (%)	Transient (%)	Country (%)	Unexplained (%)
Schmalensee (1985)	USA (1,775)	FTC-LB	1975	ROA	VCA	N/A	19.6	0.6	N/A	N/A	80.41
Wernerfelt and Montgomery (1988)	USA (247)	Trinet/EIS e FTC	1976	Tobin Q	VCA	N/A	12.3-19.5	0.0-0.9	N/A	N/A	76.97-85.23
Rumelt (1991)	USA (6,932)	FTC-LB	1974-1977	ROA	VCA	0	4.0-8.3	44.2-46.4	5.4-7.8	N/A	36.9-44.8
Roquebert <i>et al.</i> (1998)	USA (N/A)	Compustat	1985-1991	ROA	ANOVA	0.1	9.8	41.4	6.8	N/A	30.4
McGahan and Porter (1997)	USA (58,132)	Compustat	1981-1994	ROA	VCA	0.4	10	37.1	2.3	N/A	32.0
Chang and Singh (2000)	USA (20,865)	Compustat	1981-1989	ROA	VCA	0.3-0.5	15.9-17.5	48.7-50.2	N/A	N/A	22.5-25.8
McGahan and Porter (2002)	USA (72,742)	Compustat	1981-1994	ROA	ANOVA	0.8	9.6	37.7	N/A	N/A	39.9
Chang and Hong (2002)	Korea (14,575)	Korea Info. Service	1985-1996	ROA	VCA	2.5	7.6	20.8	4.4	N/A	55.3
González-Fidalgo and Ventura-Vitoria (2002)	Spain (1,216)	N/D	1991-1994	ROA	N/D	0.9	2.97.0	35.1-36.6	N/A	N/A	55.50-61.10
Hawawini <i>et al.</i> (2003)	USA (5,620)	Stern Stewart	1987-1996	ROA	ANOVA	1.0	8.1	35.8	3.1	N/A	52.0
Brito and de Vasconcelos (2005a)	Brazil (938)	Gazeta Mercantil	1998-2001	LO/AT	ANOVA	1.9	6.5	27.1	4.2	N/A	60.3
Bandeira-de-Mello and Marcon (2006)	Brazil (885)	Econômica	1998-2002	LO/AT	ANOVA	1.3	11.4	32.5	2.9	N/A	51.9
				LO/AT	ANOVA	0	4.4	52.7	2.9	N/A	40.0
				LO/AT	MINQUE	0	7.1	52.3	2.1	N/A	38.5
				LO/AT	ML	0	4.3	54.0	2.4	N/A	39.3
				LO/AT	ANOVA	0.08	2.54	55.68	2.07	N/A	38.73
				LO/AT	ML	0.91	2.64	57.86	2.47	N/A	36.11
				EP/CE	ANOVA	4.01	1.04	22.65	3.39	N/A	68.92
				EP/CE	ML	3.35	1.17	22.35	4.77	N/A	68.36
				Tobin Q	ANOVA	2.95	4.68	40.26	2.44	N/A	49.66
				Tobin Q	ML	2.96	3.97	39.77	2.03	N/A	51.26
Gonçalves and Quintella (2006)	Brazil (11,113)	Gazeta Mercantil	1996-2003	ROA	VCA	0.5	2.7	41.5	4.8	N/A	50.5

(continued)

Authors	Sample (no. for observation)	Database	Period	Dependent variable	Model ^b	Year (%)	Industry (%)	Firm or BU (%)	Transient (%)	Country (%)	Unexplained (%)
Hough (2006)	USA (19,405)	Compustat	1995-1999	ROA	HLM VCA ANOVA	< 1.0 < 1.0 < 1.0	5.3 13.5 13.9	40.1 52.1 43.8	N/A Negative N/A	N/A N/A N/A	34.5 36.3 27.0
Misangyi <i>et al.</i> (2006)	USA (10,633)	Compustat	1984-1999	ROA	HLM	0.8	7.4	45.0	N/A	N/A	46.8
Goldszmidt <i>et al.</i> (2007)	37 countries (83,641)	Compustat	1995-2004	ROA	HLM	N/A	2.5	32.7	N/A	3.2	58.7
Fávero (2008)	18 countries ^c (2,545)	Revista Exame	1998-2005	Adjusted profitability	HLM	N/A	N/A	6.43	N/A	0.001	95.57
Short <i>et al.</i> (2009)	Sweden (12,692)	Compustat	1995-2001	Revenue	HLM	N/A	21.76	63.22	N/A	N/A	15.02
				Growth rate	HLM	2.56	23.57	64.35	N/A	N/A	9.52

Notes: ^a ROA: return on assets; EP: economic profit; CE: capital employed; TMV: total market value; LO: operational profit; AT: asset; ^b MINQUE: minimum norm quadratic unbiased equation; ML: maximum likelihood; VCA: variance components analysis; HLM: hierarchical linear model; ^c country of origin; all data are from Brazilian subsidiaries; N/A: not analyzed; BU: business unit

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year effects. In other words, it indicates how each industry average varies differently along the period. These transient effects vary from 2.1 per cent to 7.8 per cent. Industry transient effects capture not only macroeconomic fluctuations affecting each industry differently, but also incremental institutional fluctuations. Cross-country analyses are also a way to grasp institutional effects. [Carvalho et al. \(2009\)](#) found, in article analyzing a sample with firm of ten Latin American countries, that country effects matter for Latin America. Country transient effects increase in periods of higher turbulence, and have a greater effect on a firms' economic performance than on its operational performance. [Goldszmidt et al. \(2011\)](#) found that the combined effects of country, country–industry and industry differences are as important as are the firm effects.

In this article, instead of looking to cross-country or transient effects, we dig deeper into analyzing how institutional changes affect industry differences in a single emerging economy. Indeed, institutional variation produces considerable effects on how industry characteristics influences firm performance and sustainability of abnormal returns ([Hermelo and Vassolo, 2010](#); [Ramanathan et al., 2010](#)). The problem is that mainstream research in variance decomposition has not placed explicitly institutions as a variable in the foreground. They take into account the assumption of the existence of efficient market institutions. Institutions are generally defined as the rules that govern political, social and economic interaction ([North, 1990](#)). Most of this market-based institutional context is not well developed in emerging countries and, therefore, the lack of such institutions could influence performance and strategy effectiveness ([Peng, 2002](#)). The relevance of institutions should be larger in emerging economies relative to other regions for two reasons. First, these countries present differences on their institutions, often called as “institutional voids” ([Khanna and Palepu, 1997](#); [Khanna et al., 2005](#)). Those voids are found on different dimensions, from openness to property rights, from corruption to capital markets. Despite what the term “void” suggest (if there are voids, there would be a best institutional arrangement), scholars point out that there is not an optimal institutional arrangement ([Hall and Gingerich, 2009](#); [Hall et al., 2001](#)). Those differences on institutions determine firm choices and, consequently, its performance. For instance, the fostering of business groups ([Hoskisson et al., 2000](#)) with significant government influence ([Inoue et al., 2013](#)), as well as the relevance of non-market strategy ([Schneider, 2009](#)) in such countries are two examples. According to [Hermelo and Vassolo \(2010\)](#), the lack of a solid institutional framework, the external shocks and unexpected changes in conditions are likely to erode a successful strategy. On the other hand, the lack of institutions that guarantee proper competition would render strategies more sustainable. One example is the existence of business groups in the developing economies and the influence in creating and maintaining these groups, fostered by government interest and development policy ([Schneider, 2009](#)). [Cuervo-Cazurra and Dau \(2009\)](#) propose that pro-market reforms positively affect firms' profitability in developing countries because the accompanying improvements in external monitoring decrease firms' agency costs. They also argue that firms benefit unequally from pro-market reforms because their agency problems are affected differently.

3. The Brazilian institutional context

Latin America is an understudied region in the management literature when compared to East Asia and the developed world ([Dau, 2012](#); [Hermelo and Vassolo, 2012](#)). A review of the two leading international management journals, *Journal of International Business*

Studies and Management International Review, showed that fewer than 6 per cent of the articles mentioned Latin America (Elahee and Vaidya, 2001). Along with the country's economic importance within Latin America, we chose Brazil to our study because it provides a suitable setting to access the influence of institutional changes on business landscapes. The country has passed for three clearly different institutional periods since its democratization in the 1980s. We present the evolution of the Brazilian institutional context through a qualitative analysis. We decided to start this timeline of historical events with the election of the first civil president in 1985, after 20 years of military dictatorship. From that episode to the present day, Brazil has rapidly evolved to a position of preeminence among emerging economies (Carvalho *et al.*, 2009).

We have divided our analysis in three equal length periods of two presidential terms each. Within each period, we analyze the evolution of political institutions, political disruptions and also the economy, and the regulatory and administrative arenas. The first period is marked by heavy uncertainty. In the political arena, the transition to a democratic state and a referendum challenging the republican and presidential form of govern were the two main happenings. Else, two elected presidents did not finish their terms in this period. In the economic arena, the fight against hyperinflation and six unsuccessful economic plans marks the period. This first period is also marked by a new constitution, trade barriers withdraw and an initial wave of privatizations. We name this period "taming inflation". Table II presents the major highlights of this period.

The second period ("Building Institutional Framework") is roughly comprised by the two terms on President Cardoso. Hyperinflation was controlled; nevertheless, there was still an economic turmoil, as the country was severely affected by the crisis involving other emerging economies (Mexican, Asian and Russian Crisis) that ultimately resulted in a large devaluation of the Brazilian currency; the real. It was a period of neoliberal policies. In the political front, two presidential terms were concluded without interruption, even though the change of the reelection rule in 1998 could be considered a "big change in the rules of the game". The period was also characterized by the strengthening of market institutions represented by laws controlling government spending, setting up a system for inflation targeting, the privatization of a large number of state-owned enterprises and the establishment of regulatory agencies. Table III summarizes the most relevant facts of this period.

The third period is loosely connected to the terms of Lula's administration. An interesting fact takes place just before the election. Amid rumors of radical changes in the ruling of the Brazilian economy, Lula releases a letter in which he committed to respecting contracts and to not promoting any radical change in the economic and political rules. One could consider that declaration to be a commitment to observed institutions. Little economic turmoil, if any, characterizes the period. For O'Neil *et al.* (2005), the Brazil, Russia, India and China (BRIC) and N-11 (the next 11 emerging countries) emerged from the crisis better than the developed world, and even within these countries, Brazil appeared to be one of the best performers. Brazil has also earned investment grade form international rating agencies in 2008. No major changes occurred in the political arena. It was the first time in history that the elected presidents concluded four consecutive presidential terms. The economic policy changed for this period from a neo-liberal approach to a "developmentist" approach (Bresser-Pereira and Diniz, 2009). We called this period "Rise to Prominence" (see Table IV).

Table II.
Institutional period 1
highlights
(1986-1993-taming
inflation)

Year	Political arena	Economic arena	Regulation/deregulation
1985	Election of Francisco Neves, first civil president since the military coup (1964). Neves dies. Vice President José Sarney takes office	1986-1993 ("Taming inflation") Inflation-228% p.a. (CPI)	
1986		Plano Cruzado Economic Stabilization Act (ESA): price control, salary control, new currency, exchange rate control, end of automatic price increases based on past inflation Plano Cruzado 2 (ESA): end price control, increase in taxes, softer rules for salary control	Exchange regime moves to controlled regime
1987		Plano Bresser-(ESA): increase in taxes, postponement of investments, and end of salary control Inflation-891% p.a. (CPI)	
1988		Plano Verão: (ESA)-price control, salary control, and new currency	New constitution
1989	First Presidential election by direct vote since 1964	Inflation: 1,636% p.a. (CPI)	
1990	President Fernando Collor Inauguration	Plano Collor I (ESA): new currency, reduced liquidity though asset freezing, price and salary control	Withdraw of trade protection tariffs
1991	Collor Impeached. Vice President Itamar Franco assumes	Plano Collor II (ESA) Inflation-458% p.a. (CPI)	First privatizations of Stated Owned Enterprises (SOE) (Usiminas, CSN)
1993	Referendum to determine political system (republic vs monarchy) and form of government (presidential or parliamentary). Republican and presidential system prevails	Plano Real (ESA): new currency, end of automatic price increases based on past inflation, reduction of government expending, fiscal balance, increase in interest rates, overvalued exchange rate Inflation: 2,490% p.a. (CPI)	Exchange regime moves to crawling peg
Highlights	Two Presidents did not finish term Both Vice Presidents assumed (no coupes) Decision on Change of Government System	Seven stabilization plans High inflation Average free of risk interest rate (ln US\$ terms): 888% p.y. Average GDP growth rate (ln US\$ terms): 9.3% p.y.	New constitution Withdraw of trade protection Privatizations

Note: CPI, consumer price index**Sources:** Baer (2003); Lazzarini (2011) and authors

Year	Political arena	1994-2001 ("Building Institutional Framework") Economic arena	Regulation/deregulation
1994	Election of Fernando Henrique Cardoso, "Father of Plano Real"	Exchange rate: 1R\$/1USD	Government cash transfer program indented to reduce poverty and social exclusion (Comunidade Solidária)
1995		Hyperinflation tamed Inflation: 23% p.a. (CPI)	Acceleration of Privatizations (Acesita, Telebras, Vale) and creation of regulatory agencies for those markets
1997		Mexican crisis affects Brazilian economy Inflation: 4.8% p.a. (CPI)	
1998	Change in rules allowing presidential reelection	Exchange rate: 1.3R\$/1USD	Adoption of system of inflation targeting
1999	Reelection of Fernando Henrique Cardoso	Brazil affected by the Asian and Russian Financial Crisis and attack on Brazilian currency Exchange rate: 2.0 R\$/1USD	Maxi-devaluation of Real Exchange regime moves from crawling peg to free exchange
2000			Law to control government expending (Lei de Responsabilidade Fiscal)
2001			Energy crisis: government passes obligatory cuts for users
2002	"Letter to the Brazilian people": declaration of the presidential candidate Lula stating, if elected, he would generally respect contract and institutions Election of Lula	Exchange rate: 3.6 R\$/1USD	
Highlights	Cardoso is the first elected president since 1964 to finish term For the first time since 1926 two presidential terms are observed from begin to end	Hyperinflation control Change in currency exchange regime Average free of risk interest rate (In US\$ terms): 69% p.y. Average GDP growth rate (In US\$ terms): 3.2% p.y.	Change in rules for presidential reelection Establishment of institutions (control of spending, regulatory agencies, inflation targeting)

Sources: Baer (2003), Lazzarini (2011) and authors

Table III.
Institutional period 2
highlights
(1994-2001—"Building
institutional
framework")

Year	Political arena	2002-2009 (“Rise to prominence”)	
		Economic arena	Regulation/deregulation
2003			Government cash transfer program intended to reduce poverty and hunger and improve education (Fome Zero/ Bolsa Família)
2004		Inflation: 6.5% p.a. (CPI)	Brazil Nacional Bank (BNDES) policy shift toward the formation of large groups with the aim of competing in the world market (Ambev, Brasilfoods, JBS)
2006	Reelection of Lula	Exchange Rate: 2.4 R\$/1USD	Government launches integrated program of investments and economic growth (PAC Programa de Aceleração de Crescimento)
2008		Brazil receives the “investment grade”	
2009		Brazil is mostly unaffected by the 2008 financial crisis. Exchange Rate: 2.4 R\$/1USD	
Highlights	For the first time in history, four consecutive presidential terms are concluded by the officials without interruption (motivated by health or political reasons)	Brazil mostly unaffected by external shocks. Average free of risk Interest rate (In US\$ terms): 16% p.y. Average GDP growth rate (In US\$ terms): 14.3% p.y.	Change in the orientation of government policy, «rules of the game» mostly unaffected

Table IV.
Institutional period 3 highlights (2002-2009–“Rise to prominence”)

Sources: Baer (2003); Lazzarini (2011) and authors

4. Material and methods

We collected data for listed companies in Bovespa Brazilian Stock Market from 1986 to 2009. We considered only listed companies for two main reasons: data reliability and data availability. Due to compliance and auditing obligations, we considered listed companies as the most reliable information available. The data source was the Economática database. It is a stock market analysis tool operating in a solid database. Founded in 1986, the company operates in eight countries: USA, Brazil, Argentina, Chile, Mexico, Peru, Colombia and Venezuela.

We respected the categories from Economática to assign firms to industries. This classification is tied to the North American Industry Classification System (NAICS). A firm is assigned to an industry when it is possible to identify that this industry is responsible to a predominant part of its revenue. In our final sample, we considered the

following industries: food and beverage, retail, civil construction electronics, energy (electric), banking and insurance, industrial machinery, mining, nonmetallic mining, pulp and paper, oil & gas, chemical, steel, telecommunications, textiles, transportation services and auto. Industries with small number of observations were not considered, such as agriculture and fishing, and investment funds. We did also not considered holdings without a clear definition of an industry.

We collected data for net income, return on equity (ROE) and equity value at the end of each year. We have converted net income and equity values for US Dollars, using the average exchange rate for each year. We have cleared the base for outliers using two criteria: first, we did not consider firm observation with negatives equity values. Second, we excluded outliers. Although *Hair et al. (1998)* recommend the utilization of 2.5 standard deviations from the mean, we did not use data with ROE values outside two standard deviations from yearly means. We made this decision because of the reduced sample in some industries. From the original base of 7,293 observations, we considered 5,469 as valid observations for the study. A correlation matrix involving all variables in the study is shown in *Table V*. No relevant correlations among variables were found.

We developed two empirical strategies. First, we build business landscapes to describe how their configurations changed for each period. One way to describe industry performance variance is through the business landscapes. The idea of business landscapes draws on the industrial economics tradition to explore the relationship between industry, as a unit of analysis, and performance variation (*Bain, 1959; Caves and Porter, 1977; Mason, 1939; Porter, 1996, 1981, 1979*). A business landscape describes how observed firm performance averages change along different industries. Significant variations indicate that industry structure differences matter in describing firm performance. *Ghemawat (1999)* proposes two dimensions to illustrate a business landscape. The first is a comparative indicator of industry profitability based on industry average return on capital. The other dimension is the amount of invested capital based on the total volume of investments in a given industry. The area delimited by these two dimensions represents the potential economic profit for each industry. The benefits of the business landscapes are the graphical visualization of industry profitability and potential economic profit. In this paper, we assess how business landscapes configurations changed over different institutional periods. The objective is to have a visual representation of the Brazilian landscapes in the three different periods.

The shortcoming of this method is that the landscapes, by themselves, cannot lead the researcher to any conclusion about the impact of the different institutional periods. Hence, we developed a second empirical strategy. First, we assessed the institutional impact by statistically analyzing means and variance differences (Levene, ANOVA and Kruskal–Wallis tests). To perform those analyses, we have checked our data for

Variables	Company	Industry	Year	ROE	Equity	Period
Company	1.0000					
Industry	0.9860	1.0000				
Year	-0.0852	-0.0967	1.0000			
ROE	-0.0376	-0.0484	0.1403	1.0000		
Equity	-0.0563	-0.0694	0.1367	0.0399	1.0000	
Period	-0.0785	-0.0892	0.9404	0.1690	0.1170	1.0000

Table V.
Variables correlation
matrix

normality and homoscedasticity. The distribution is normal (Doornik–Hansen test, $p < 0.0000$), and there is no heteroskedasticity (Breusch–Pagan/Cook–Weisberg test, $p < 0.0000$).

Second, we developed a panel regression, introducing industry and institutional periods effects (as dummies). We observed the effect of the introduction of each dummy separately, and then, all dummies on the model. Although the Hausmann test indicates the use of random effects ($\text{Prob} > \chi^2 = 0.4671$), we decided to perform both fixed and random effects (FE and RE) regressions to improve the robustness of our tests. We developed the six equations below:

FE models:

$$y_{it} = \beta_0 + w_i + v_k + \varepsilon_{it}, \text{fe} \quad (1)$$

$$y_{it} = \beta_0 + w_i + u_j + \varepsilon_{it}, \text{fe} \quad (2)$$

$$y_{it} = \beta_0 + w_i + u_j + v_k + \varepsilon_{it}, \text{fe} \quad (3)$$

RE models:

$$y_{it} = \beta_0 + w_i + v_k + \varepsilon_{it}, \text{re} \quad (4)$$

$$y_{it} = \beta_0 + w_i + u_j + \varepsilon_{it}, \text{re} \quad (5)$$

$$y_{it} = \beta_0 + w_i + u_j + v_k + \varepsilon_{it}, \text{re} \quad (6)$$

Where y_{it} is the variable representative of performance (ROE) of firm i in the year t ; β_0 is a constant term (average performance of i firms); w_i is the firm effect; u_j is the industry dummy; v_k is the institutional period dummy and ε_{it} is the error; ε_{it} is i.i.d. errors. On all FE models, we controlled for heteroskedasticity using the “robust” option in stata[®]. Moreover, for helping on choice of the best model, we added a measure of the relative goodness of fit: Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) or Schwarz Criterion. If the introduction of the institutional period variable improves the goodness of fit of the equations in comparison with equations without it, we would have one more element to suggest the importance of the institutional period on Brazilian firm performance.

5. Results

5.1 Descriptive statistics

Table VI presents the number of companies for each industry in our panel. There were numerous cases where companies had not presented results for the entire 24 years period. This is due to movements as mergers, acquisitions, bankruptcies and initial public offers. The civil construction industry, for example, grew from six companies in the 1986–1993 period to 18 companies in 2006. Although some industries presented small number of observations for some years, the Anderson–Darling Normality test showed that all sectors, but mining and oil & gas, presented normal distribution (p -value $< 0,005$).

Table VII presents the means for ROE, ROE standard deviation and equity values, for each industry and institutional period in the sample.

Industries	1986-1993			1994-2001			1986-2009			2002-2009			1986-2009					
	ROE		Average no. of observation	EQUITY		Average no. of observation	ROE		Average no. of observation	EQUITY		Average no. of observation	EQUITY		Average no. of observation			
	by year	by firm		by year	by firm		by year	by firm		by year	by firm		by year	by firm				
Food & beverages	206	6.3	216	6.7	24.1	5.4	25.1	5.9	206	4.6	16.1	17.3	5.1	20.3	10.4	21.3	10.9	
Retail	3.4	5.4	3.9	6.2	11.6	5.2	12.6	5.3	10.8	5.1	10.8	11.6	5.5	8.6	8.6	9.4	9.4	
Civil construction	3.5	4.7	5.0	8.0	9.4	5.0	10.6	5.3	20.5	4.7	20.5	20.9	4.5	11.1	6.8	12.2	7.3	
Electronics	11.8	7.2	12.0	7.4	10.5	5.3	11.0	5.9	6.5	5.2	6.5	6.3	5.6	9.6	12.1	9.8	13.0	
Energy	5.6	3.5	6.6	4.1	28.1	5.1	28.8	5.3	39.6	6.1	39.6	43.1	6.8	24.5	11.1	26.2	11.6	
Banking & insurance	19.8	7.2	18.9	7.6	30.0	5.1	28.1	5.1	33.8	5.3	33.8	31.5	4.9	27.8	10.4	26.2	9.7	
Industrial machinery	8.4	7.4	8.9	7.9	6.3	5.6	7.0	5.6	4.0	5.3	4.0	3.8	5.0	6.2	13.5	6.5	14.3	
Mining	7.8	6.9	7.8	7.8	9.1	6.1	9.4	6.3	5.9	3.6	5.9	6.5	4.0	7.6	10.7	7.9	10.5	
Pulp & paper	5.5	7.3	5.6	7.5	7.3	6.4	8.1	6.5	17.6	6.4	17.6	18.0	6.5	22.4	23.9	23.9	6.0	
Oil & gas	5.4	7.2	4.8	7.6	8.0	7.1	7.3	7.3	1.4	3.7	1.4	1.0	2.0	3.9	4.6	4.6	3.1	
Chemical	22.9	6.3	22.8	6.5	27.4	6.3	28.0	6.4	15.6	6.6	15.6	16.3	6.8	14.9	16.0	16.0	5.3	
Steel	31.6	7.0	32.5	7.2	30.0	5.7	30.5	6.0	11.5	6.0	11.5	11.8	6.5	16.1	16.6	16.6	5.6	
Telecommunications	3.1	3.6	3.1	4.2	14.9	3.7	15.1	4.0	17.6	6.4	17.6	18.0	6.5	22.4	23.9	23.9	6.0	
Textiles	17.6	6.4	18.0	6.5	22.4	5.4	23.9	6.0	1.4	3.7	1.4	1.0	2.0	3.9	4.6	4.6	3.1	
Transportation services	1.4	3.7	1.0	2.0	3.9	3.1	4.6	3.1	15.6	6.6	15.6	16.3	6.8	14.9	16.0	16.0	5.3	
Auto	15.6	6.6	16.3	6.8	14.9	5.2	16.0	5.3	11.5	6.0	11.5	11.8	6.5	16.1	16.6	16.6	5.6	
Average	11.5	6.0	11.8	6.5	16.1	5.3	16.6	5.6										

(continued)

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Table VI.
Number of observations by industries and periods

Table VI.

	2002-2009			1986-2009				
Pulp & paper	6,9	6,1	7,1	6,3	6,5	15,7	7,0	16,7
Oil & gas	6,9	5,5	6,4	5,7	6,8	16,2	6,1	16,3
Chemical	15,1	5,3	15,1	5,5	21,8	13,4	22,0	13,5
Steel	22,8	5,9	22,3	5,7	28,1	14,7	28,4	14,5
Telecommuni-cations	15,5	5,0	17,1	5,5	11,2	7,9	11,8	8,6
Textiles	18,9	5,6	19,4	6,0	19,6	12,4	20,4	13,2
Transportation services	9,1	5,6	9,5	5,1	4,8	6,1	5,0	6,1
Auto	10,5	6,5	10,3	6,3	15,0	13,1	15,8	13,6
Average	15,2	5,3	15,5	5,5	14,3	11,4	14,7	11,8

Sectors	ROE			SD			Equity		
	1986-1993 (%)	1994-2001 (%)	2002-2009 (%)	1986-1993 (%)	1994-2001 (%)	2002-2009 (%)	1986-1993	1994-2001	2002-2009
Banking & insurance	12.1	10.0	14.3	6.2	7.8	9.4	378.973	442.274	721.376
Mining	10.7	6.6	8.8	5.9	7.4	15.7	147.876	235.164	245.117
Retail	9.3	4.4	12.6	3.9	10.7	15.9	81.587	145.156	117.738
Oil & gas	9.2	13.2	21.2	6.0	10.8	11.6	179.386	318.973	658.473
Telecom	7.9	-2.2	4.0	3.3	19.4	6.3	629.099	679.975	1,158.977
Auto	6.2	2.7	16.8	9.2	12.0	9.9	70.207	87.968	106.287
Civil construction	6.0	1.4	7.7	2.0	4.7	7.1	31.402	47.239	241.533
Industrial machinery	5.9	4.2	10.7	6.9	13.9	12.0	61.894	115.009	218.391
Textiles	5.0	-0.4	-2.3	5.3	7.3	17.2	58.763	90.326	104.346
Pulp & paper	4.3	2.4	7.0	3.7	5.0	11.4	559.818	735.237	779.908
Food & beverages	3.7	2.3	5.0	5.1	8.8	10.2	105.175	163.825	374.928
Chemical	2.5	2.4	9.6	4.4	10.0	10.9	159.496	244.614	228.729
Electronics	1.2	1.3	6.8	10.6	15.5	7.8	73.526	147.120	126.620
Steel	0.1	0.0	14.5	5.8	11.2	12.5	205.910	284.795	433.329
Energy	-4.7	0.9	11.0	4.0	6.8	13.1	1,659.361	1,208.703	691.836
Transportation services	-34.5	-8.5	15.5	13.4	11.4	11.2	192.693	84.702	333.535

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Table VII.
ROE, ROE SD and
equity values by
industry for each
period

The table above presents greater ROE average for 13 of 16 industries in the Period 3 (2002-2009). In addition, standard deviation was also higher in Period 3 for 11 industries and equity values were higher for 12 industries in the same period.

5.2 Business landscapes

We followed Ghemawat (1999) to build our two-dimensional business landscapes. We used ROE and equity data as metrics for return and invested capital, respectively. The landscapes help describing industry return heterogeneity by contrasting ROE in the y-axis and equity in the x-axis. The rectangle area formed by ROE x equity represents the total profit of the industry, serving as a proxy of industry attractiveness (Figure 1).

The highest ROE averages in the Period 1 were noticed in the banking and insurance, mining, retail and oil & gas industries. Two industries presented negative return averages: energy and transportation services. The highest equity levels were noticed in the energy, telecommunications and pulp & paper industries, respectively (Figure 2).

The second period showed the oil & gas industry as the most profitable, followed by banking & insurance. Transportation services industry remains unprofitable, as well as telecommunications industry, which was privatized in this period (Figure 3).

In the third period, oil & gas was still leader in profitability, now followed by auto, transportation services (now highly profitable) and steel. Only the textile industry presented negative average return. This period is the one with higher profitability of all three.

5.3 Variance analysis and panel regression models

The statistical tests focused on differences among means and the dispersion of values around the industries for each institutional period. The analysis of the means suggests the extent to which institutional changes impact industry attractiveness. The analysis

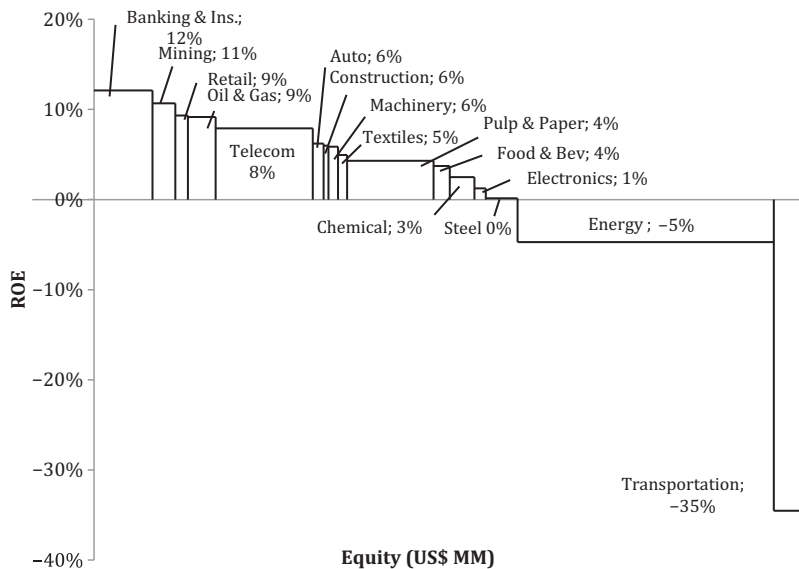


Figure 1.
Business landscapes
1986-1993

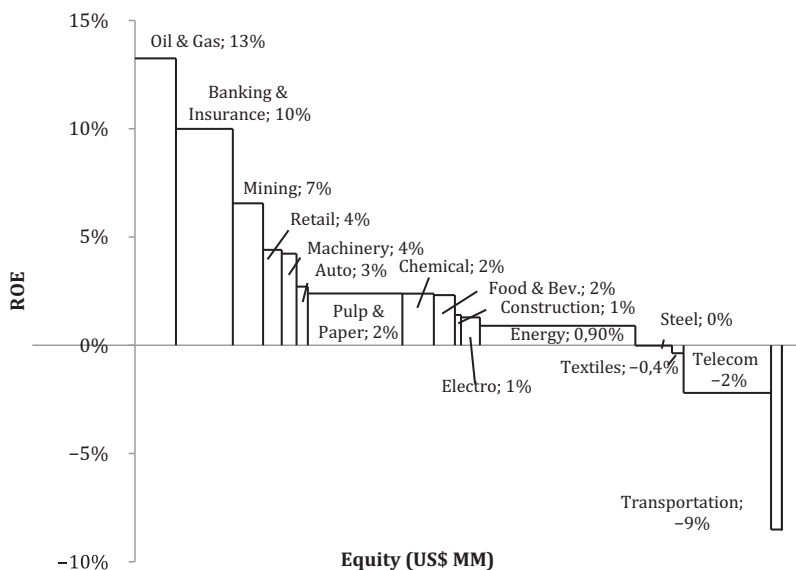


Figure 2.
Business landscapes
1994-2001

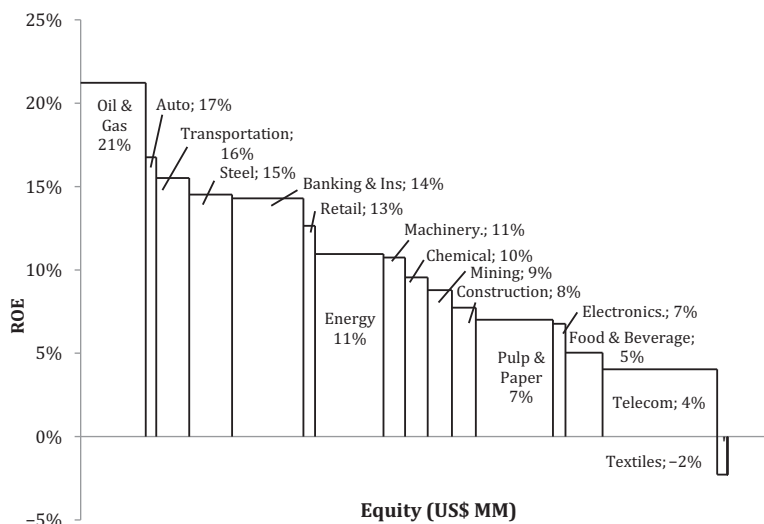


Figure 3.
Business landscapes
2002-2009

of the variance sheds light on how institutional changes impact the risks and potential for achieving abnormal returns within each industry.

Figure 4 depicts the mean values for each industry and period. To have an exploratory graphical view of the dispersion, the size of the bars is one standard error from the mean. Notably, the oil & gas and finance sectors are the ones with higher return on equity. On the other side, textiles and telecom presented the lowest ROE.

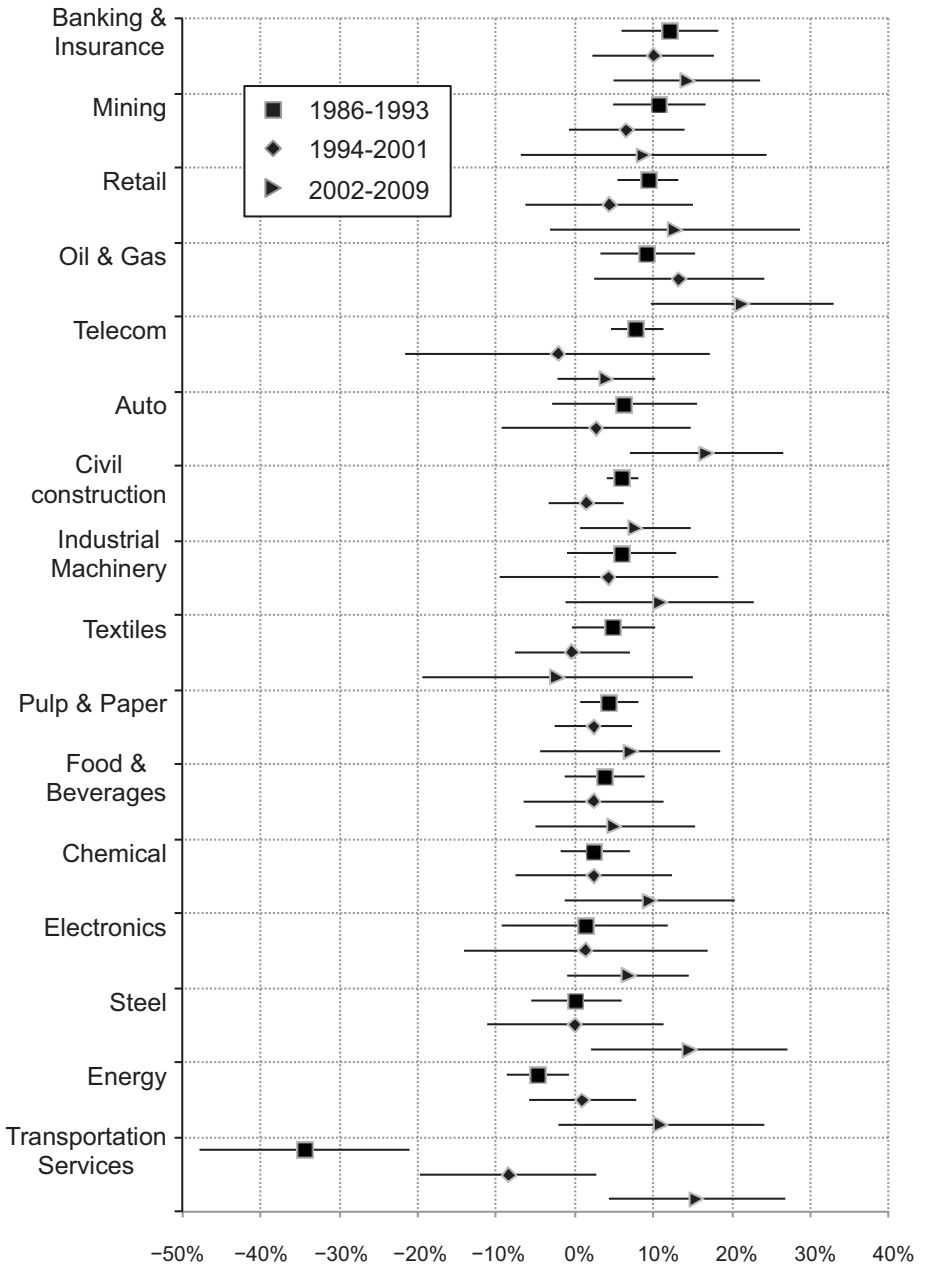


Figure 4.
Interval plot of ROE
× Industry × Period

Transportation services, electronics and pulp & paper are sectors with higher average differences. It is important to note that the transportation services industry presented a relevant shift in terms of companies' composition, due to airlines bankruptcies and ground transportation IPOs. ROE averages across the three periods are different (p -value < 0.0001).

The Levene test for equal variances indicated that is not possible to state that ROE variances are equal for industries (p -value < 0.0001). Besides ANOVA, the non-parametric Kruskal–Wallis test showed similar results. In fact, in 12 of 17 industries, the dispersion of firm performance around the industry mean increased consistently over the three periods. In addition, the Bonferroni 95 per cent confidence interval for standard deviations test in Figure 5 indicates that is possible to consider that the overall variance in Period 3 is larger than in Period 2.

The panel regressions models also reveal the importance of the impact of the third institutional periods on Brazilian firms performance. Table VIII above presents the results of equations (1)–(6). The third institutional period variable impact was positively significant at 1 per cent in all models the variable was considered. Regarding the industry effect, model (6) indicates the positive RE of oil and gas (at 1 per cent), banking and insurance (at 1 per cent) and retail (at 10 per cent). Similarly, it indicated a negative RE of the textile industry on performance (at 10 per cent). Considering the criteria for goodness of fit (AIC, BIC and Likelihood), the best model is the one that considers both industry and institutional period effects. Thus, our main investigation is on the correct way. The institutional period affects firm performance in the context of Brazil.

We should point some limitations for the study. The first one refers to our sample. If, by one side, we used listed companies information to guarantee better reliability, by the other side, the sample size was reduced and may jeopardized some analysis, mainly on industries with small number of companies. The second limitation refers to the outliers' treatment criteria, which may cause the same impact of reducing sample size. Third, we used the standard deviation data as a proxy for differentiated strategic positioning, but it can be analyzed as a result and not a cause of a good strategy. Fourth, largely diversified firms were not assigned to any specific industries because there was no evidence of predominant line of business.

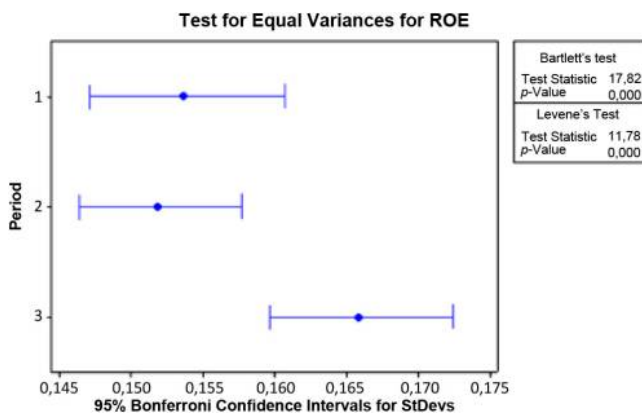


Figure 5.
ROE variances by
period

Table VIII.
Panel regressions
results

Industries	Fixed effect models			Random effect models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dummy period 2 (building institutional framework)	-0.0038855 (0.063197)		-0.0038855 (0.063197)	-0.0049969 (0.0650245)		-0.0051641 (0.0650382)
Dummy period 3 (rise) to prominence	0.0724456 (0.008496)***		0.0724456 (0.008496)***	0.0703142 (0.0065451)***		0.0698351 (0.0065047)***
Dummy industry-retail construction	0	0	0		0.0502887 (0.0232432)*	0.0418687 (0.022852)*
Dummy industry-civil construction	0	0	0		0.017349 (0.0202616)	-0.0110652 (0.019983)
Dummy industry-electronics	0	0	0		-0.0185754 (0.0239692)	-0.0148232 (0.0235623)
Dummy industry-energy (electric)	0	0	0		0.0190071 (0.0178896)	-0.0009542 (0.0176448)
Dummy industry-banking and insurance	0	0	0		0.0779803 (0.0173539)***	0.0660251 (0.0170704)***
Dummy industry-industrial machinery	0	0	0		0.0242335 (0.0291557)	0.0303918 (0.0286691)
Dummy industry-mining	0	0	0		0.0053397 (0.0341764)	-0.0065602 (0.0335685)
Dummy industry-non-metallic mining	0	0	0		0.0472916 (0.0347378)	0.0527823 (0.0341523)
Dummy industry-pulp and paper	0	0	0		-0.0041492 (0.0301441)	-0.0105047 (0.0296429)
Dummy industry-oil & gas	0	0	0		0.1015629 (0.0296443)***	0.0955516 (0.0291513)***
Dummy industry-chemical	0	0	0		-0.0021623 (0.0190445)	0.0016086 (0.0187198)
Dummy industry-steel	0	0	0		-0.0059058 (0.0181409)	-0.0029634 (0.0178357)
Dummy industry-telecommunications	0	0	0		-0.0161325 (0.0206399)	-0.0272572 (0.0203092)
Dummy industry-textile	0	0	0		-0.0303861 (0.0194447)	-0.0328679 (0.0191106)*
Dummy industry-transportation services	0	0	0		0.047276 (0.0260407)*	0.0230689 (0.0256182)
Dummy industry-auto	0	0	0		0.0168397 (0.0216774)	0.0221846 (0.0213122)
constant	0.0444009 (0.004761)***	0.068635 (5.00e-19)***	0.0444009 (0.004761)***	0.0361319 (0.0065271)***	0.0456558 (0.0131978)***	0.0272133 (0.0133744)**

(continued)

	Fixed effect models			Random effect models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
R^2	0.0472	0.0000	0.0472	0.0472	0.0419	0.0876
Number of observations	5,469	5,469	5,469	5,469	5,469	5,469
Number of groups	495	495	495	495	495	495
observations by group (average)	11.0	11.0	11.0	11.0	11.0	11.0
Institution Dummy?	Yes	No	Yes	Yes	No	Yes
Industry dummy?	No	Yes	Yes	No	Yes	Yes
Regression fixed effect?	Yes	Yes	Yes	No	No	No
Regression random effect?	No	No	No	Yes	Yes	Yes
Log likelihood	3,390.079	3,251.422	3,390.079			
AIC	-6,776.159	-6,502.844	-6,776.159			
BIC	-6,762.945	-6,502.844	-6,762.945			
LR test						

Notes: Significant at ***1; **5; * 10%; LR, likelihood-ratio

Table VIII.

In summary, the results show the influence of the institutional context on industry performance. As institutions evolve toward “pro-market”, it seems to be a lower dependence between industry and firm performances on macroeconomic factors, favoring internal operational competencies, as suggested by [Cuervo-Cazurra and Dau \(2009\)](#) and [Hermelo and Vassolo \(2010\)](#). Especially in the Brazilian context, it seems that the improvement of institutional conditions, mainly in Lula’s years, resulted in better conditions for companies to achieve higher economic results. From the analysis of [Tables II, III and IV](#), we suggest that “pro-market” evolution in Brazil was almost continuous, at least for the past 16 years (Periods 2 and 3). This is coherent with [North \(1990\)](#) suggestion on the slow speed of institutional changes. However, the papers main contribution is to point out that this effect is felt differently across industries. In our study, ROE variance was increasingly higher during time for most industries: banking, mining, retail, oil & gas, civil construction, textiles, pulp and paper, food & beverages, chemical, steel and energy. Period 2 (1994-2001) presented higher variance for fewer industries, as telecom, that passed by great turbulence due to privatization in that time. Previous empirical investigations using Brazilian data showed that the amount of total variation associated with transient industry effects was greater than the stable effects in more institutional turbulent periods ([Bandeira-de-Mello and Marcon, 2006](#)). Therefore, the effects of pro-market and other institutional changes may not be similar for all industries. Some changes may be more favorable for some industries than others. Both governments and managers should take it into consideration when developing their strategies.

An anecdotal fact can exemplify the relevance of institutional changes, as well as its different impacts on industries. On April 2012, Brazilian President Dilma Rousseff announced her willingness to reduce interest rates to foster economic growth. To start the process, the state-owned Banco do Brasil, the country’s largest bank reduced its rates and offered additional R\$ 43 billions in credits on the local market. While this would sound as great news for companies on almost all sectors, this announcement triggered a massive sell of all Brazilian bank shares in the stock market. In just one day, Banco do Brasil shares dropped 5.91 per cent, Itaú shares dropped 3.08 per cent, Santander Brasil shares dropped 1.79 per cent and Bradesco dropped 2.72 per cent ([Brasil 247, 2012](#)).

6. Conclusion

The main results indicate that institutional periods in Brazil influenced firm performance, suggesting that:

- there is an important institutional effect on performance; and
- the impacts of those institutional effects may be different across industries.

Despite the fact that economic fluctuations are important, the impact of institutional changes also seems to be significant in understanding industry and firm performance. In addition, the improvement of the institutional framework increases the variance of firm performance around the mean. Market institutions seem to reward good strategies rather than favor social welfare. Managers should consider the institutional settings as an important factor on their strategies.

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