FUNDAÇÃO GETULIO VARGAS

ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

CHLOÉ SANDRINE HÉLÈNE TRICAUD

MAIN OBSTACLES IN THE BUSINESS ENVIRONMENT AFFECTING FIRM GROWTH: A COMPARATIVE ANALYSIS BETWEEN CHINESE AND BRAZILIAN SMEs

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Thesis presented to Escola de Administração de Empresas de São Paulo of Fundação Getulio Vargas, as a requirement to obtain the title of Master in International Management (MPGI).

Knowledge Field: Economia e Finanças Internacionais.

Adviser: Prof. Dr. Antonio Carlos Manfredini Da Cunha Oliveira

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ABSTRACT

Using World Bank Data, this research analyzes the similarities and differences in the main obstacles faced by Chinese and Brazilian micro, small and medium enterprises (MSME). We performed both country and cluster analyses in order to confront subjective and objective data, with the aim to be able to identify firms' behaviors according to their own characteristics and their country environment.

KEY WORDS: MSMEs, OBSTACLES TO BUSINESS, FIRM GROWTH

RESUMO

Usando dados do Banco Mundial, esta dissertação analisa as semelhanças e diferenças entre os obstáculos enfrentados pelas micro, pequenas e médias empresas (MSME) no Brasil e na China. Realizamos tanto uma análise comparativa entre os dos países como uma análise de clusters para confrontar os dados subjetivos e objetivos recolhidos, de modo a identificar o desempenho dasempresas, levando em consideração as características dos países e o ambiente de negócios.

KEY WORDS: MPMEs, OBSTACULOS AOS NEGOCIOS, DESEMPEHNO DA EMPRESA

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LIST OF ABBREVIATIONS

BNDES   Banco Nacional de Desenvolvimento Econômico e Social

BRIC   Brazil Russia India China: common acronym to describe these large emerging economies

FDI   Foreign Direct Investment

GDP   Gross Domestic Product

IBGE   Instituto Brasileiro de Geografia e Estatística

NBFI   Non Business Financial Institutions (including MFI)

MFI   Microfinance Institutions

MSME   Micro Small and Medium Enterprises

OECD   Organization of Economic Cooperation and Development

PCB   Private Commercial Bank

ROA   Return on Assets

ROE   Return on Equity

SEBRAE   Serviço Brasileiro de Apoio às Micro e Pequenas Empresas

SOB   State-Owned Bank

SME   Small and Medium Enterprises

WBES   World Bank Enterprise Survey (source for raw data)

1.   INTRODUCTION

Brazil and China, two major economies of the loose BRIC group, have been compared on many grounds, but little light has been shed on their respective small and medium enterprises (SMEs) development. Both promised to a bright future, China and Brazil SME sectors do not observe the same performance in terms of competitiveness and growth. Although institutional development in Brazil seems to have reached a higher level than in China (including a widespread banking system and a more sophisticated legal framework), Chinese firms apparently manage to perform better than their Brazilian counterparts. This success, often attributed to the Guanxi[1], a set of informal practices complementing the institutions' deficiencies, could for the most part actually be traced back to their demographic power. Nevertheless, interrogations remain on the cause behind the success of Chinese private enterprises. Is it because they benefit from a more facilitating business environment than firms in Brazil? In this research, we chose to focus on SMEs, whose essential role in economic development has been discussed by many scholars.

Besides the profound differences in their economies, China and Brazil share common characteristics which make them particularly interesting to compare: they both experienced a rapid development of the SME sectors, starting in the 1980s; they were both subject to a period of intense GDP growth in the early 2000s and both are still coping with common issues that affect emerging countries such as lack of infrastructure, low levels of legal enforcement, high regional inequalities and institutional deficiencies. The two countries are becoming increasingly interdependent, with China becoming the main export partner of Brazil in 2009, (Latin American Herald Tribune[2]).

In studying the main obstacles to business for SMEs in Brazil and China, the main objective is to to identify the variables that are significantly impacting firms' operations and growth. One objective of this research work is to make a distinction between country variables and the inner characteristics of firms. In order to do so, this thesis proposes the following research question:

> **How do the Brazilian and the Chinese business environments affect firm growth? (a cross-country analysis on the main obstacles to business)**

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[1] Guanxi refers to networks or connections that are facilitating business operations by providing support and cooperation among the parties involved. Guanxi is known to be a structural cultural principle in Chinese society.
[22] http://www.laht.com/article.asp?ArticleId=333733&CategoryId=10718

In answering this question, we will get support from the World Bank Enterprise Survey which provided valuable data on the two countries, allowing the comparison. As discussed in Section IV, this data has been collected in order to be as representative and reliable as possible. What makes this thesis really innovative is first that nobody has ever compared China and Brazil using this dataset, given that the survey's release date is quite recent. This work will also intend to innovate in the methodological tools used to analyze the data. We will use quantitative analysis and a qualitative approach including a cross-country analysis and three different cluster analyses in order to identify both differences and similar patterns between Chinese and Brazilian SMEs. Our main objective is to highlight differences between the two countries and to draw similar patterns according to firms' characteristics in order to be able to anticipate firms' behaviors when facing a set of obstacles.

Thanks to these two methods of comparison, we will identify what types of variables have an impact on the perceived obstacles to a firm's operations. We will also assert the differences between perceived obstacles and the objective constraints faced by business owners in their daily operations. Finally, we intend to draw a portrait of firms that are typically impacted by one obstacle rather than another. Of course, this work is not exempt from biases, whether from methodological issues or the data itself. Nevertheless, we paid extra attention to those possible methodological flaws in drawing our conclusions.

On a more personal level, I do think this research work complements the academic focus I have undertaken on economics in emerging markets, and that it will be valuable in my future career in the sector of economic development. I truly believe that supporting the development of a strong SME sector is at the core of economic development policies, given the SME sector's importance on GDP contribution and employment. The stakes are high, and worth further research to identify what really matters to the development of SMEs. I therefore hope this work can contribute to increase knowledge and trigger new interest on this important topic.

2.   LITTERATURE REVIEW

2. 1. The role of SMEs in economic growth

A large body of literature has acknowledged the importance of SMEs in economic growth. Ayyagari, Beck, Demigürç-Kunt (2007) first used World Bank data to find that SMEs employed more than 50% of the formal workforce for 48 out of the 76 countries covered in the analysis. In Brazil for instance, their study showed that SMEs accounted for 60% of all formal jobs. In general, economists have observed a strong correlation between SME contribution to the formal economy and the country's state of development. While in middle income countries, SMEs represent 55% of employment and 39% of GDP; this percentage reaches 65% and 52% respectively in high income economies. Beck, Demigürç-Kunt and Levine (2005) assert that a large SME sector in manufacturing is a characteristic of a successful economy. Birch (1979) first acknowledged the importance of small firms in job creation. His survey of American firms showed that those with less than 100 employees were responsible for generating 80% of new jobs. Ayyagari, Demirgüç-Kunt and Maksimovic (2011) further found that the size of firms is inversely correlated to their contribution to total employment and the rate of job creation. The importance of SMEs in job creation can be explained by their greater flexibility of operations and access to cheap labor (Mitra and Pingali, 1999). The ability to develop a network of performing SMEs is therefore crucial as they contribute greatly to the building of a dynamic and healthy economy. However, there is a controversy on the effect of the SME sector on economic growth. Cravo, Gourlay and Becker (2010), in studying the link between the importance of the SME sector and regional economic growth in Brazil, found that whereas the opposite may be true for developed economies, the relative importance of SMEs in developing countries is negatively correlated to economic growth. According to the authors, whether SMEs have a positive or negative effect on a country's economic growth depends on the amount of human capital accumulated within companies, measured by the average schooling of employees. Even though the causal link between SMEs and growth is open to debate, the size and the performance of the SME sector gives a first indication of the impact of institutional bottlenecks on the business environment. Indeed, those inefficiencies prevent firms from growing to their optimal size (Kumar et al., 2011).

2. 2. The fast development of SMEs in Brazil and China

One similarity between China and Brazil is the fact that their SME sectors have grown quite recently and at faster pace than for developed countries. Since 1978 and China's liberalization, the legal framework and central government's incentives have allowed SMEs to grow steadily. As rural families were able to engage in business activities, private family-owned companies flourished: the

number of SME owners increased from 1 million in 1980 to 15 million in 1992 (Dana, 1999). In 1994, SME development was further encouraged by the opening up of 14 coastal cities to FDI, which provided urban SMEs with needed capital resources. During the 1980s, the Township and Village Enterprise initiative has allowed SMEs in China to develop at a rate never experienced in any other country (Sun, 2000) and played an essential role in the country's industrialization. After 1990, the Central Chinese government pursued reforms on enterprise governance structure and ownership which marked the beginning of Sino-foreign corporations. Given their increasing contribution to Chinese GDP and employment, the economic importance of SMEs was officially acknowledged in the 1997 Fifteen Party Congress. During this period, SME clusters in the provinces of Jiangsu, Zheijiang, Guangdong and in Beijing blossomed thanks to increased competition, economies of scale and reduction of transaction costs. In 2003, along with the definition of clear thresholds for SMEs, the Chinese government enacted a law to foster fair treatment towards SMEs, which included specific provisions seeking to facilitate market access to non SOE. On the other hand, China's accession to the WTO in 2001 has increasingly put pressure on Chinese SMEs to comply with international regulations on trade and labor standards. In 2008, the crisis hit Chinese SMEs hard, with 20% of them going bankrupt in March 2009, according to the Chinese Academy of Social Sciences, a government think tank. Despite being more affected by the crisis, SMEs received fewer help packages from the government which resulted in a slower recovery. Nowadays, Chinese SMEs are concentrated in 600 industrial zones with a combined output value of more than CNY 100 billion, accounting for 50% of the total industrial output and 80% of formal employment. Within these zones, 5 clusters generated outputs exceeding CNY 30 billion (Xiangfeng, 2007). In 2009, the Chinese Public Innovation Fund granted a CNY 1.7 million package to technological SMEs.

For a long time, the Brazilian legal framework has blocked SME development. In 1981 for instance, an export license required "1,470 separate legal actions with thirteen government ministries and fifty agencies" (Rosenn, 1984, p.21). With Brazil's liberalization and the gradual state withdrawal from large corporations with massive privatization in the 1990s, firms' average size has shrunk (Salama, 2006). Between 1996 and 2002, the amount of micro and small enterprises grew 57% and 51% respectively, compared to only 15% and 12% for medium and big companies (SEBRAE, 2012)[3]. The rise of the SME sector fluctuates depending on economic regions : whereas between 1985 and 2000, the amount of small companies increased by 56% in the North and 42% in the North-East, this number only reached 18% for the South-East region (SEBRAE, 2012). Only in 2006 the Brazilian government implemented the "Juro Zero Program" addressing innovative SMEs' financial needs, offering zero coupon loans from BRL 100,000 to BRL 900,000 (OECD, 2010).

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[3] Figures calculated with Sebrae's thresholds on micro, small and medium enterprises (see definition Table 1, p.13)

Currently, large amounts of public financial resources are allocated to the development of SMEs through SEBRAE, whose budget was USD 1.25 billion in 2009 and 1.6 billion in 2011[4].

2. 3. The SME sector's contribution to the economy in Brazil and China

According to their respective national definitions, SMEs in Brazil and in China represent the vast majority of all formally registered enterprises. In 2008, SEBRAE registered 5.8 million SMEs – compared to only 17,000 large companies - which accounted for over 99% of total enterprises (SEBRAE, 2010, p.35). The share of microenterprises (less than 20 employees) was 94% in the same year. In China, small enterprises according to the national definition (with a threshold from 100 to 600 employees depending on the sector) accounted for 98% of total formal enterprises in 2007, with 2.3 million entities registered (Wang, 2009)[5].

In 2008, Brazilian SMEs provided 17 million formal jobs which represent 68.7% of all formal employment in relative terms while microfirms accounted for 24.5% of the total share (SEBRAE, 2010, p.179). At the same time, the employment growth rate was significantly higher for large scale firms in the 2004-2008 period: 20% compared to 13% (SEBRAE, 2010, p.179). With the Chinese encompassing definition of SME (See Table 3.1.3 on section 3.1), SMEs generate 82% of total employment opportunities in China, with small enterprises employing 51% of all formally employed Chinese.

More importantly, while having fewer enterprises formally registered, the Chinese SME sector's contribution to the economy is significantly higher than in Brazil. The total output of Chinese SMEs accounts for at least 60% of the country's GDP (Asian Development Bank Institute[6],2014 ; Xiangfeng, 2008). In Brazil, the president of SEBRAE, Carlos Alberto dos Santos admitted that small and micro firms only accounted for 20% of Brazil's GDP, while medium sized enterprises did not play a significant role in the national economy. This difference between China and Brazil, while partly explained because the Chinese definition includes larger firms, may be a symptom of the higher obstacles faced by Brazilian SMEs, resulting in a negative impact on their productivity.

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[4] Information available on www.sebrae.com.br

[5] It is important to notice that Brazil reported more than twice the number of small enterprises, a gap that may be explained by significantly higher levels of informality in the Chinese business environment or by the use of different thresholds implied in their national definition of small companies.

[6] http://www.asiapathways-adbi.org/2014/06/is-finance-a-binding-constraint-for-sme-participation-in-trade-in-asia/

2. 4. Impact of business environment on firm growth

While Batra, Kaufmann and Stone (2003), along with Ayyagari, Demirgüç and Levine (2005), have paid particular attention to the cross-country similarities concerning the impact of the business environment on firm growth, proving a strong correlation between business environment and firm size, Dollar, Hallward-Driermeier, and Mengistae (2005) have studied this relationship for a smaller group of countries (Bangladesh, India, China and Pakistan). They have used the standardized survey of the World Bank (Investment Climate Survey, 2003) on a large number of companies to identify how infrastructure bottlenecks affect firm growth, showing that international integration is more likely to happen in a favorable business environment. Their study seeks to explain why China has succeeded where many other comparable countries (emerging Asian countries with same levels of GDP) in the same region have failed or had mitigated success. Similarly, they provide more evidence that improving the business environment by cutting customs clearance procedures, building efficient infrastructure and making financial services available affects significantly the probability of a firm exporting. Studying the African region, Freund and Rocha (2010) find that bureaucratic custom practices explain most of the limitations to trade. Nevertheless, in order to get an exhaustive analysis of the correlation between a given business environment and firm growth, it is essential to go further than just study country variations.

2. 5. Business environment and the characteristics of firms

Aterido, Hallward-Driemeier and Pagés's analysis (2007; 2009; 2010) shows that the business environment affects firms differently, depending on their size. Indeed, small firms are exposed to obstacles and constraints while big firms are able to hedge against them. For instance, small firms experience more power shortages on average, while large firms, which may be more electricity-intensive, tend to secure their own power supply (Gelb et al., 2007). The result is that a poor electricity grid will have a direct impact on the growth rate of SMEs, while only an indirect impact on those of large firms. Gelb et al. (2007) also studied the variations on perceived obstacles across firms of different sizes. Using subjective answers on a questionnaire about the investment climate in 26 African countries, they showed that small firms tend to complain more than large firms on issues regarding finance or access to land, for example; while other perceived obstacles such as corruption or infrastructure are less scale-dependent. Using the same model, taking into account the perception of potential constraints, Beck, Demirgüç-Kunt and Maksimovic (2005) found that regardless of the country, small enterprises benefited more from institutional and financial development. Laeven and

Woodruff (2007) also found that firm location may be an essential determinant to explain the extent to which a firm is impacted by the business environment.

2. 6. The elements of the business environment impacting firm growth

Basing their work on the World Bank Enterprise Survey, (World Bank and IFC MSME Country Indicators, 2010) Kushnir, Murmulstein and Ramalho (2010) analyzed the data of MSMEs from 98 countries and tried to establish a common hierarchy of the most binding obstacles. Out of 15 main obstacles identified in the Enterprise Survey, the most commonly cited as being the biggest obstacles to the operations of SMEs are in decreasing order: electricity, access to finance, practices of the informal sector, tax rates, political instability and corruption. Empirical evidence supports the view that a more efficient judicial system – at the basis of the institutional framework – is correlated with the presence of larger firms. Kumar, Rajan and Zingales (2001) further argue that improving a country's patent protection system leads to an increase in the size of R&D intensive enterprises. These results advocate for an institutional explanation behind cross-country differences in firm size. Dinh (2010) focused on developing countries and identified the more binding obstacles on firms operations. For him, in a majority of developing countries, informal sector competition and access to finance are the most binding constraints affecting firms' growth rates, especially for smaller sized firms. In assessing firm growth, he measured the evolution in employment figures; using both objective and subjective answers to identify the most binding constraints. Klapper, Laeven and Rajan (2006) studied the impact of different elements of the investment climate on the entry of new firms. High registration costs hinder business creation and growth, while financial regulations and property rights protection promote firm creation and growth. Demirgüç-Kunt, Love, and Maksimovic (2006) complemented the existing literature by providing empirical evidence on a survey with data covering 52 developed and developing countries. They specifically investigated the drivers of and the gains from incorporations. Their results show that there is a higher probability of firm incorporation in countries with strong shareholder and creditor rights, effective bankruptcy legislation and better developed legal and financial systems. Nevertheless, the causal link with firm growth is not evident, since incorporated enterprises only register faster growth rates in countries with better institutional development. It only suggests that the legal status of firms can be an indicator of the country's institutional development, since incorporated firms are more efficient in a formal institutional framework, whereas unincorporated firms tend to perform better in countries with less-developed institutions.

What interested most of the scholars is the extent to which each particular element of the business environment affects firm growth. Indeed, some factors may only have an indirect effect, while others can directly impact firm growth. While correlation is hard to establish for some of the business

environment variables, Ayyagari, Demirgüç-Kunt and Maksimovic (2006) pointed financial constraints, crime and political instability as directly affecting firm's growth rates. Among those three factors, finance is the most robust variable impacting the rate of growth of enterprises.

2. 7. External factors determining firm growth

In studying the impact of business environment constraints on the growth of firms, we must acknowledge the external factors that may impact the size of these companies. You (1995), for instance, identified a potential connection between a given country's comparative advantage and the average size of its firms. If a country has a comparative advantage for a good efficiently produced in large firms, it may show a higher than average density of large firms. Institutional theories also suggest that the size of firms is a result of the margin between intra-firm transactions and market transactions (Coase, 1937). Brüderl, Preisendörfer and Ziegler (1992) also argue that business owners with higher academic achievements tend to be more innovative, which has a direct impact on firm growth. Lorunka and al. (2011) further found that the amount of capital at start-up, the gender of the entrepreneur and the growth strategy of a firm are essential determinants predicting growth for small firms. Moreover, empirical evidence suggests the growth of small firms is directly linked to the entrepreneur's ambitions. Surveying small businesses, Kolvereid and Bullvag (1996) actually found that almost 40% of the responding entrepreneurs did not want their firm to grow. This result is possibly due to some countries' legal framework which can require a lot of paperwork and often imply an increasing tax burden when firms achieve a certain size. The entrepreneur's aspiration to grow is significantly correlated with his educational achievement, the industry he is operating in and the firm's past growth turnover and growth in the number of employees. Similarly, while emphasizing the existence of external, internal and social barriers, Gaskill and al. (1993) also found that the lack of managerial skills, training and education is often responsible for the failure of small businesses.

2. 8. Access to finance and credit constraints

In 2001, the World Bank stated that a significant part of the economic growth differences across countries were to be explained by their level of financial development. Since financial constraints – including the access to and the cost of finance – have been identified by a significant number of SMEs as the primary barrier to growth (Beck, 2007) and access to finance is proven to have a direct impact on firm growth (Ayyagari, Demirgüç-Kunt and Maksimovic, 2006) and on firm size (Kumar, Rajan

and Zingales, 1999); it is important to focus on this feature. First, recent research reinforces the fact that SMEs face bigger financial obstacles in financing their operations than large firms (Beck, Demirgüç-Kunt and Maksimovic, 2005; Ayyagari, Demirgüç-Kunt and Vojislav; 2006; Beck, Laeven, Maksimovic 2006). Cole (1998) also found that firms with pre-existing saving accounts are more likely to be granted a loan. Furthermore, different background conditions lead to different levels of financing constraints across and within countries (Laeven and Woodruff 2007).

The lack of access to external finance does not only have an impact on the cost firms have to pay for new investments, it can also prevent firms from making necessary investments. The link between the lack of external finance and firms being credit constrained has been documented recently by Banerjee and Duflo (2010). Using a sample of 253 SMEs in India, they studied the evolution of sales before and after firms become eligible for loans at subsidized interest rates. They observed that instead of just using subsidized loans to replace other more costly sources of financing, the borrowing firms expanded their sales proportionally to the newly available credit resources. They both used the subsidized credit to expand their activities while still using internal sources of financing, which further supports the assumption that they were previously credit constrained. Following the same pattern, Zia (2008) observed in Pakistan that a group of small firms were forced to reduce their sales after they became ineligible for subsidized credit, while large firms facing the same ineligibility did not. The 1999-2000 World Business Environment Survey provided more extensive cross-country evidence; using a large sample of 10,000 firms in 80 countries. Beck, Demirgüç-Kunt and Maksimovic (2005) found that the probability of experiencing slow output growth is directly linked to the business owner's identification of finance as a major constraint. As seen before, financing obstacles affect SMEs more than large companies. Specifically, they measured that financing constraints reduce small enterprise growth by 10 points on average. The required collaterals, bank paperwork and interest rates payment represent a far more constraining obstacle for SMEs than for large companies. As small business owners are often asked to back their loans with personal collaterals, this may discourage new investments as it implies high levels of risk for the individual (Avery et al., 1998). Furthermore, SMEs do not benefit from the access to other forms of financing such as leasing, export or loans extended by foreign banks. Indeed, in addition to financial selection, international banks are often located in large business centers away from SMEs (Clarke et al., 2001). When compared to legal obstacles and corruption, financing constraints have the most significant impact on reducing firm growth. The authors also highlight that many other business environment obstacles are actually related to finance.

The lack of credit availability impacts sectors and regions differently. Sectors that are naturally composed of capital intensive firms – such as the chemical industry – are more impacted by credit constraints. On the other hand, SMEs tend to be less capital intensive than larger firms.

An interesting assumption was brought up by Sleuwaegen and Goedhuys (2002) while they were studying firm size distribution in Ivory Coast. In a situation of limited access to inputs, and more significantly to credit, small firms tend to grow slower and large firms faster than in a financially developed country. This results in the "missing middle", where there is a lack of medium sized enterprises, a profusion of small and some large companies.

The availability of external finance leads to two main positive effects for existing firms. First, they can properly exploit investment opportunities in order to reach their efficient size. Secondly, they can increase the productivity of their portfolio and choose more efficient organizational forms. Improving the availability of external finance also leads to an increase in the number of start-ups, (Beck, Demirgüç-Kunt and Honohan, 2009) and is positively correlated with innovation (Rajan and Zingales, 2003) and productivity. This link between the access to external finance and innovation and productivity is particularly observed when focusing on bank finance. Recently, Kutchev, Ramalho, Rodriguez-Meza and Yang (2013) provided evidence that firms showing high levels of labor productivity are less likely to be credit constrained. Additionally, firms with higher turnover (sales/asset ratio) and lower sales volatility are expected to have a better access to formal credit.

While evidence shows that financing constraints tend to hurt SMEs more than larger firms, it also suggests that they are the ones benefiting the most from the country's financial development (Laeven, 2003), while large firms see their financing constraints increase in case of financial liberalization – due to the increasing competition among firms. For instance, looking at 36 industries in the manufacturing sector covering 44 countries, Beck, Demirgüç-Kunt, Laeven and Levine (2005) observed that financial development led to disproportionate growth benefits for the small-firm intensive industries, such as furniture. In more details, Galindo and Micco's work (2005) suggests that improving systems of credit information – both by providing increasing amount of information and by improving its quality – has a direct impact on the access to financing. Indeed, greater information opacity and the absence of external audit prevent small business owners to credibly convey the quality of their investment projects (Berger and Udell 1998; Binks and Ennew 1996). Regarding new entries, Aghion, Fally and Scarpetta (2007) found in their survey of European firms that financial development leads to the higher pace of new firms' entry in sectors that rely heavily on external finance. Additionally, access to financial services may be essential to the survival of start-ups beyond one year, as shown in Demirgüç-Kunt, Klapper and Panos' study of Bosnian entrepreneurs (2009).

To sum up, the existing literature seems to point out the access to finance as one of the main explanatory variables of firms' growth and performance.

2. 9. Barriers to firm growth in China

Most scholars are focused on finding common patterns to link business environment variables and firms' performance. Nevertheless, a significant body of literature chose to look at the particularities of the Chinese context.

First, it is important to acknowledge the importance of the SME sector's contribution to the Chinese economy. Since the 2004 constitutional amendment that allowed non-state-owned SMEs to gain a legal status, the number of Chines SMEs has grown to reach 42 million. Furthermore, they contribute to 60% of China's total GDP and 80% of urban employment.

A significant contribution is that of Zhu, Whittman and Peng (2012) who interviewed 82 Chinese managers and owners of 41 SMEs. By conducting the face-to face interviews, they indentified five key institutional constraints to SME innovation in China, namely in order of importance: competition fairness, access to financing, laws and regulations, tax burden and, finally, support systems.

Reid and Xu (2009) further investigated the determinants of firm growth and survival in China. They gathered empirical data on 83 privately owned Chinese firms in the province of Guangdong between, 2004 and 2006, of which a majority where SMEs. To explain the variations in firms' growth and survival rates, they used both firm specific variables (age, size, business planning, among them) and environmental variables (firm location). They built on existing research to create a comprehensive model, not only limited to age-size variables. They measured growth in terms of employment (number of full time employees) and sales. Their main findings were that age and growth alone are insufficient to explain the difference among firm growth rates, and that factors like the choice of location, the intensity of competition, and the demand price elasticity have to be considered.

The case of China is especially interesting to study because of the specificities of its financial environment. According to the work of Banerjee and Duflo (2004) greater banking depth enables firms to grow and the economy to develop so countries or provinces where the highest banking capillarity is observed are expected to show the highest growth rates. However, the opposite is observed in China. Differences in growth rates between Chinese provinces are highly and negatively correlated with banking depth (Boyreau-Debray and Wei 2005). Given that the central state has been controlling the banking system, resources were mobilized to pour into the declining Chinese state-owned companies, which led to a sub-optimal use of credit and credit scarcity for private firms. The Chinese banking system, while showing among the highest levels of capillarity in the world, has not contributed significantly to the country's growth. China may be an example illustrating that a banking systems that grows too fast can actually lead to distortions in the use of credit. China shows noticeable

differences with other developing countries in the significant role played by the informal financial system in its economy (Allen, Qian and Quian, 2008). In a context where inefficient state-owned banks are pervasive, informal financing has compensated for the lack of external finance in providing financing resources to SMEs in China. Nonetheless, studying a sample of Chinese firms, Ayyagari, Demirgüç-Kunt, and Maksmovic (2007) noticed that, on average, firms that had access to formal finance were experiencing faster growth. This empirical evidence suggests that informal finance is only a second-best option even if the result can be partially explained by the banks' selection bias. Still, for our research, it is interesting to assess the impact of informal finance on perceived and objective financial constraints for Chinese SMEs.

2. 10. Barriers to firm growth in Brazil

Looking at regional data first, Ayyagari, Demirgüç-Kunt, and Maksmovic (2006) observed that Latin America showed the highest crime and judicial inefficiency perceived obstacles compared to the rest of the world. Stone, Levy and Paredes (1992) were among the first to notice that while Chile enjoyed a better legal and regulatory environment, Brazil reduced the gap by using effective informal substitutes. In their empirical study, Brazilian garment entrepreneurs ranked policy uncertainty, price instability, inflation and a high tax level as being the most serious obstacles to their firms' growth[7]. In Brazil, SMEs' failure rate in the first three years is 50% (SEBRAE, 2012).

Brazil is infamous for its high levels of bureaucracy. When comparing institutional efficiency in Chile and in Brazil, Stone, Levy and Paredes (1992) observed that Brazilian institutions often implement rigid and complex regulations, regardless of the cost for the business, which are unable to deal with "day-to-day problems in regulations and business transactions"(p.100).

Informality is also a preponderant issue in the country. According to SEBRAE's figures, in 2008 approximately 9,5 million enterprises were not formally registered compared to the only 5.9 million formal enterprises. As in China, the obstacles faced by formal SMEs on informal competition and tax rate burdens as well as labor regulations are closely related. When a small company decides to register formally, it loses its competitive advantage from not paying taxes and faces higher labor costs, becoming more vulnerable to informal competitors.

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[7] Since a strong emphasis has been put on stabilizing the macroeconomic environment, we expect those results to have significantly evolved.

More recently, Kumar and Francisco (2005) have studied enterprise size, financing patterns and credit constraints in Brazil, using data from the World Bank's Investment Climate Survey. They first focused on financing patterns, and found that on average, Brazilian firms' working capital and new investments were financed predominantly with internal funds, then bank credit and trade credits. According to the authors, informal funding can be important in financing working capital. Their results are consistent with the work of Crisóstomo, Iturriaga and González (2014) on a panel of Brazilian companies between 1995 and 2006. Their study provides evidence that large Brazilian firms mobilize significantly more external funds to finance their investments; 83% of large firms had overdraft facilities or lines of credit compared to only 76% for small firms and 60% for micro-firms. MSMEs are also charged significantly higher interest rates than larger firms. Interestingly, in Brazil, commercial banks provide more financial resources to MSME than public banks. By examining the managers' average academic achievements, the authors were able to link it with the use of equity finance and foreign bank finance.[8]

Examining credit constraints only, Kumar and Francisco (2005) point out that while 59% of large firms have at least a bank loan, this proportion falls to 27% for micro-firms; 9.4% of microfirms have seen their loan applications rejected and 38% did not even apply, even if they needed financing, in most of the cases because of the cost related to the loan and the procedure complexity. Looking at the determinants of credit constraints, they did not identify a robust statistical correlation with sales, but more with sales evolution, since firms with decreasing sales experienced higher rejection rates. More strikingly, their results show that location has a tremendous impact on firms' access to credit. Indeed, Kumar et al. (2004) also observed sharp variations in bank density between the South and South East regions, relatively well covered by bank branches, and the North and North-East, where the access to finance is limited. As a result, Kumar and Francisco (2005) provide evidence that Northern enterprises use twice as much internal funds than other regions. They expect to find easier access to credit in the states which benefit from higher bank capillarity. Kumar (2004) also found a strong correlation between the manager's level of education and its firm's access to financial services in Brazil.

On a broader perspective, the main obstacles identified in Kumar and Francisco's Survey of Brazilian firm owners are, in decreasing order of importance: cost of financing (1), tax rates (2), corruption (3), economic and regulatory policy uncertainty (4), macroeconomic uncertainty (5) and access to finance (6). Their research further emphasizes the variation of perceived obstacles between firms of different sizes: large firms are less likely to rank access to finance, corruption and tax rates as very significant

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[8]Other variables may intervene to explain this result

constraints to growth. Since their survey was conducted in 2003, one may expect to find some changes in the most significant perceived obstacles.

3.   A NEW CONTRIBUTION TO THE LITERATURE

3. 1. The World Bank Enterprise Survey : a new common, comprehensive database

SME definition can vary widely across regions, countries, organizations and scholars; both in the determinants chosen to assess the company's size or the thresholds set to small and medium size companies. For instance, Melle and Raymond (2001) used sales as the sole criterion, while Arroyabe and Arranz (2001) considered both sales and number of employees as criteria. The widest variations are observed in the number of employees: Bechetti and Trovato (2002) fixed the limit for SME at 100 employees, while Robson and Bennet (2000) set it to 200 employees and Haynes and Senneseth (2001) to 500 employees. The European Union provides us with an exhaustive definition[9], including criteria on the number of employees, the firms' turnover, the total balance sheet and the firm's independence[10]. Following this definition, a company may be classified as a medium enterprise if the number of its employees does not exceed 250 people, its total assets are worth less than EUR 27 million or its annual turnover does not exceed EUR 40 million; and it is an autonomous enterprise[11]. According to the same definition, a company is labeled "small" when it has less than 50 employees, a turnover below EUR 7 million or assets not over EUR 5 million. Microfirms are companies with less than 10 employees. In an attempt to come up with a universal definition of MSME, Gibson and Van der Vaart (2008) suggested the following formula: "An SME is a formal enterprise with annual turnover, in U.S. dollar terms, of between 10 and 1000 times the mean per capita gross national income, at purchasing power parity, of the country in which it operates."(p. 18)

As a result, cross-country analysis has long been restrained by this lack of common definition for SME. It is especially true in the case of China, and that was part of the reason why the country was not included in World Bank specific data until very recently, in 2011.

A large number of sources (1/3 of the countries in the world), including the OECD, the World Bank and Brazil's IBGE (1994) are using the cut-off range of 0 to 250 employees to define SMEs, where micro-enterprises have up to 9 employees, small enterprises from 10 to 49 and medium enterprises from 50 to 249 employees.

In Brazil, the definition varies across public agencies and sectors. SEBRAE differentiates between companies operating in the industrial, construction and agriculture sector, for which the threshold for SMEs is 500 employees and companies operating in the commercial or service sectors, for which the

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[9] Source : http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf

[10] A firm is independent when not it is not a subsidiary of a another entity

[11] Holding or outsiders' share of capital or voting rights does not exceed 25%

threshold is set at 100 employees (See Table 3.1.1). IBGE uses a similar definition for SME, except they only use a staff headcount criterion. Finally, BNDES, does not discriminate between sectors and uses the sole criterion of annual turnover, with a threshold set at BRL 90 millions for SMEs (See Table 3.1.2).

Table 3. 1. 1. The thresholds of the SME definition by SEBRAE

Enterprise category	Industry, Construction, Agriculture, others	Commerce, Service
Staff Headcount		
MICRO	1 to 19	1 to 9
SMALL	20 to 99	10 to 49
MEDIUM-SIZED	100 to 499	50 to 99
Annual gross revenues		
MICRO	≤ BRL 360,000	
SMALL	> BRL 360,000 to ≤ BRL 3,600,000	

Source: http://www.sebrae-sc.com.br/leis/default.asp?vcdtexto=4154

Table 3. 1.2. The thresholds of the SME definition by BNDES

Enterprise Category	**Annual Turnover**
Micro	≤ BRL 2,4 million
Small	> BRL 2,4 million to ≤ BRL 16 million
Medium-sized	> BRL 16 million to ≤ BRL 90 million
Medium-large	> BRL 90 million to ≤ BRL 300 million
Large-scales	> BRL 300 million

(Source: BNDES, Circular N°11/2010[12])

In China, SMEs only gained access to a legal status in 2004. Previously, it was virtually impossible to get data from Chinese private SME firms. The Chinese definition of SMEs varies across industries: companies with up to 3,000 employees can still be considered SMEs, depending on the sector (Table 3.1.3). Generally, small enterprises, according to the national definition, have thresholds superior to what most of other countries consider as medium-sized enterprises. For instance, in the construction

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[12]http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_pt/Galerias/Arquivos/produtos/download/Circ 011_10.pdf

sector, a company is consider small if the number of its formal employees does not exceed 600 (SME promotion law of China, 2003). Traditionally, Chinese official agencies also only collect data for large firms (annual sales greater than CNY 5 million) while independent commercial data providers have yet to establish their credibility. In this context, it has been a real challenge to gather credible and comparable data across countries.

Table 3. 1. 3 SME thresholds in China

Size Category	Sectors	Employees number	Business revenues (CNY millions)	Total assets (CNY millions)
Small	Industry	< 300	< 30	< 40
	Construction	< 600	< 30	< 40
	Wholesale	< 100	< 30	
	Retail	< 100	< 10	
	Transport	< 500	< 30	
	Post	< 400	< 30	
	Hotel & restaurant	< 400	< 30	
Medium	Industry	300-2000	30-300	40-400
	Construction	600-3000	30-300	40-400
	Wholesale	100-200	30-300	
	Retail	100-500	10-150	
	Transport	500-3000	30-300	
	Post	400-1000	30-300	
	Hotel & restaurant	400-800	30-150	

Note : SME meet one or more of the conditions. ME should meet three conditions, otherwise they are SE.
Source : SME Promotion law, 2003

We observed several attempts to gather data on SME's business environment constraints in both China and Brazil (Zhu, Whittman and Peng, 2011, Reid and Xu, 2009, Cravo, Gourlay and Becker, 2010) but, before the WBES, the reduced sample size made their representativeness questionable. For instance, Reid and Xu's empirical study (2009), while providing valuable result, only covers 83 private firms. Furthermore, they had access to the firms' managers through contacts with faculty members at the Guandong University of Foreign Studies, which led to a significant bias in their sample. Zhu, Whittman and Peng (2011) used an even more reduced sample in assessing institution-based barriers to innovation in China, with only 41 SMEs analyzed.

The WBES, using a standardized format, is the first dataset allowing the analysis of large and representative samples of the economies (for further details, see section 5. on Methodology). A special

effort was made to get reliable data and check for the inconsistencies in answers making the WBES the first large empirical set of data exploitable for cross-country analysis. It is also more comprehensive than any of the surveys that were launched before, as it provides information on firms' size, sales, level of international integration, managers, quality of the workforce, as well as information on objective and subjective obstacles to firm growth, including financial, infrastructural and institutional barriers.

The World Bank conceived the Enterprise Survey as an exhaustive assessment of national business environments in order to identify deficiencies across countries and create a better climate for investment and sustainable growth. The Enterprise Surveys are both collecting objective indicators based on managers' experiences and their subjective perception of their own business environment. Since 2005, the WBES possesses a standardized methodology of sampling, implementation and quality control that covers 116 countries, which allows comparisons across time and countries. First reliable data was collected for China in 2011, which may be the reason for under-exploitation of the results for research purposes. The sampling is chosen to be representative of the formal, non-agricultural, private economy (state-owned companies are excluded from the sample and analyzed separately in order to reduce biases). The World Bank's final goal is to provide researchers with a panel data to make it possible to analyze the evolutions in the business environment over time. Since the survey is quite recent, only one or two standardized surveys per country are available so far, so the time series are too short to be subjected to statistical analysis.

Still, numerous academic papers (e.g. Beck, Demirgüç-Kunt and Martinez, 2010; Kuntchev, Ramalho, Rodriguez-Meza and Yang, 2013 ; Ayyagari, Demirgüç-Kunt, Maksimovic, 2011) have been written using the Enterprise Survey samples, but none of them had a special focus on China and Brazil similarities and divergences. This work will be the first one – to our best knowledge – to compare these two major emerging economies while using the standardized method brought-up by the World Bank. It will provide a detailed analysis on the obstacles faced by both countries, and will focus on the impact of different obstacles on firm growth.

3.   2. Changing the scale of analysis

Basing their research on the World Bank Enterprise Survey, most scholars used the data to find correlations between obstacles and growth restriction applicable to any country of the data set. The approach in the work of Beck, Demirgüç-Kunt and Levine (2005) was to identify common characteristics between countries in the obstacles faced by firms, and to uncover the correlation

between firm size and business environment constraints. Their work provided general relations between economic and growth firms and most commonly faced obstacles by SMEs.

Beck (2007) exposed in more detail the cross-country and cross-sector variations, highlighting that smaller, younger and domestic firms report higher financing obstacles.

Some scholars studied variations across regions: Ayyagari, Demigürç-Kunt and Maksimovic (2006) specifically studied the biggest perceived obstacles in Africa, Latin America, Europe and Asia. Their results show that Latin America had the highest reported obstacles in crime and corruption whereas Asian countries reported the lowest financial obstacles. Gaviria (2002) specifically focused on Latin America, stressing the role played by crime and corruption reducing Latin American firms' competitiveness. Schiffer and Weder (2001) provide regional averages on most binding constraints to growth using the data set from the 2001 Global Investment Climate Survey.

Additionally, some scholars specifically looked at country data and variations across country provinces or states. Using the Investment Climate Survey – former version of the WBES – Kushnir's analysis focused on China and found that the six most commonly cited obstacles by Chinese SMEs were electricity provision, access to finance, practices of the informal sector, tax rates, political instability and corruption.

Less emphasis was put in analyzing variations in obstacles encountered by SMEs within a given country. So the purpose of this paper is to compare two seemingly unrelated and very different countries[13], China and Brazil, while also studying variation patterns inside the two countries. Our aim is to build on existing literature in order to provide a more detailed analysis of SMEs' obstacles to growth in China and Brazil, both within and across the two countries.

3.   3. Beyond the traditional age-size determinants

Traditionally, research papers on obstacles to firm growth focus on age (firm's creation date) and size determinants (sales and number of employees) to explain most of the cross-firm and cross-country variations (Evans 1987, Jovanovic 1982). One of the most valuable inputs of the Enterprise Survey to improve empirical knowledge on SME constraints is that it covers a wide range of determinants, from firm characteristics (age, size, experience of top manager, owner's gender, legal status, number of employees) to business environment characteristics (competitors, regulations, infrastructures). It allows us to probe for potential determinants of firm growth and obstacles to growth. This research

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[13] Though they are both emerging economies, and belong to the loose BRIC group.

aims to test other variables beyond age and size to see if any pattern exists between those characteristics and firm growth obstacles.

3. 4. The comparison of both subjective and objective obstacles to firm growth

A dimension that has also been neglected in the existing body of literature is the comparison between the perceptions of managers and actual business environment constraints. As both objective and subjective questions are asked to managers, an interesting area of focus would be to assess the gap between perceived and actually experienced constraints. For instance, we can analyze if the number of power-outages experienced is correlated with energy being perceived as a major constraint to the business operations. Regarding financial barriers, a significant number of questions are asked about the average amount of collateral required for loans, the firms' existing line of credit or overdraft facilities or their application for new loans. This set of data may be compared with the managers' perception on their firms' access to finance.

This paper will also add a new dimension to the existing literature by applying cluster analysis to try to spot similarities and differences across China and Brazil.

4.   DATA PRESENTATION

4. 1. Setting the limits of the sample: a SME definition

As discussed in Section 3 (Contribution to the literature), for the sake of comparativeness in our experimental study, we chose to base our definition of SME on the World Bank's common acceptation of a SME (Ayyagari, Beck and Demirgüç-Kunt, 2005) using both sales and number of employees as our main criteria. Even within the World Bank, discussions are still open on the numerical cut-offs to consider for the SME definition. According to a most recent definition found in a World Bank working paper (Kushnir,Mirmulstein and Ramalho, 2010), a SME is a company operating in the formal sector with less than 250 employees, a microenterprise has up to 10 employees, a small enterprise up to 50 employees and a medium enterprise has from 50 to 250 employees. Ayyagari, Beck and Demirgüç-Kunt (2005) indicated that the SME Department of the World Bank was working in 2005 with the following cut-offs for annual sales : up to USD 100,000 for microenterprises, up to USD 3 million for small firms and up to USD 15 million for medium firms. They also set a cut-off of 300 employees for SME definition.

The SME definition for this work is based on these last thresholds and the IFC's note on Enterprise Definition for Micro, Small and Medium Firms[14] (p.1). It will classify a firm as a MSME if qualifying under two of the three indicators, as follows:

Table 4.1.1. IFC's most recent definition on SMEs

Indicator	Micro Enterprise	Small Enterprise	Medium Enterprise
Employees (E)	E<10	10<E<50	50<E<300
Total Assets (A) in USD	A< 100,000	100,000<A< 3 million	3 million<E< 15 million
Annual Sales (S)	S< 100,000	100,000< S< 3 million	3 million<S< 15 million

Source : IFC, 2012

Since little information is given on firms' total assets, our work will only consider the number of employees and annual sales. We will adopt a strict definition to get comparative samples, so in order

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[14]Source :http://www.ifc.org/wps/wcm/connect/de7d92804a29ffe9ae04af8969adcc27/InterpretationNote_SME_ 2012.pdf?MOD=AJPERES

to qualify as a SME, an enterprise would have to comply with both the employees and annual sales criteria.[15]

Using these cut-offs, the Chinese sample is reduced from 2700 enterprises initially to 2179 qualifying under the two criteria. For Brazil, the initial sample of 1800 enterprises is cut to 1558 SME, according to the strict definition. It represents a size contraction of 19% for the Chinese sample and of 13% for the Brazilian one, considering that the Chinese sample had previously very large companies represented. Because the loss does not exceed ¼ of the samples, we consider it to still be representative of these economies.

4. 2. Characteristics of the World Bank Enterprise Survey (WBES)

The WBES, by providing data on the constraints to private companies' growth, allows us to link firm characteristics, such as performance, with the business environment in a particular country. The survey covers the following dimensions:

(a) Firm internal characteristics: size, legal status, localization, age, foreign/domestic ownership, and schooling of top manager.

(b) Level of infrastructural development : electricity, internet, water connection, telephone connection

(c) Level of firm internationalization.

(d) Performance : cost of labor and cost of raw materials, capacity utilization

(e) Regulation and bureaucracy: time to obtain a construction permit, delays to get an import license.

(f) Crime: sales lost to theft and cost of security services.

(g) Financial access : cost of collateral, availability of lines of credit, percentage of working capital financed through bank credit as opposed to internal resources

(h) Business-government relations: senior management time spent on dealing with regulations, the frequency of visits from tax inspectors, among others.

(i) Informality: informal payments required for infrastructure connection, during tax inspections, practices of competitors.

(j) Labor covering variables such as the number of permanent and temporary employees, education level of workers.

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[15] We also considered using a broader definition, where only one of the two criteria was sufficient to qualify for the SME classification. But given that the Chinese Remimbi (CNY) is known to be undervalued, resulting in annual sales estimates in dollars smaller than their actual worth; and since it did not reduce the sample significantly, we used a strict two criteria definition in order to gain accuracy.

The survey also covers the subjective perceptions of firms' owners in terms of the extent to which they are affected by business obstacles. They rate obstacles on a scale, from "no obstacle" to "very severe obstacle". The last question about obstacles to business refers to what they consider the biggest obstacle to their operations. The obstacles assessed can be classified in 7 main groups as listed on Table 4.2.1:

Table 4. 2. 1. WBES Obstacle characterization and classification

Obstacle category	Obstacles tested
LACK OF PHYSICAL INFRASTRUCTURES	Electricity Telecommunications Transports
MACROECONOMIC AND POLITICAL CONTEXT	Political instability Crime, theft and disorder Corruption Access to land Courts
BUREAUCRATIC OVERLOAD	Business licensing and permits Customs and trade regulations Labor regulations Tax administration Practices of competitors in the informal market[16]
TAX BURDEN	Tax rates
LACK OF FINANCING	Access to finance
QUALITY OF HUMAN CAPITAL	Inadequately educated workforce

Source: WBES

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[16] Practices of informal competitors can also be classified in categories "Tax burden" or "Macroeconomic context", to the extent that formal firms become less competitive compared to informal firms when they start to pay taxes, and the consequence of formal registration are even worse when tax rates are high.

The WBES pays particular attention to reliability of the answers, which is why they developed a complex methodology in order to assess the level of trust to be put in each respondent's answers. This "trustfulness assessment" includes to ask questions in a very direct manner, to report if the respondent refuses to answers or eludes the question and to check the consistency of answers within the same questionnaire. Within the preselected sample of only SMEs, 99% of both the Brazilian and the Chinese respondents are estimated to be trustful or somewhat trustful.

4. 3. Samples' representativeness

Both Chinese and Brazilian Surveys are quite recent: they were conducted between November 2011-March 2013 and May 2008-June 2009, respectively taking into account the available information from fiscal years 2011 and 2007 respectively. This is particularly important considering the economies of these emerging countries are evolving at very fast rates. Just to have an idea of the impressive growth rate of the two economies: Chinese GDP increased by 62% between the three years separating the two surveys (2008-2011) and Brazil's GDP has increased by 50% (Table 4.3.1). Other macro-economic events may also have had a significant impact during this period of time. For instance, as Brazilian data was taken during fiscal year 2007, it does not reflect the effects of the financial crisis on the companies' growth and performances. For this reason we must take into consideration the time gap between samples: figures concerning a firm's average annual sales or the level of infrastructure development (especially new technologies coverage) are expected to be lower for Brazil because of the time that has elapsed between the two surveys. On the other hand, the situation in Brazil has dramatically deteriorated since the time of the survey: Brazil in 2007 was experiencing a period of growth, while it is now facing recession.

Table 4.3.1. GDP growth rates in China and in Brazil between 2008 and 2011

	GDP 2008 (in USD trillions)	GDP 2011 (in USD trillions)	Country GDP increase (%) between 2008-2011
BRAZIL	1.653	2.477	50%
CHINA	4.522	7.322	62%

Note: Data are in current USD. USD figures for GDP are converted from domestic currencies using single year official ER. For a few countries where the official ER does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.
Source: World Bank National Accounts, 2014

Surveyors used a randomized selection method with predetermined representativeness objectives. Contrary to previous studies on the same topic (Reid and Xu, 2009), surveyors were not given access to companies upon reference in order to eliminate any selection bias. The WBES only includes companies from the formal sector, in order to be able to get reliable and quantifiable data on their performances.

4. 4. Regional distribution

Surveyed firms in the WBES do not necessarily represent all the states/provinces in a given country, but try to create a representative sample of the whole economy, which is why economically dynamic regions are apparently over-represented.

In China, the WBES only covers 12 out of 34 provinces. Beijing, the Jiangsu Province and Shanghai account for 23% of the total number of companies while concentrating 17% of the country's GDP.[17]

Chart 4.4.1. Firms surveyed by state in the WBES China 2012 by provinces
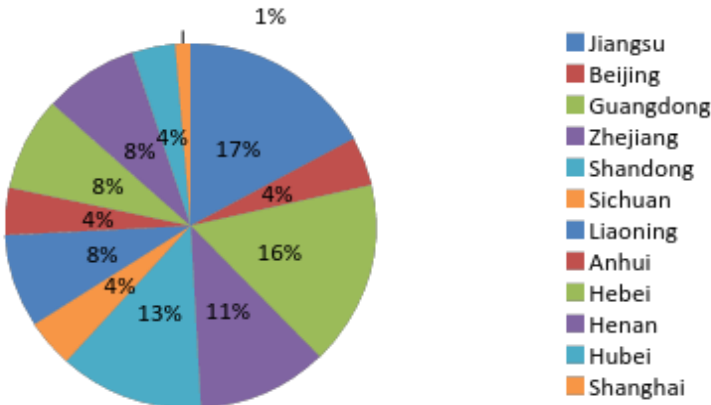
Source : Author's data[18]

Regrouping the provinces by GDP per capita, we identify 3 groups that are distinct both geographically and economically. In the group of the relatively poorest provinces (GDP per capita lower than USD 8,000) we find the inland provinces of Sichuan, Hubei, Henan, Anhui and Hebei. Middle Income coastal regions (USD 8,000 to USD 12,000) are represented by the Guangdong, Zhejiang, Shandong and Liaoning provinces, whereas the richest are represented by the Shanghai municipality province, the Beijing municipality province and Jiangsu.

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[17] *2013 Statistical Communiqué of the provinces on National Economic and Social Development* (annual average exchange rate = CNY 6.1932 per USD)

[18] For following graphs/ tables/ maps, if the source is not indicated, it is assume the content comes from the author based on WBES data

Map 4.4.1. Sample distribution between wealthiest, middle-income and poorest states: China, 2012
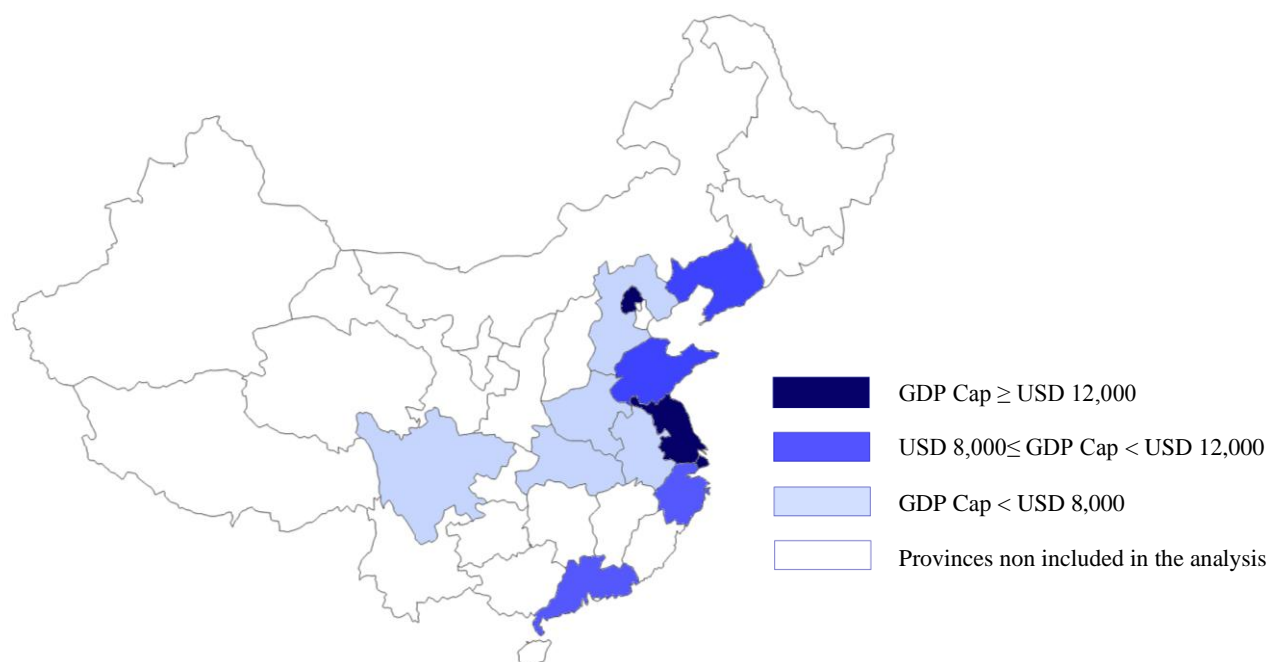
GDP Cap ≥ USD 12,000

USD 8,000≤ GDP Cap < USD 12,000

GDP Cap < USD 8,000

Provinces non included in the analysis

Source: Statistical Communiqué of the provinces on National Economic and Social Development, 2012

In Brazil, the WBES covers 15 out of 27 states. Firms from São Paulo represent 24% of the total amount of respondents, which is relevant compared to its GDP share in the Brazilian economy (32% in 2012[19]). Companies of the Southeastern region account for 44% of the survey while representing 55% of the country's GDP (IBGE, 2012).

Chart 4.4.2. Firms surveyed by state in the WBES Brazil 2009

- Amazonas
- Bahia
- Ceará
- Distrito Federal
- Goiás
- Maranhão
- Mato Grosso
- Minas Gerais
- Paraíba
- Paraná
- Pernambuco
- Rio de Janeiro
- Rio Grande do Sul
- Santa Catarina
- São Paulo

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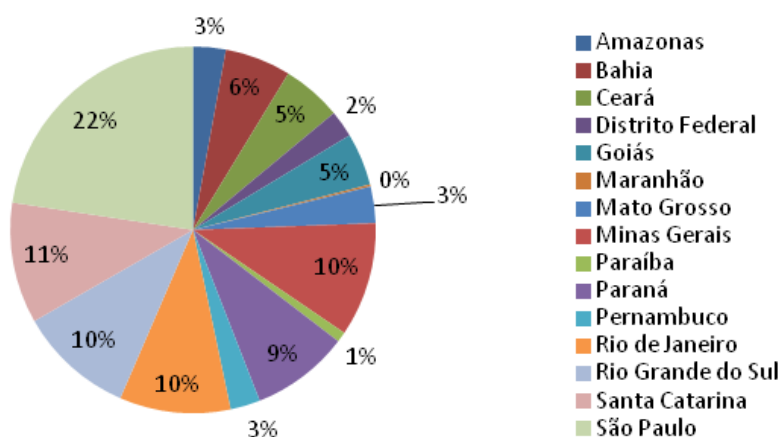
[19] *2012 Regional Accounts Report*, IBGE.

http://www.ibge.gov.br/english/estatistica/economia/contasregionais/2012/default.shtm

Following the same GDP per capita criterion, in the group of the relatively poorest regions we find Maranhão, Ceará, Paraíba, Pernambuco and Bahia. In the group of intermediate regions there are Amazonas, Goiás and Minas Gerais. Finally, the Federal District, São Paulo, Rio de Janeiro, Paraná Santa Catarina, Mato Grosso and Rio Grande do Sul are representing the wealthiest states (Table 4.3.2). An important pattern to notice is that sampled companies located on the wealthiest states have average sales 1.7 times higher than those of the poorest states.

Map 4.4.2: Sample distribution between wealthiest, middle-income and poorest states: Brazil, 2012

■	GDP Cap ≥ USD 12,000
■	USD 8,000≤ GDP Cap < USD 12,000
■	GDP Cap < USD 8,000
□	Provinces non included in the analysis
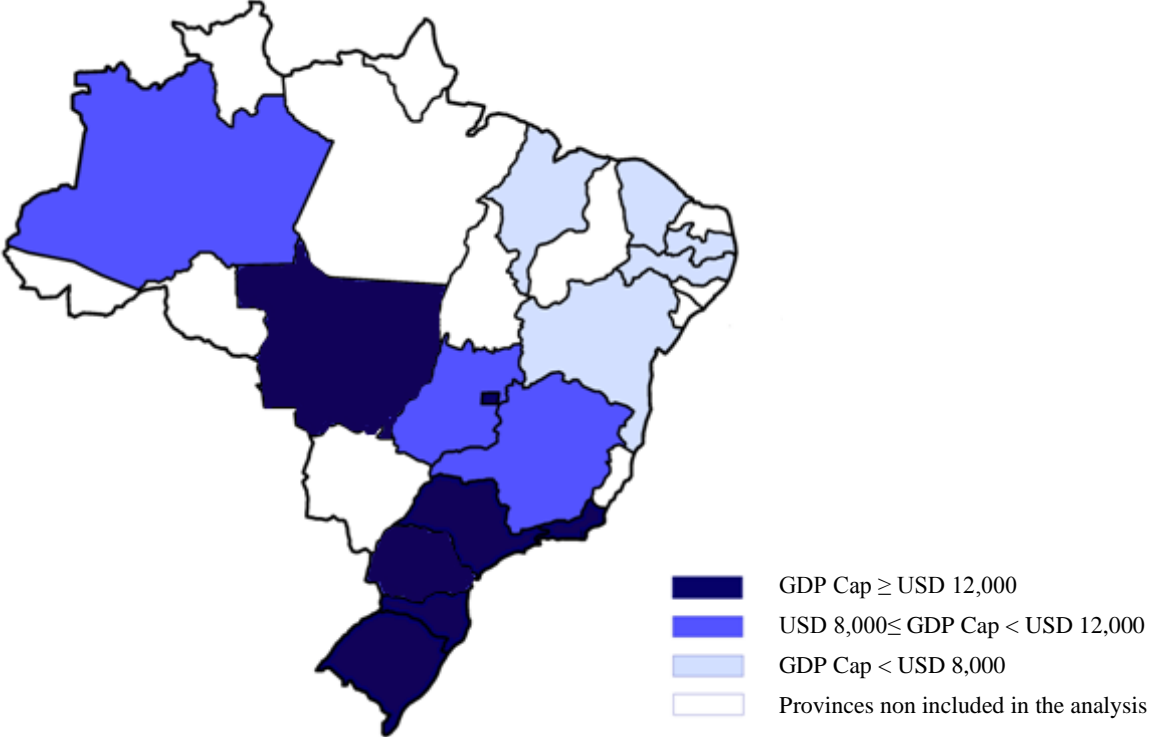
Source: Regional Account of Brazil, 2012

Table 4.3.2 High-income, middle-income and low-income states surveyed in Brazil and China (2012)[20]

	High-income states (GDP per capita > USD 12,000)	Middle-Income states (USD 8,000≤ GDP per capita < USD 12,000)	Low-income states (GDP per capita < USD 8,000)
Brazil	Distrito Federal São Paulo Rio de Janeiro Santa Catarina Mato Grosso Paraná Rio Grande do Sul	Amazonas Minas Gerais Goáis	Bahia Ceará Maranhão Paraíba Pernambuco
China	Beijing Shanghai Jiangsu	Guangdong Liaoning Shangdong Zheijiang	Anhui Henan Hebei Henan Hubei Sichuan

Brazilian firms are mostly located located in high-income states (67%), while almost half of the Chinese companies come from middle-income states (Charts 4.4.3), which may have a significant impact on results. However, this distribution is consistent with GDP per capita national levels in the two countries.

Charts 4.4.3. Firms repartition between low, middle and high-income groups in Brazil and China
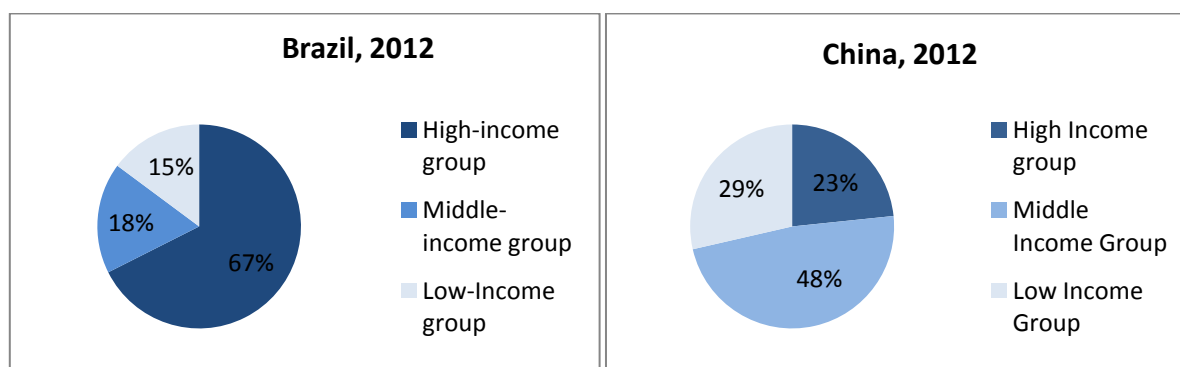
Source: Statistical Communiqué of the provinces on National Economic and Social Development, 2012
Source: Regional Account of Brazil, 2012

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[20] Sources : China : 2012 Statistical Communiqué of the provinces on National Economic and Social Development /
Brazil : IBGE Regional Accounts (2012) ftp://ftp.ibge.gov.br/Contas_Regionais/2012/pdf/comentarios.pdf

4. 5. Sector distribution

When analyzing the sample, it is also important to look at sector segmentation, as some sectors are more prone to specific obstacles. For instance, the IT sector is very dependent on electricity, whereas firms in the textile industry are suffering from informal competition and labor regulations. A significantly uneven distribution across sectors between the two countries can lead to significant biases in the results.

Table 4.5.1. Firms surveyed per sector, Brazil, 2009

Sector	Firms surveyed/ Total sample
Furniture	12%
Garments	12%
Machinery and equipment	11%
Food	9%
Textiles	9%
Autoparts	8%
Other manufacturing	8%
Shoes and leather	8%
Chemicals	7%
IT	7%
Retail	4%
Other services	2%
Construction	1%
Hotel and restaurants	1%

The sector repartition is very heterogeneous. It excludes the agricultural sector whose contribution to the Brazilian economy is significant (5.5% of the country's GDP in 2013 and 15.7% of the labor force in 2011)[21]

The sample seems, at first, to over-represent industries compared to services, as compared to their respective contribution to GDP (26.2% and 68.1% in 2013)[22].

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[21] CIA World Factbook (the agribusiness sector's contribution to GDP and labor force is higher, but part of It is included in the analysis
[22] CIA World Factbook

Chart 4.5.1. Sample repartition between industry and services, Brazil, 2009
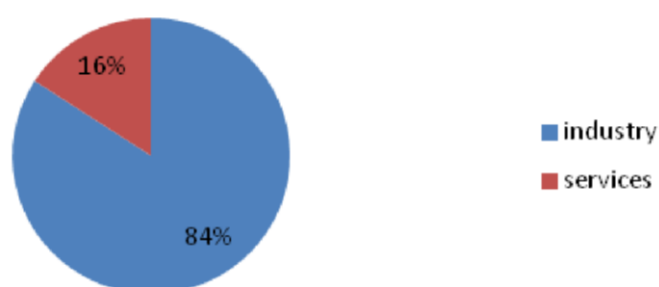
The manufacturing companies account for 84% of the Brazilian sample.

Table 4.5.2. Firms surveyed per sector, China, 2012

Sector	Firms surveyd/ Total sample
Hotel and restaurants: section H	6%
Retail	6%
Plastics & rubber	6%
IT	6%
Textiles	6%
Machinery and equipment	6%
Wholesale	6%
Non metallic mineral products	5%
Transport Section	5%
Garments	5%
Food	5%
Basic metals	5%
Chemicals	5%
Services of motor vehicles	5%
Fabricated metal products	5%
Electronics	5%
Transport machines	5%
Construction	4%
Recorded media	1%
Precision instruments	1%
Paper	1%
Leather	1%
Furniture	1%

The Chinese sectors are segmented with more detail. Similarly to the Brazilian sample, the service sector accounts for only 34% of the companies compared to its actual contribution to the country's GDP (46,1% in 2012)[23], despite a reorientation of the sampling method in order to include more service providers.

4. 6. Segmentation per size

Chart 4.6.1. Distribution of firms between micro, small and medium enterprises in both samples
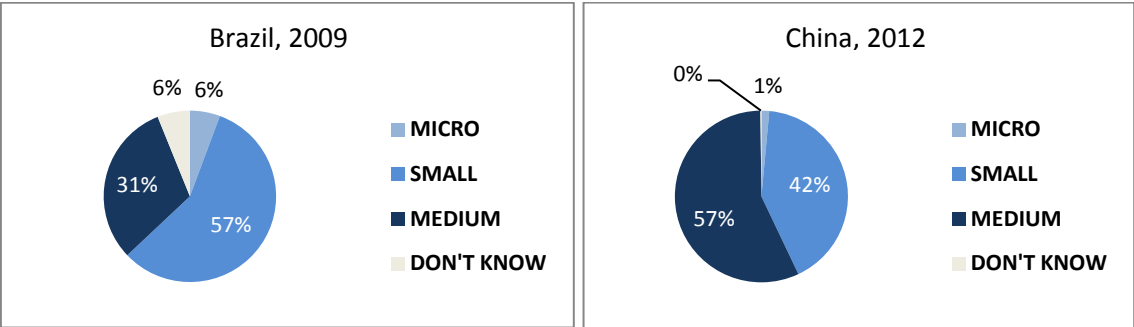
China's sample is composed of a majority of medium companies, whereas small companies are predominant in the Brazilian sample. We expect this difference in sample composition to influence the perception of an obstacle's severity. The mean number of employees for Brazil is 40, while Chinese firms count 66 employees on average. This difference is even more emphasized when looking at annual sales: Chinese firms have 3.2 times higher annual sales than Brazilian firms, with USD 2.8 million annually, compared to only USD 0.85 million for Brazil.

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[23] CIA World Factbook

5.   METHODOLOGY

5. 1. Common determinants of firm growth

As discussed before, determinants of firm growth can be either firms' internal characteristics or business environment characteristics.

Size is an important determinant of firm's growth, measured both in terms of annual sales and number of employees. Nevertheless, other internal characteristics – such as the top manager's academic and professional background, the average schooling of employees, the firm location, the sector, the firm's structure of ownership and its degree of internationalization – may play a significant role in explaining firm growth as well.

The survey also includes an exhaustive panel of external factors coming from the business environment. Since access to finance seems to be the main determinant of firm growth among those external factors, our research will pay particular attention to this aspect.

Internal characteristics also define how firms are impacted by their business environment. So in Section 6 we will examine the interaction between firms' internal determinants of growth (mainly size) and the occurrence and intensity of obstacles to business. In section 7, we will seek to identify groups of firms with similar internal characteristics (same size, same industry) across countries to identify the differences in perceived obstacles within groups.

5. 2. How to measure firm growth

Firm growth is a multi-faceted phenomenon: common indicators for firm growth are based on financial criteria, but also on non financial ones. This makes firm growth extremely difficult to measure and therefore to compare across companies, industries and countries. Delmar, Davidsson and Gartner (2003) discussed the appropriateness of different instruments of growth measurement. Using cluster analysis on a sample of high-growth Swedish companies, they showed that business growth is indeed a multidimensional phenomenon and identified seven different growth patterns, depending on existing firms' characteristics. In order to select the faster growing firms they mainly used indicators related to absolute and relative sales and employment growth, indicating that those two dimensions may be the variables most directly linked with firm growth.

The most popular measures of growth are sales volume and employment (Weinzimmer, Nystrom and Freeman, 1998, Wiklund, 1999). Flamholtz (1986) argued that those particular indicators were the

most widely used in firm growth assessment because they often preceded other performance indicators, such as increasing market share and profits. While sales volume may be the most commonly accepted indicator of firm growth, Penrose (1955) highlighted, 60 years ago, that it was not the most convenient tool for research. For instance, high-tech companies may not observe large increase in their sales volume but, at the same time, the performing companies may grow very fast in their patents acquisition or number of employees. In case of cross-country analysis, different inflation rates can be a significant bias to the sales volume comparison. In measuring the performance of firms in Massachusetts, Brush and Vanderwerf (1992) used both objective criteria (growth in sales, return on sales, growth in the number of employees and subjective criteria (competitors' perceptions). Murphy, Trailer and Hill (1996), observing the existing empirical research on organizational performance noticed that the majority of the analyses only studied one or two dimensions. They concluded that "performance measures can produce logically inconsistent results across measures" (p.4). Delmar et al. (2003) also highlighted the importance of the distinction between organic growth and acquisition growth (through alliances or mergers and acquisitions) that does not intrinsically generate income growth.

While the WBES does not provide any information on the firm profits and financial ratios (ROA, ROE, Debt to Equity), it gives a clear indication of sales evolution. Indeed, the questionnaire employs a single question asking the evolution of annual sales compared to three years before. The WBES is more of a static evaluation of the different firms' stage of development than an assessment on the firms evolving performance. Since our only tool to assess firm growth will be through the increase in sales volume, and in the number of employees, our results cannot indicate the firm's performance but rather the firm's ability to grow by expanding its market or its activities.

5. 3. Cluster analysis applied to the WBES

Cluster analysis can be a relevant method to assess regional differences inside a same country. Joseph Cortight (2006) advocates for the use of cluster analysis in order to identify a region's strengths and weaknesses. For instance, Stimson et al. (2001) applied the cluster analysis model to Australian cities in order to highlight differences in stages of economic development.

Closer to our concerns, cluster analysis was also used to assess the heterogeneity among Mexico's micro-enterprises (Cunningham and Maloney, 1998). The authors based their work on a survey comprised of 11,000 micro firms. This survey contained characteristics of the entrepreneurs (years of education, work experience), firm characteristics (creation date, total number of workers, earnings, registration and compliance with regulation) but also more subjective questions, where entrepreneurs

were asked to express their need for new financing, the problems they faced in the business environment and their expansion plan. The Ward cluster analysis allowed them to combine entrepreneurs' observations and firms' characteristics into "progressively larger endogenously determined clusters by minimizing the sum of the within-group variance of all clusters" (Cunnincham and Malloney, 1998, p.9). This example highlights the relevance of cluster analysis in analyzing large data sets using both objective and subjective data.

Building up on the previous use of cluster analysis to compare large datasets across different regions, we decided to apply this methodological tool seeking to identify patterns in the obstacles faced by companies across countries. We used K-clustering as a segmentation technique, in order to organize firms with similar traits and sensitivity to certain business obstacles. The basic idea was to oppose two distinct obstacles, and to see what sort of companies were affected more by obstacle 1 compared to obstacle 2 and vice versa.

In order to interpret the data, we had to transform the qualitative responses of owners on their perceptions of business obstacles by rating the obstacles from 0 ("No obstacle") to 4 "Very severe obstacle", as shown in Table 5.3.1.

Table 5.3.1. Rating and correspondence of obstacles on the sample

Rating	Perception
0	No obstacle
1	Minor obstacle
2	Moderate obstacle
3	Major obstacle
4	Very severe obstacle

We first assessed the main obstacle for each country, and we only studied the obstacles that were thought to have a significant negative impact on the companies' operations in one country or the other. With the help of an Excel module, we were then able to classify companies in different modules, and to study the composition of these modules. In order for the cluster analysis to be accurate, it is crucial to minimize the distance within clusters while maximizing it between clusters. In other words, we had to test the standard deviation inside and between clusters in order to determine the optimal number of

clusters. After testing different hypothesis, we set the number of clusters at 6, in order to have large comparable groups with a standard deviation not exceeding 1 point. [24]

Using cluster analysis, 3 sets of two obstacles were tested:

- Tax rates vs. Access to finance (CA1)
- Practices of competitors in the informal market vs. Corruption (CA2)
- Inadequately educated workforce vs. Transports (CA3)

Those obstacles were chosen in the cluster analysis because they are the most commonly perceived as high obstacles to business operations in both countries. In each set, obstacles compared needed to be quite unrelated, in order to get clear cut-offs between clusters. In CA1, tax rates are an obstacle which grows along with firm size whereas the opposite tendency can be observed for access to finance. In CA2, corruption is mainly affecting Brazilian firms while practices of informal competitors are affecting both countries. In CA3, Transports is considered among the biggest obstacles for Chinese respondents, but is only mentioned by 3 companies in Brazil as being the biggest obstacle to their operations.

In setting the three cluster analyses, we tried to obtain comparable clusters, respecting the rules on Table 5.3.2:

Table 5.3.2. Rating and correspondence of obstacles on the sample

	Score on obstacle 1	Score on obstacle 2
Cluster A	Very high	Very low
Cluster B	Medium	Medium
Cluster C	Medium	Very high
Cluster D	Very high	Very high
Cluster E	Very low	Very low
Cluster F	High	High

6.   RESULTS : COUNTRY COMPARISON[25]

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[24] Inside a cluster, the average standard deviation on Obstacle 1 and on Obstacle 2 did not exceed 1. It means than most companies inside a same cluster score N or N+1 on a given obstacle, with obstacles scores ranging from 0 to 4.

In this section, we define the main differences between the perceived obstacles in China and in Brazil. First, we are looking at the biggest obstacle to the respondents' operations in order to identify the main constraints in both countries. Then, we analyze the differences in country scores for each of the main obstacles, trying to figure out if those obstacles affect the same type of companies in the two countries. At the end of this section, we draw preliminary conclusions based on our country comparison that will direct the cluster analysis.

6.   1. Main obstacles to business in Brazil and in China[26]

Both countries face commonly the same types of obstacles; it is only the intensity that varies. Among the common obstacles to the two countries, the most recurrent are tax rates, practices of competitors in the informal market, access to finance and inadequately educated workforce.

In Brazil, respondents score high for virtually every obstacle surveyed indicating that they face intense and heterogeneous constraints in their business activities. The most common obstacles faced by Brazilian business owners are, in decreasing order of importance: tax rates, tax administration, an inadequately educated workforce and corruption (in terms of number of firms considering those obstacles as major or very severe constraints to their operations).

Chart 6.1.B Biggest obstacles in Brazil by number of enterprises surveyed, 2009 :
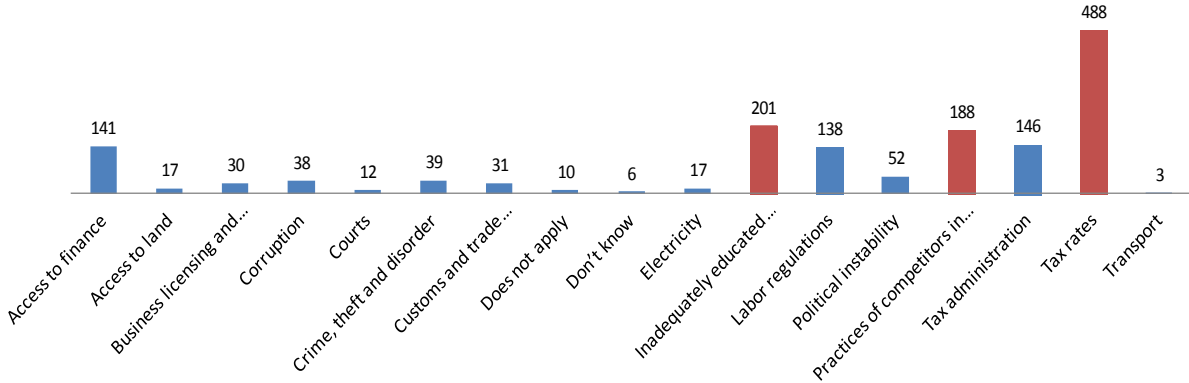
Note: figures above the columns are the number of companies

Looking at firm size in Brazil, we generally observe no great variations in the way micro, small and medium enterprises are affected by business obstacles. Owners of microenterprises tend to complain relatively more about corruption, access to finance, crime, theft and disorder, electricity and the inadequately educated workforce than average (Appendix 6.1.1); while medium-sized business

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[25] In this section, all obstacle scores refer to Table 5.3.1

[26] In section 6, average comparison will not be subjected to t-tests; tables and graphs whose identification contains B refer to Brazil; those whose identification contains C refer to China

owners stress more the tax burden, tax administration, transports, customs, business licensing and labor regulations (Appendix 6.1.3). Small enterprises seem to be more affected than medium and micro enterprises by corruption and judicial system deficiencies (Appendix 6.1.2).

The Brazilian state reporting the highest level of average obstacles is Amazonas with 2.82 on average (Appendix 6.1.7): it can be explained by its isolation from the rest of the country and the lack of infrastructure to link it to the dynamic parts of Brazil. Goiás[27] is the state performing better on obstacle to business (2.24 on average) , but there is no significant regional variation in the intensity of obstacles faced by business owners in Brazil. If we look at groups of states with homogeneous wealth (Map 4.4.4), the poor North-East reports higher than average obstacle mean score (2.51). But middle-income states also report to be less impacted on average by obstacles to business than the rich South-Eastern region. It may be due to the sample composition or to some obstacles affecting richest states more (tax rates for instance). Firms that are operating internationally report more obstacles on average than enterprises whose main market is either local or national.

In China, the biggest obstacles according to the respondents are, in decreasing order: access to finance, practices of competitors in the informal market, tax rates, inadequately educated workforce and transports (Chart 6.1.C)

Chart 6.1.C Biggest obstacles to business operations in China by number of enterprises surveyed, 2011
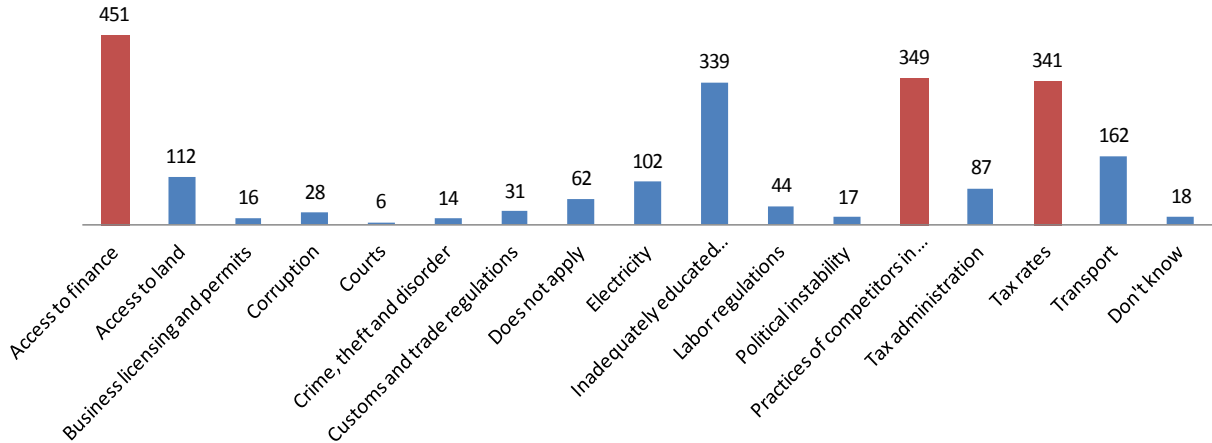
Note: figures above the columns are the number of companies

Chinese respondents do not report a lot of obstacles to business, even micro-firms' owners. Except for tax rates, tax administration, access to finance, transports, inadequately educated workforce and informal competition; the other obstacles can be considered negligible.

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[27] Only 3 companies from Maranhão were included in the sample, so we do not consider the average obstacle for this state to be representative

As for Brazil, we observe variations between the obstacles faced by micro, small and medium firms. Microfirms are more vulnerable than average to the lack of access to physical infrastructure (telecom, electricity) and access to land. They tend to suffer more from the macroeconomic and political context (corruption, crime, political instability, business licensing), from informal competitors and from the lack of skilled labor (Appendix 6.1.4). Medium-sized enterprises are more affected by tax rates, transports and customs, and access to finance (Appendix 6.1.6). It does seem to point out that as firms in China are growing, they get more needs in terms of financing and international infrastructure which their business environment fails to match. Small firms in China are actually the one with lowest perceived obstacles on average (Appendix 6.1.5)

In China, the province of Hubei seems to be the most affected on average by business obstacles while Beijing is the least affected (Appendix 6.1.8). Nevertheless, on average, high-income provinces do not seem to score better than low-income provinces.

6. 2. Perception of tax rates

In both countries, tax rates are considered one of the biggest obstacles. At the time of the survey, the average corporate tax rate was 69% on total commercial profit for Brazilian companies and 63.5% for Chinese companies[28], which is quite high compared to world's averages. The difference in corporate tax levels in the two countries is reflected in the respondents' answers: while 82% of Brazilian business owners consider tax rates a major or a very severe obstacle to their operations, they are only 8% in China. Tax rates tend to affect the same types of enterprises in Brazil and in China but have a greater impact on Brazilian firms.

Chart 6.2.1. Obstacle scores on Tax rates in Brazil and China

<div align="center">

Brazil　　　　　　　　　　　　　　　　　**China**

</div>

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[28] World Bank data : 2007 for Brazil and 2011 for China.
http://data.worldbank.org/indicator/IC.TAX.TOTL.CP.ZS

■ No obstacle	■ Moderate obstacle	■ Minor obstacle
■ Very severe obstacle	■ Does not apply	■ Do not know
■ Major obstacle		
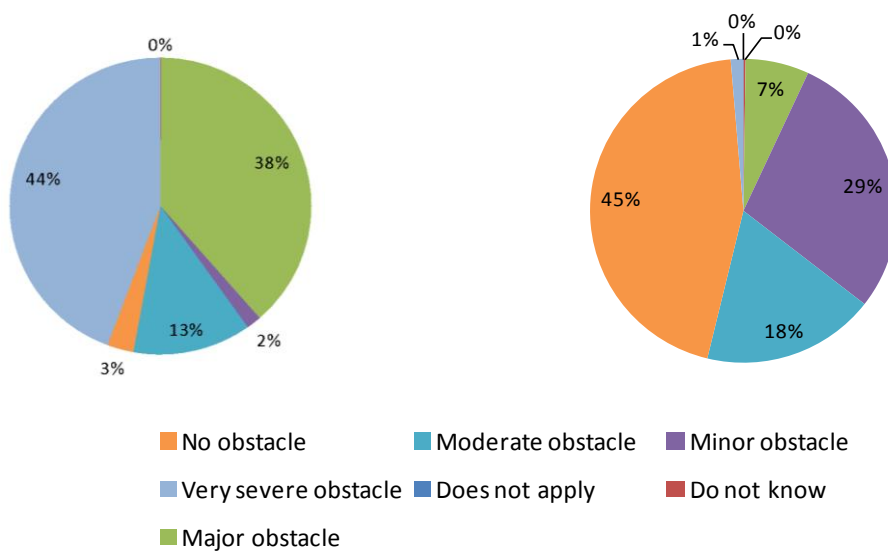
As discussed in the literature review, firm size may be the main explaining variable to obstacles to business, and it does seem to have an impact on the perceived tax burden. In both countries, firms tend to become more vulnerable to tax rates as they grow. Micro enterprises score lower on the tax burden (average score in Brazil = 3.1 and in China = 0.53) than medium-sized companies (average score in Brazil = 3.3 and in China =0.8). Following the same logic, there is a strong apparent relation between firms' annual sales and scores on the tax burden (Chart 6.2.2.C) in China and Brazil, but only Brazilian firms seem to experience bigger obstacles related to tax rates when they grow in terms of workforce.

Chart 6.2.2.C Average annual sales in function of obstacle score on Tax rates, China
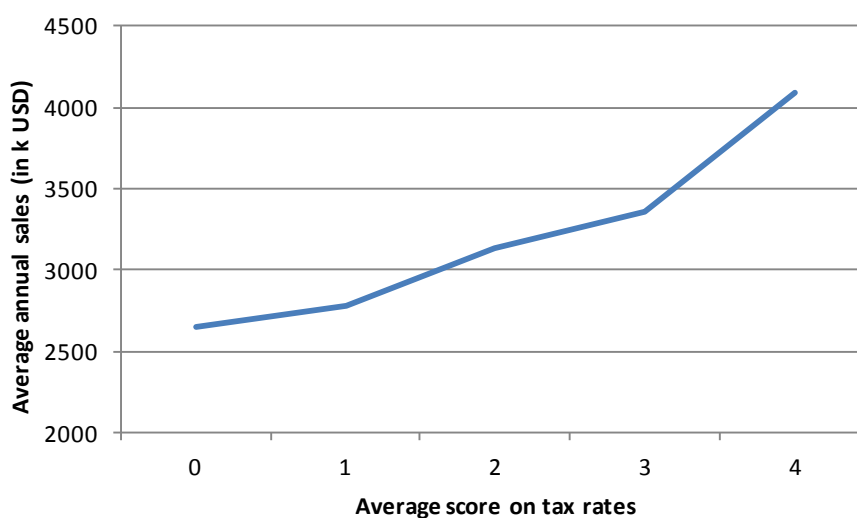
International diversification does not have the same effect on the perceived tax burden in the two countries In Brazil, firms who mainly sell internationally report higher obstacles (3.6) than firms whose main market is local (3.2) or national (3.3) (A.6.2.1). Conversely, Chinese companies that mainly sell internationally seem to suffer less from the tax burden (0.66) than companies operating locally (0.98) (A 6.2.2)

These two observations seem to support the assumption that in Brazil, large and exporting SMEs are more likely to be affected by tax rates while in China, the companies most affected by tax rates are most often large local players. It is also interesting to notice that not only tax rates but also tax administration seem to impede Brazilian firms' operations. Indeed, although the Brazilian government has implemented a program to facilitate tax payment (the "Simples Nacional Program"), high levels of bureaucracy still pervade.

Summing-up, tax rates are affecting predominantly larger companies which are mainly operating locally for China or internationally for Brazil (Table 6.2.1).

Table 6.2.1. The tax burden in China and Brazil

	China	Brazil
Average score	0.91	3.20
% of firms that reported tax rates as the biggest obstacle to their operations	16%	31%
What are the variables linked to tax rates?	Annual Sales (+) International Div. (-)	Annual Sales (+) Number of employees (+) International Div. (+)

6. 3.   Perception of inadequately educated workforce

Getting access to a pool of educated workers is often a challenge in emerging countries. Despite spending 5.5% of its GDP on education in 2009, Brazil still lags behind in terms of PISA

performances[29]. This unavailability of an educated workforce leads to skills shortages: in 2011, 57% of Brazilian employers reported recruitment difficulties[30]. China (Shanghai) was the top scoring OECD country in the 2009 PISA test, but it did not prevented 19% of employers to report recruitment difficulties. Even more concerning, in 2011, this proportion rose to 24%[31].

Chart 6.3.1. Obstacle score on inadequately educated workforce in Brazil (B) and China (C)
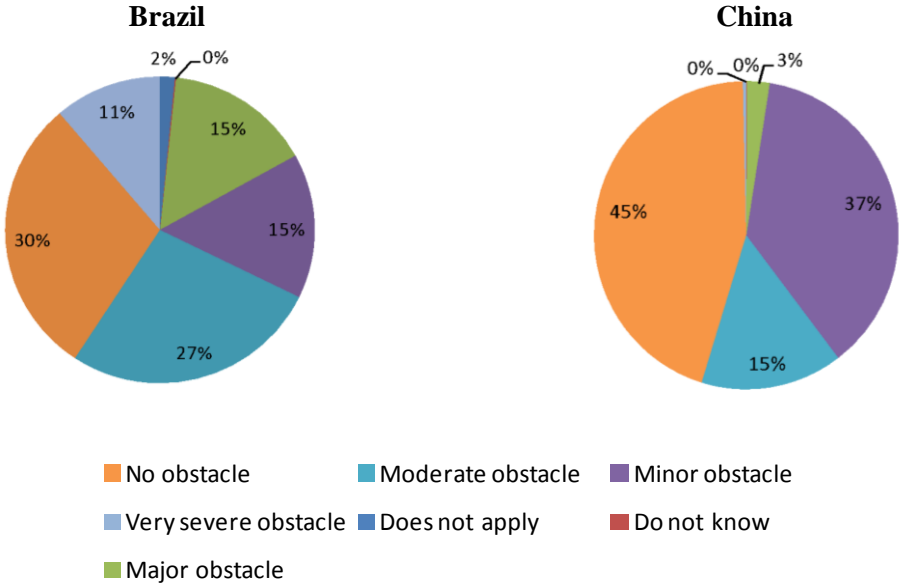
Even though we would have expected smaller structures to have more difficulties than bigger ones to attract and recruit skilled employees, micro enterprises in Brazil report fewer obstacles regarding the quality of the workforce than small and medium enterprises (A. 6.1.1), supposedly because their demand is also lower. In China, consistent with the existing literature, micro and small businesses seem to suffer more from inadequately educated workforce than medium-sized companies.

In Brazil, richer states appear to suffer less from the inadequately educated workforce (2.91 on average vs. 3.14 for the low income states). This seems understandable given the fact these states host the majority of universities, so are given access to a larger pool of graduate students. Surprisingly, in China, the average score for the richest region (Beijing, Shanghai and Jiangsu) is higher (0,97) than for the poorest regions (Hebei, Henan, Anhui, Hubei, Sichuan) where it is 0,74.

We also observe that the relation between the percentage of skilled production workers and the perceived impact of inadequately educated workforce is positive for Brazil (Chart 6.3.2.B) and

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[29] PISA test, OECD, 2009
[30] http://skills.oecd.org/informationbycountry/brazil.html
[31] http://skills.oecd.org/informationbycountry/chinapeoplesrepublicof.html

negative for China (Chart 6.3.2.B). Since the most affected companies in China are the ones with the lowest proportion of skilled workers, it may hypothesize that those micro and small companies are constrained to low skilled industries, while bigger companies have access to a pool of educated workers. In Brazil, the most affected companies seem to operate in industries with a high need of qualified workforce. This assumption is supported by two other observed patterns. First, there is a positive relation between the proportion of university graduates in the workforce of Brazilian firms and their score on inadequately educated workforce (A 6.3.1). Secondly, the higher the score, the higher the proportion of Brazilian firms that provided training to their employees. These results may indicate that Brazilian firms are using adaptive strategies to curb the negative effect of only having access to a poorly qualified workforce. Doing so, they are using money on raising the level of human capital while they could have invested it elsewhere.

Chart 6.3.2.B. Proportion of skilled workers on total workforce in function of obstacle scores on Inadequately educated workforce, Brazil
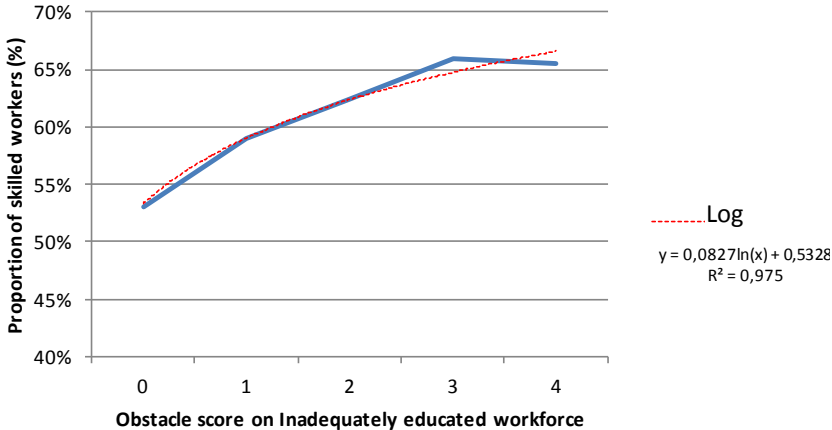
Chart 6.3.2.C. Proportion of skilled workers in function of obstacle scores on inadequately educated workforce, China
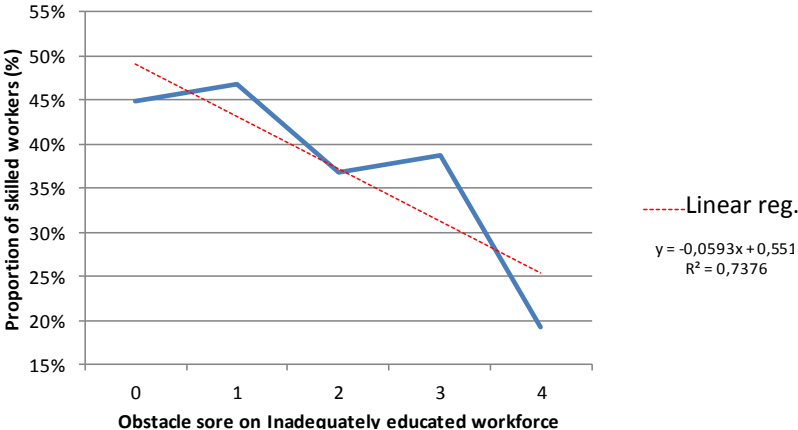
To sum up, the labor constraint does not affect Chinese and Brazilian companies in the same way. In Brazil, the most affected companies are micro-firms operating in rich states, in industries with high levels of human capital. In China, the companies most vulnerable to this obstacle are small or medium, located in the poor provinces and operating in industries with low levels of skilled workers (Table 6.3.1), which are deprived of access to properly educated workers.

To sum-up, this obstacle affects different categories of firms in Brazil and in China: whereas in China, micro-firms in richer provinces are the most vulnerable, in Brazil it is more the small and medium firms located in low-income states (Table 6.3.1)

Table 6.3.1. Inadequately educated workforce in Brazil and China

	China	Brazil
Average score	0.76	2.98
% of firms that reported Inad. Educated workforce as the biggest obstacle to their operations	16%	13%
Type of firms affected	Micro firms in rich regions	Small and Medium firms in poor regions
What are the variables linked to tax rates?	% of skilled workers (-)	% of skilled workers (+) % of graduate from university (+)

6. 4. Perceptions of informal competition

As in many emerging countries, Chinese and Brazilian business owners have to cope with informal competitors that do not pay taxes, do not comply with labor regulations, and are sometimes more flexible and responsive to changes in the macroeconomic environment or to client demand. Although the importance of the informal sector is difficult to measure, some observers estimated that almost half

of the Brazilian urban workers were informal in 2007[32]. This ratio is known to be approximately the same in China (Jütting and Xenogiani, 2007).

In Brazil, informal practices have often been described as the only way of doing business. The "jeitinho brasileiro" was first seen as a way to by-pass absurd bureaucratic requirements created by inefficient institutions. But as Brazil is growing and joining international institutions, the business environment is becoming increasingly formalized. Companies are calculating the trade-off between registering and getting access to a larger market, or staying in the informal sector. As corporate taxes and bureaucratic costs are high in Brazil, companies face a real dilemma.

Chart 6.4.1. Obstacle scores on practices of competitors in the informal market in Brazil and China
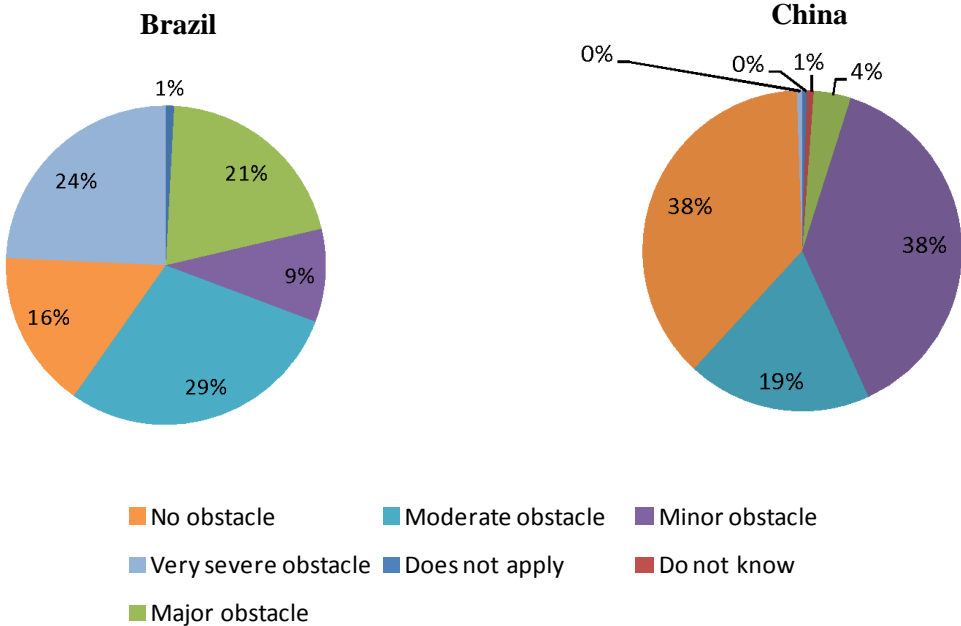
In Brazil, 45% of firms report very severe obstacles or major obstacles related to informal competitors while they are only 4% in China. While the average score is much lower in China than in Brazil (0.9), informal competition is still ranked as one of the top obstacles to business amongst Chinese business owners. As in Brazil, practices of competitors in the informal market seem to have a greater negative impact on Chinese micro firms (1.17) than on small firms (0.96) and medium firms (0.85).

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[32] Survey by WIEGO using the 2007 PNAD Survey by IBGE, excluding agricultural workers: http://wiego.org/sites/wiego.org/files/publications/files/Budlender_WIEGO_SB4.pdf. It should be noted that currently, the proportion of informal workers in Brazil is likely to be significantly lower.

In both countries, we observe the same relation between firm size and vulnerability to practices of competitors in the informal market. Informal competition is putting an important pressure on smaller businesses and it shows in the survey's results: there is a relation between the amount of annual sales of the surveyed firms and their perception of informal competitors (Charts 6.4.2.B and 6.4.2.C). It is consistent with the fact that the more a firm is growing in terms of sales, the less it will compete against small informal businesses. The same apparent relation is found for the number of employees in China: the most affected firms report 43 employees on average compared to 69 for firms which do not consider practices of informal competitors as an obstacle to their operations.

Chart 6.4.2.B. Average annual sales in function of obstacle scores on practices of competitors in the informal market, Brazil
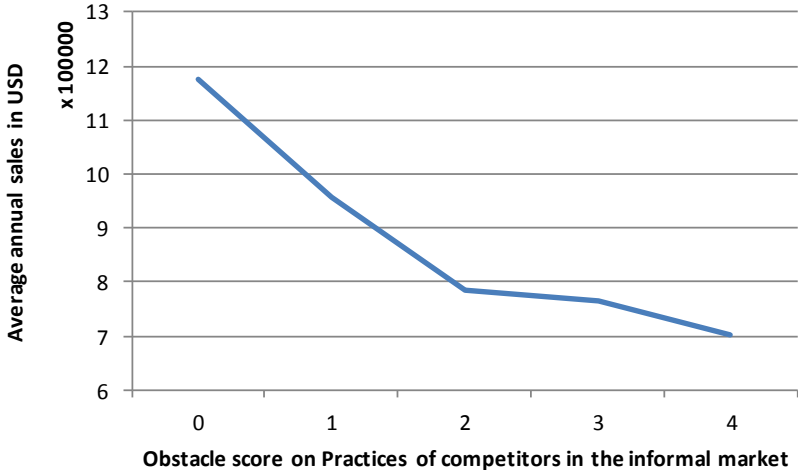
Chart 6.4.2.C Average annual sales in function of obstacle scores on practices of competitors in the informal market, China
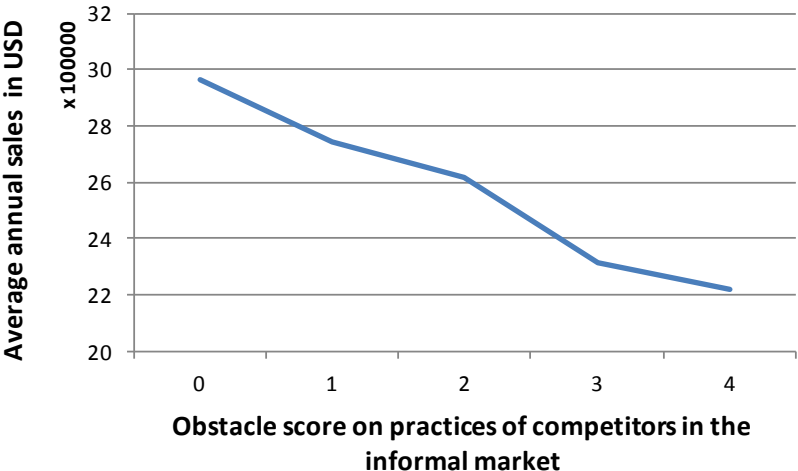
We could not find any clear relation between the year the firm began its operations and the extent to which the owner feels his business is threatened by informal competition, so age of the company does not seem to be a relevant criterion here. This statement is also supported by the fact that, companies that formally registered only recently do not perceive higher obstacles related to informal competition than companies registered a long time ago. It may suggest that those companies recently registered have adapted better to the informal competition.

The intensity of informal competition also seems to be linked to international diversification: companies which mainly sell outside their home countries are significantly less affected by practices of competitors in the informal market, than companies mainly selling locally (A.6.4.1 and A.6.4.2). Those results are consistent with the fact that firms that compete on a national or an international stage have to comply to stricter norms than those who are mainly acting on a local level.

Looking at regional disparities, north-eastern states in Brazil (Ceará, Bahia, Pernambuco) and Amazonas have the highest scores on this obstacle (A.6.4.4). It may be due to a more flexible legal framework and lower legal enforcement in the North-Eastern and Amazonian regions, but we also need to consider interconnected variables that may affect the result (for instance, average annual sales for these states are lower than average). In China, the opposite relation is observed: poor inland states seem to suffer less from practices of informal competitors (0.81) than rich coastal states such as Shanghai, Beijing or Jiangsu (A.6.4.3).

In Brazil, companies that have more competitors and lower performances than the average (in terms of sales increase) score higher on this obstacle. They also seem to become less vulnerable when attracting more university graduates in their workforce (Chart 6.4.3.B). Those three observations seem to support the assumption than more than in China, Brazilian firms vulnerable to informal competition are actually growth constrained by this obstacle.

Chart 6.4.3.B.. Average percentage of the workforce with a university degree in function of obstacle score on Practices of competitors in the informal market, Brazil
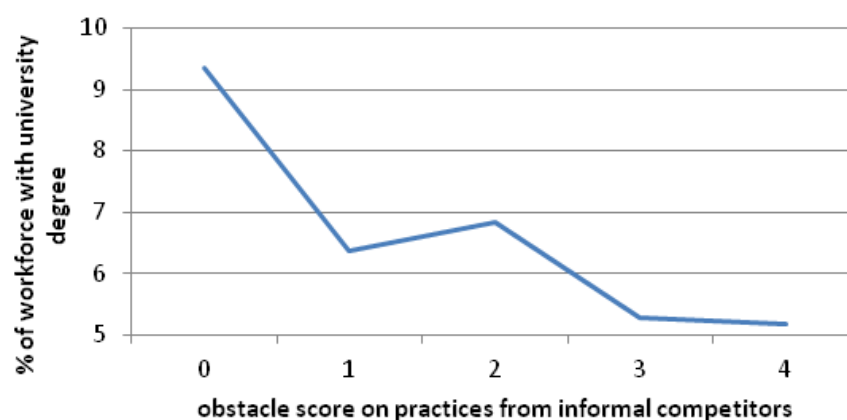
To sum-up, informal competition is affecting micro-firms operating locally the most, regardless of the country. In Brazil, those most affected micro-firms are found predominantly in rich states where the competition is more intensive, whereas the opposite is observed for China (Table 6.4.1).

Summing-up, informal competition affects quite the same sort of companies in Brazil and China: in both cases, micro firms operating locally are more vulnerable to this obstacle than larger firms.

Table 6.4.1. Practices of competitors in the informal market in Brazil and China

	China	Brazil
Average score	0.90	2.28
% of firms that reported informal competition as the biggest obstacle to their operations	16%	12%
Type of firms affected	Micro firms poor regions	Micro firms in rich regions
What are the variables linked practices of competitors in the informal market?	Annual sales (-) Number of employees (-) International diversification (-)	Annual sales (-) International diversification (-) Competition intensity (+) Sales evolution (-) Proportion of graduates (-)

6. 5. Perceived obstacles on access to finance

Access to finance is an essential variable to analyze for its direct impact on firm growth. It is expected to be better in Brazil, which has a developed and efficient banking system, while China still relies on state-owned banks and is known to lag behind in terms of financial reforms. As a result of the weak financial framework and the country's rapid transition from a planned economy to a market economy, informal finance has often complemented inefficiencies in the Chinese formal capital market (Ji, 2009).

Chart 6.5.1. Obstacle scores on access to finance in Brazil and China
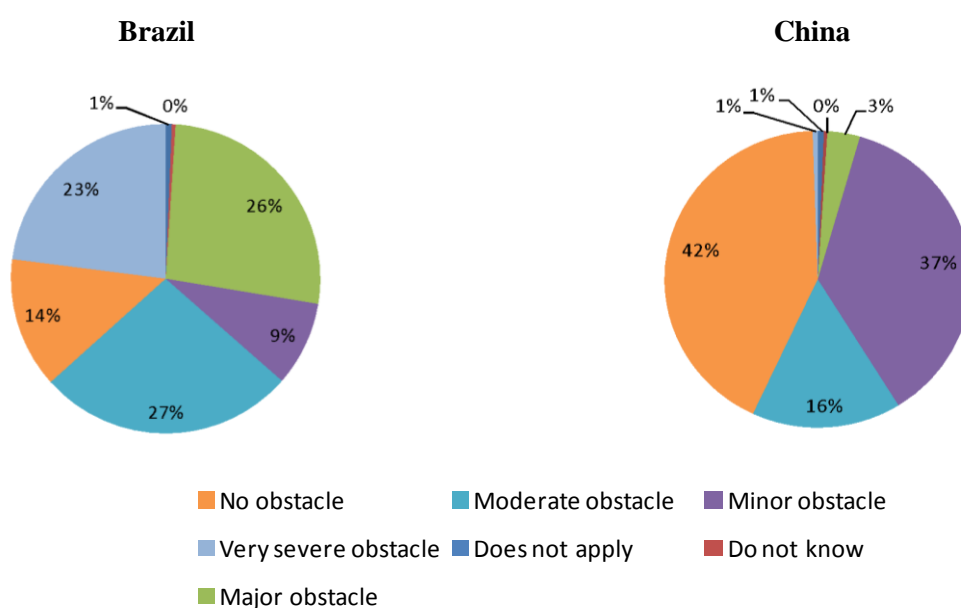
As discussed previously in the literature review, access to finance may be one of the most critical determinants of firms' growth. In Brazil, almost half of the respondents see it as a major to very severe obstacle (Chart 6.5.1). Amongst Chinese respondents, access to finance is the constraint most often cited as the "biggest obstacle" to their business operations. It is also the third obstacle in terms of average score.

The known relation between access to finance and firms size is observed for Brazilian respondents, where firms that reported no obstacle related to access to finance have average annual sales more than 3 times higher than the most affected firms' sales (Chart 6.5.2.B). However, this relation is not observed for China (Chart 6.5.2.C). It seems to indicate that as Chinese companies grow, they may not find the necessary resources to finance their activities.

Chart 6.5.2.B Average annual sales in function of obstacles scores on Access to finance, Brazil
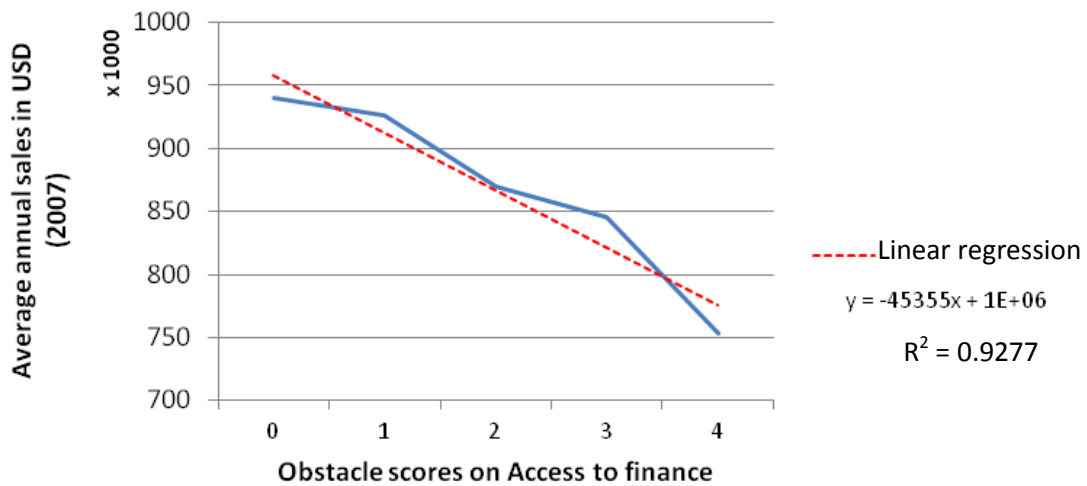
Chart 6.5.2.C. Average annual sales in function of obstacle score on access to finance, China
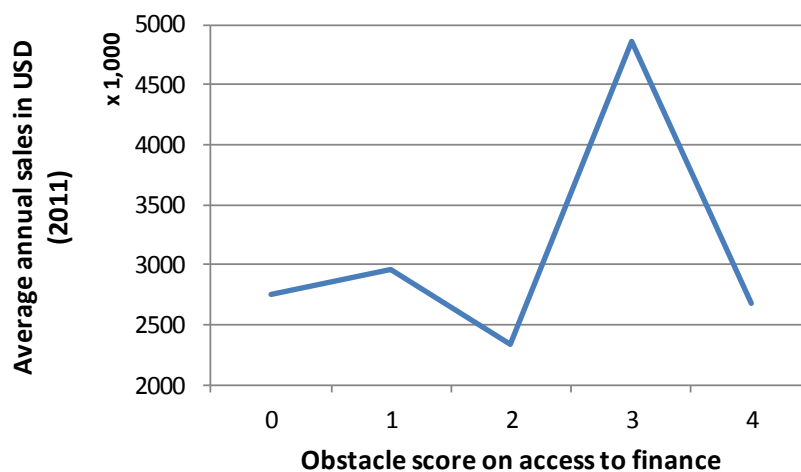
Financial vulnerability is also linked to dependence on external sources of financing. If we look at the composition of the working capital by sources of financing, we also observe an apparent relation between very low perceived obstacle on access to finance and a high share of working capital being financed by internal funds (Chart 6.5.3.B and Chart 6.5.3.C).

Chart 6.5.3.B. Composition of working capital by financing sources, Brazil
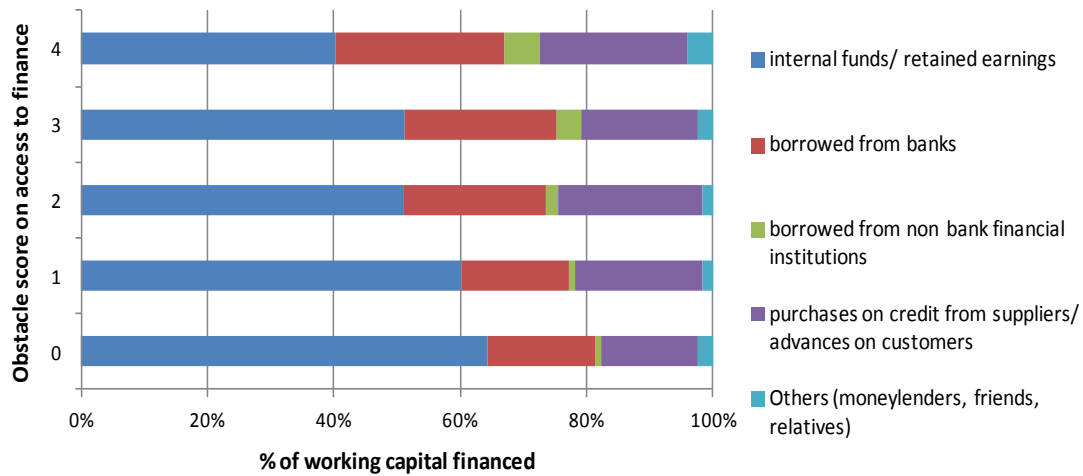
Chart 6.5.3.C. Composition of working capital by financing sources, China
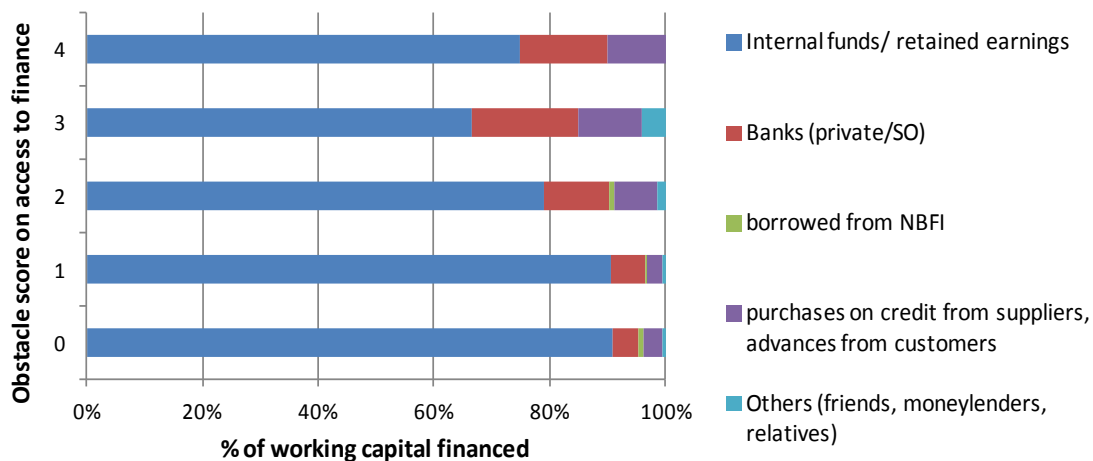
The top scoring respondents on access to finance are actually those who are the less in need of external financing, since they are – for the majority of their working capital – self sufficient; whereas the most affected firms resort more to credit on purchases, borrowings from alternative financial institutions (such as the microfinance sector) and informal financing (moneylenders, friends, relatives). In both countries, we observe that the lower the score, the higher the probability of a firm to finance its working capital with internal funds. This seems to support the evidence that companies less affected by the financing obstacle have less financing needs, so in a way, they overcome the lack of external financing resources by using their own. This is especially true for Chinese companies, which use

significantly more internal funds/ retained earnings than Brazilian firms, regardless of their score on access to finance. [33]

To have a clear idea of credit constraints, it is important not only to look at the working capital composition but also the financing of new investments, such as fixed assets. The WBES allow us to get a good idea of how do firms adapt to their business environment in their investment decisions. The same pattern applies for financing working capital and purchases of fixed assets (Charts 6.5.4.B and 6.5.4.C)

Chart 6.5.4.B Purchase of net fixed assets by financing sources, Brazil
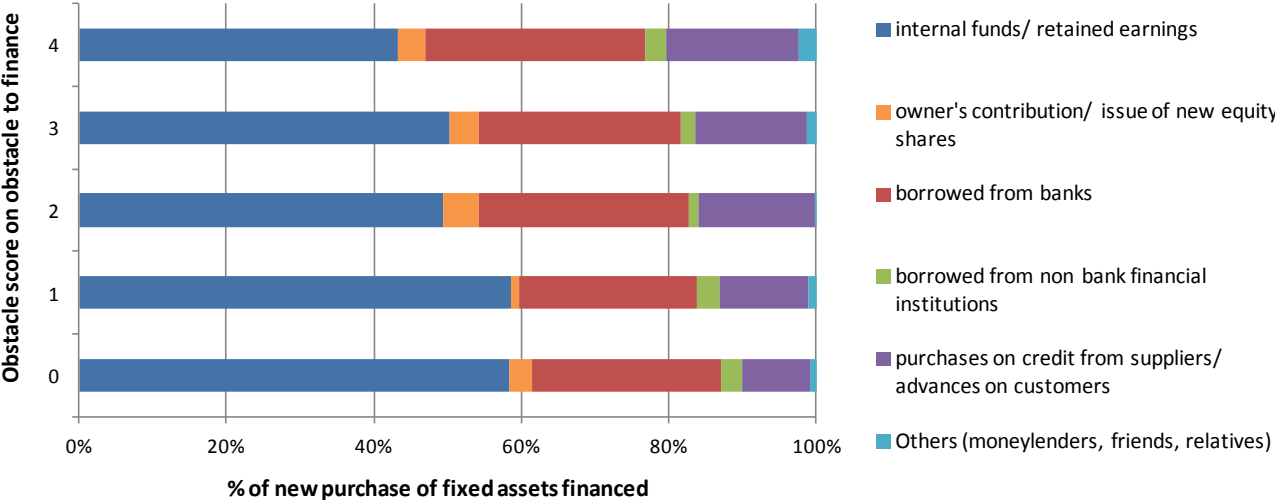
Chart 6.5.4.C. Purchase of net fixed assets by financing sources, China

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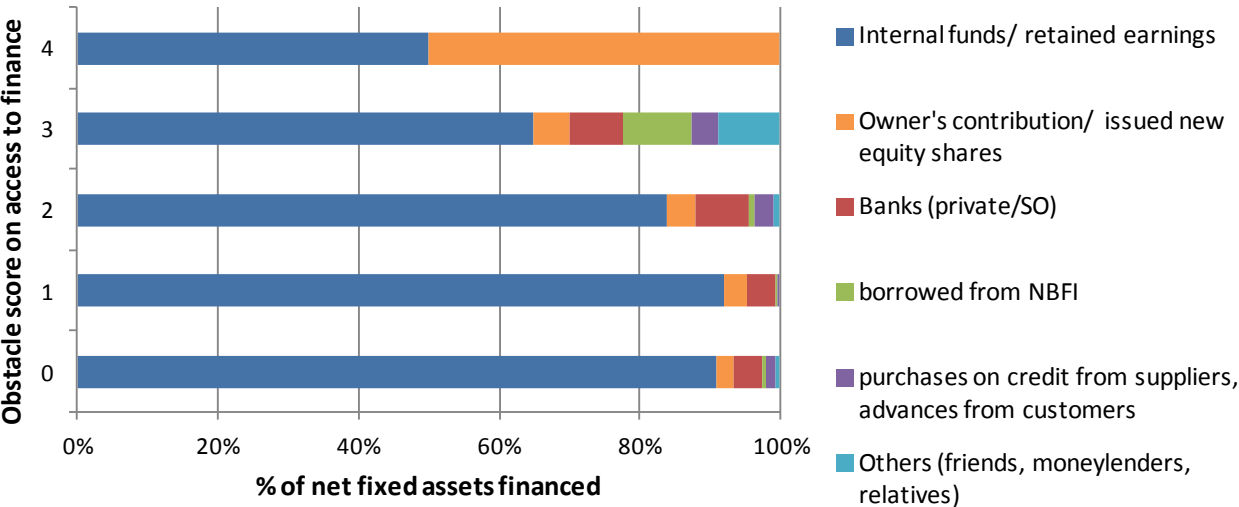
[33] As only 4 firms report the maximum obstacle for access to finance in China, we will not consider the results for this score, as the sample is not wide enough to ensure its representativeness.

Top scoring (0 and 1) Brazilian companies are financing the most part of their fixed assets through internal funds and retained earnings, but are also financed by public or private banks. The ones who responded they struggled to have access to credit have more diverse sources of financing, with an increasing share of informal lending and loans from non financial institutions. In China, top scoring firms (score =0) are self-sufficient for 91% of their new investment financing needs.

As previously noticed in Kumar's empirical study (2005), the North-Eastern region is more affected (2.60) than the richer South. But taking into account the average sales per regions, we do not find consistent regional disparities (Table 6.5.1.B)

Table 6.5.1.B Firms average sales and scores on access to finance per states (Brazil), 2007

States	Number of firms	Average annual sales in K USD	Average score on access to finance
Amazonas	45	784.5	2.87
Bahia	91	709	2.67
Ceará	82	518.	2.42
Distrito Federal	37	7512	2.65
Goiás	72	425.	2.46
Maranhão	3	257	2.00
Mato Grosso	50	653	1.98
Minas Gerais	157	282	2.34
Paraíba	14	355	2.64
Paraná	135	934	2.15
Pernambuco	41	742	2.83
Rio de Janeiro	153	819	2.45
Rio Grande do Sul	159	1082	2.12
Santa Catarina	166	909	2.13
São Paulo	352	1,228	2.44
Total	1557	**847**	**2.37**

In China, the provinces most affected by the lack of access to finance are not the poorest: Shanghai Guangdong and Zheijiang, which reported the highest level of obstacles, are wealthier than the average province in China.

The main reasons evoked not to apply to a new loan (or a line of credit) in China are, in decreasing order: application procedures are too complex (1), interest rates are not favorable (2), collateral requirements are too high (3) and size of loan and maturity are insufficient (4).

Table 6.5.1.C. Firms average sales and scores on access to finance per states (China), 2011

States	Number of firms	Average annual sales in K USD	Average score on access to finance
Anhui	96	1,856	0.16
Beijing	95	1,980	0.12
Guangdong	382	2,854	0.40
Hebei	176	2,520	0.15
Henan	183	3,466	0.35
Hubei	162	3,329	0.39
Jiangsu	386	2,995	0.23
Liaoning	180	2,421	0.23
Shandong	278	2,034	0.17
Shanghai	28	3,002	0.50
Sichuan	94	2,787	0.31
Zheijiang	119	4,548	0.39
Total	**2179**	**2,807**	**0.28**

Finally, we also spotted a paradox. As compared to Brazil, Chinese respondents are 2/3 less likely to apply for a new credit line (A. 6.5.1 and 6.5.3). Even if it seems that their external financing needs are lower on average, we can still observe that a higher share of Chinese business owners are credit constrained (46% compared to 17% of Brazilian respondents), despite Chinese companies scoring significantly lower on average on the financing obstacle.

Summing-up, the lack of access to finance seems to have a greater impact on companies with insufficient internal funds. It seems to affect Chinese and Brazilian companies differently, but it is a significant constraint to both countries, as highlighted by the ratio of credit constrained firms.

Table 6.5.2. Access to finance in Brazil and in China

	China	Brazil
Average score	0.76	2.98
% of firms that reported access to finance as the biggest obstacle to their operations	21%	9%
% of firms credit constrained	35%	17%
What are the variables linked to tax rates?	Availability of internal funds (-) Number of employees (+)	Availability of internal funds (-) Annual sales (-)

6. 6. Perceived obstacles on corruption

As discussed before, corruption still pervades both Brazil and China's economies. In China, the common cultural practice of Guanxi, which refers to gift-giving in order to build business relations, can still be considered bribery on international standards. Despite a recent focus on corruption by the Xi Jiping's government, China ranked 100 out of 175 countries on the corruption perception index 2014[34], with little effectiveness from citizens reporting on corruption. In Brazil, companies have to deal with an impressive number of regulatory agencies due to federalism, which increase the risk of bribery. The tax system is also very complex and prone to corruption. This may explain, why corruption is rated very high amongst Brazilian respondents in the survey.

Chart 6.6.1. Obstacle scores on corruption in Brazil and in China

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[34] https://www.transparency.org/cpi2014/results
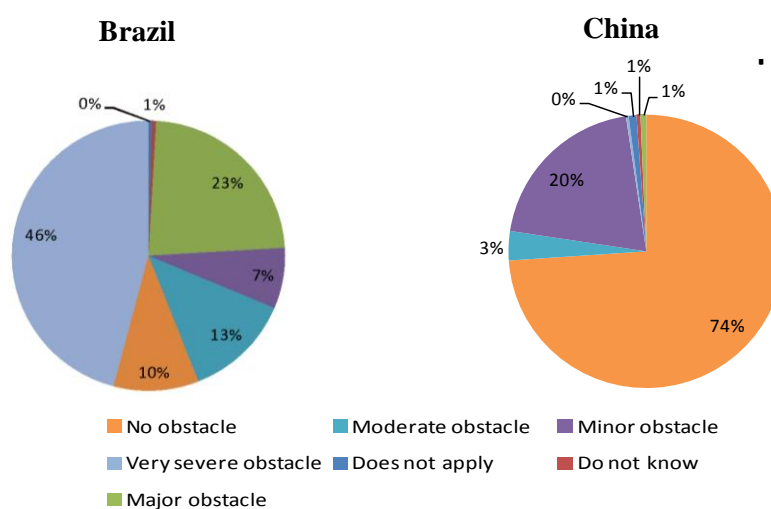
Corruption is of course very hard to quantify, because respondents tend to underreport it, especially in China (Chart 6.6.1). In Brazil, though, respondents do seem to answer quite openly on corruption, with more than 2/3 of them identifying it as a major to a very severe obstacle. This proportion rises if we only take into account micro-enterprises (A.6.1.1 and A.6.1.4) suggesting that there may be a size variable that influences the impact of corruption.

Geographically, according to the survey, the states that are more concerned about corruption are: Amazonas, Ceará, Santa Catarina and Pernambuco in Brazil (Appendix 6.6.1) and Guangdong (Foshan City) in China. Given that there is evidence that Chinese respondents considerably understate the level of corruption they are facing, we could not draw any conclusions from the analysis, but in Brazil it suggests that corruption is more of an issue in lower-income states.

To sum-up, micro firms are more vulnerable to corruption, and in Brazil, low income states are more affected by this obstacle (Table 6.6.1).

Table 6.6.1. Corruption in Brazil and in China

	China	Brazil
Average score	0.31	2.88
% of firms that reported corruption as the biggest obstacle to their operations	1%	3%
What type of firm is more vulnerable to corruption?	Micro firms	Micro firms in low income states

6. 7. Perceived obstacles on Transports

Transport is an interesting obstacle to analyze since it is only considered the biggest obstacle to business by 2 companies in Brazil, but ranks first for 7.4% of Chinese firms. Transport infrastructure is known to be underdeveloped in the two countries. On the World Bank's logistics performance, index, which is an indicator of the quality of trade and transport-related infrastructure, Brazil scores 2.93/5 which is still lower than China with 3.67/5.[35]For instance, in 2014, only 13.5% of Brazilian roads were paved compared to 63.7% in China.[36] We believe that since Brazilian companies have a

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[35] Data taken on year 2014. http://data.worldbank.org/indicator/LP.LPI.INFR.XQ
[36] http://data.worldbank.org/indicator/IS.ROD.PAVE.ZS

smaller average size, they may be selling their products or services in local markets, requiring fewer infrastructures related to product distribution.

Charts 6.7.1. Obstacle score on transports in Brazil and China

Brazil

China

■ No obstacle   ■ Moderate obstacle   ■ Minor obstacle
■ Very severe obstacle   ■ Does not apply   ■ Do not know
■ Major obstacle
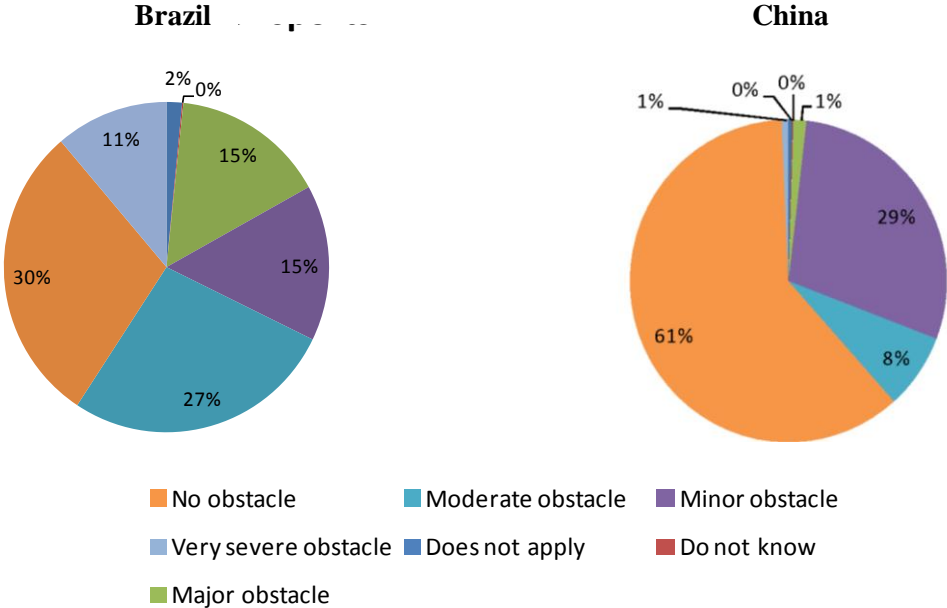
Only 26% of Brazilian companies are suffering significantly from the lack of transport infrastructure, which is relatively low compared to other obstacles in the country, but still higher than for China. But as firms grow, this ratio increases in both China (Chart 6.7.2.C) and Brazil, with 30% of medium companies reporting very severe or major obstacles on transports. Following the same trend, Chinese companies' owners that do not consider transport as an obstacle have 63 employees on average, whereas those who consider transport as a major obstacle have 90 employees on average. Chinese micro-firms seem to be less affected (0.28) by bad transport infrastructure than medium-sized firms (0.55). It seems to suggest that transportation becomes a challenge for firms when their activities are already quite developed.

Chart 6.7.2.C. Average annual sales in function of obstacle scores on transports, China
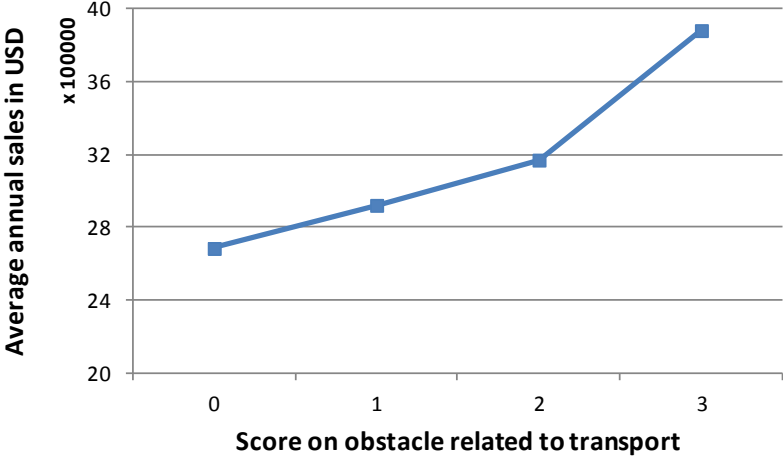
Chinese companies whose main market is local are less affected by bad transport services (0.47) than companies mainly selling internationally (0.55). In Brazil, companies operating predominantly on a national level are the ones that seem most affected by the low quality of transport.

Summing-up, larger companies are more vulnerable than micro and small enterprises in both countries. In China, internationally diversified firms also score higher on this obstacle (Table 6.7.1)

Table 6.7.1. Transports in Brazil and China

	China	Brazil
Average score	0.91	1.63
% of firms that reported transports as the biggest obstacle to their operations	7%	0%
What are the variables linked to transports?	Annual Sales (+) Number of employees (+) International Div. (+)	Annual Sales (+)

6. 8. General comparison between China and Brazil

After observing the results, the first striking point is that the average perception of obstacles in Brazil is significantly higher than in China. Whereas the mean obstacle score for Brazil is 2.37 it only

reaches 0.52[37] for China with a maximum of 0.91 for the tax rates obstacles. It means than on average, Chinese business owners do not tend to consider any of the mentioned obstacles to be meaningfully impacting negatively their operations. Even after controlling the size factor, Chinese micro enterprises report significantly smaller obstacles intensity than their Brazilian counterparts.

It may trigger three different hypotheses: the first hypothesis is that there is a strong country factor that explains that Chinese companies face fewer obstacles or are more efficient in tackling them. It is consistent with the fact that China ranks 90th at the World Bank Doing Business Index while Brazil lags behind (167/189). China's business environment seems to have a better impact on companies than Brazil's one. Chinese respondents also seem to benefit from better infrastructures (Table 6.8.1). Brazil performs significantly lower than China on the quality of its infrastructures and on bureaucracy. Respondents reported than on average, it takes 3 times longer to obtain an electrical connection or a telephone connection in Brazil than in China. When looking at bureaucracy, administration seems to be more efficient – or level of regulation lower – in China. For instance, it takes half the time for Chinese exporting goods to clear customs.

Table 6.8.1. Indicators on infrastructure quality and bureaucracy: Brazil and China

INFRASTRUCTURE QUALITY	Brazil	China
Days to obtain electrical connection	38	12
% of companies that experienced at least one power outage last fiscal year	43%	41%
Days to obtain water connection	12	11
% of companies that experienced insufficient water supply for production last fiscal year	5%	3%
Days to obtain telephone connection	15	5
BUREAUCRACY		
Days to clear customs for exports	16	8
Days to obtain a construction permit	91	35
Days to obtain an import license	43	25
Days to obtain an operating license	83	22

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[37] Student test: p-value < 0,0001

If the first hypothesis is verified, we would expect Chinese companies to perform better in terms of increasing sales and hiring employees. Indeed, in a 3 year timeframe, 73% of the sampled Chinese companies have experienced increasing sales compared to only 40% of Brazilian companies; and 70% have expanded their workforce compared to only 56% of the sample in Brazil. When looking at the World Economic Forum's Global Competitiveness Report, China's quality of overall infrastructure (4.2) is rated much better than Brazilian one (3.6).[38]

Given that the importance of the informal sector is negatively correlated with the level of economic development (Ayyagari, Beck, Demirgüç-Kunt, 2003), and since China has a lower level of GDP per capita than Brazil, the second hypothesis to explain the results gap is that the Chinese informal sector is more important than the Brazilian. In this case, the vast majority of Chinese SMEs main remain in the informal sector, while only a few competitive enterprises are in the formal sector. It implies than obstacles to business in China may be higher than observed in the survey, but affect very heterogeneously enterprises from the formal and the informal sector.

The third plausible explanation is that Chinese people are less inclined to recognize they are facing significant obstacles because of the lack of freedom of speech and perception biases: it is especially plausible when it comes to sensitive topics such as corruption and political instability. This can be highlighted when confronting the Chinese perceptions on a given obstacles and actual indicator on this obstacles. For instance, 80% of Chinese respondents consider access to finance as no obstacle or a minor obstacle to their business operations (compared to only 23% Brazilians). China scores significantly better on perceived access to finance (0.82 on average) than Brazil (2.37 on average), although only 28% of Chinese respondents benefit from an overdraft facility compared to 82% in Brazil. Moreover, 66% of Chinese respondents that stated access to finance was not an obstacle did not have an overdraft facility, and 75% of the same respondents did not have any credit from a financial institution. Only 10% of the Chinese respondents seem to think that corruption is at least a moderate issue in their business environment (compared to 82% for their Brazilian counterparts), even though China scores worse at the Transparency International Corruption Index[39], and some Chinese respondents stating that corruption was not an obstacle admitted they had to pay informal gift to get infrastructure installed or to get an operating license. Another perception bias could be that as the situation is improving at very fast rates in China in terms of infrastructure facilities, Chinese respondents may underestimate obstacles they face by comparing the current situation with their struggle in the past.

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[38] http://www3.weforum.org/docs/GCR2011-12/14.GCR2011-2012DTIIInfrastructure.pdf
[39] http://www.transparency.org/cpi2014/results

In Brazil, as shown in Chart 6.8.1.B, there is a strong apparent relation between obstacles and annual sales (except for tax rates). Companies with very small amount of annual sales (<USD 100,000) are not the worst-off, as we could have expected. There is a peak of obstacle intensity between USD 100,000 and USD 500,000 for obstacles regarding inadequately educated workforce, corruption, and practices of competitors in the informal market. For access to finance and transports, the peek is between USD 500,000 and USD 1 million, showing that firms need to get big enough first to have significant investment needs and to distribute their products over a wide area.

Chart 6.8.1.B Average obstacle score by annual sales, Brazil
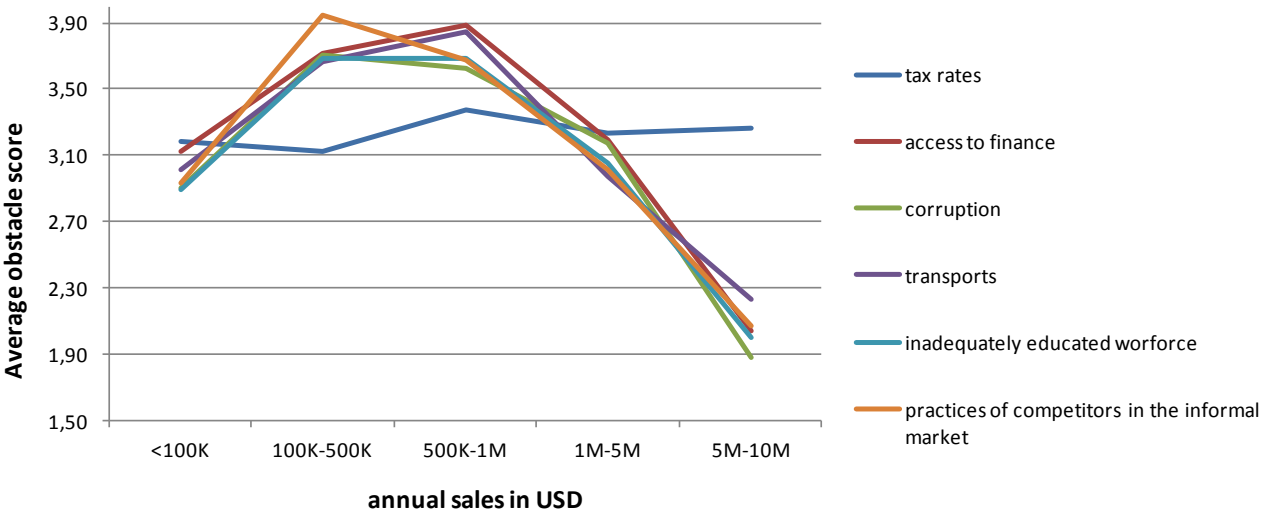
In China, the apparent relation is less obvious: there is even a tendency to score higher on obstacles (except for practices of informal competitors) as sales increase.

Chart 6.8.1.C. Average obstacle score by annual sales, China
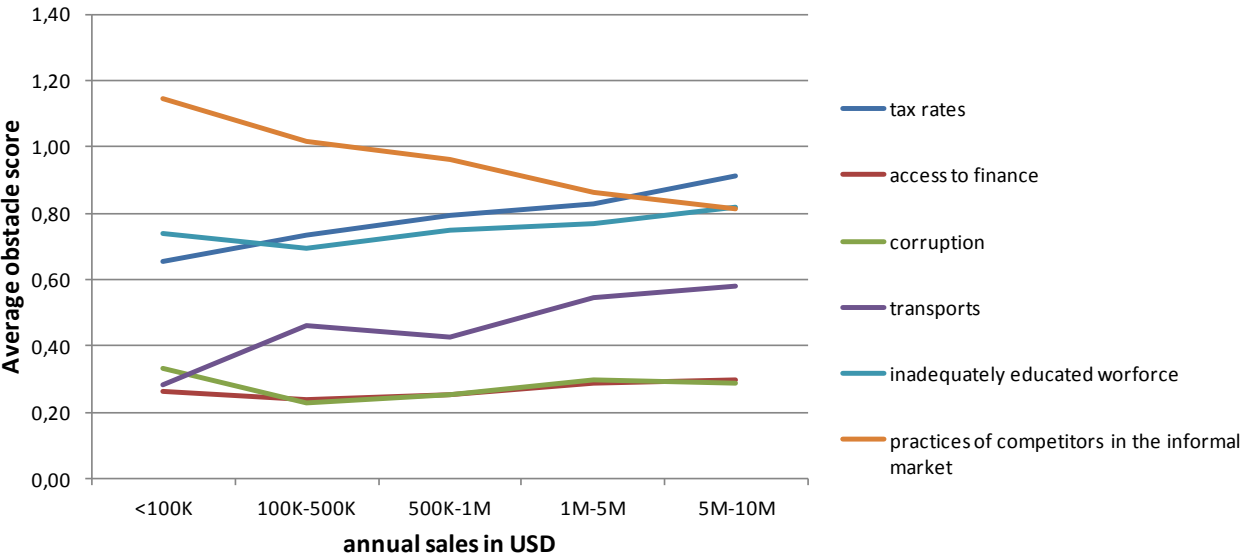
When looking average scores by number of employees, the relation is not as clear as for average annual sales. It suggests that annual sales are the main firm size factor impacting obstacles to business. In Brazil, no apparent relation can be observed between the number of employees and the mean scores on obstacles.

Chart 6.8.2.B. Average obstacle score by number of employees, Brazil
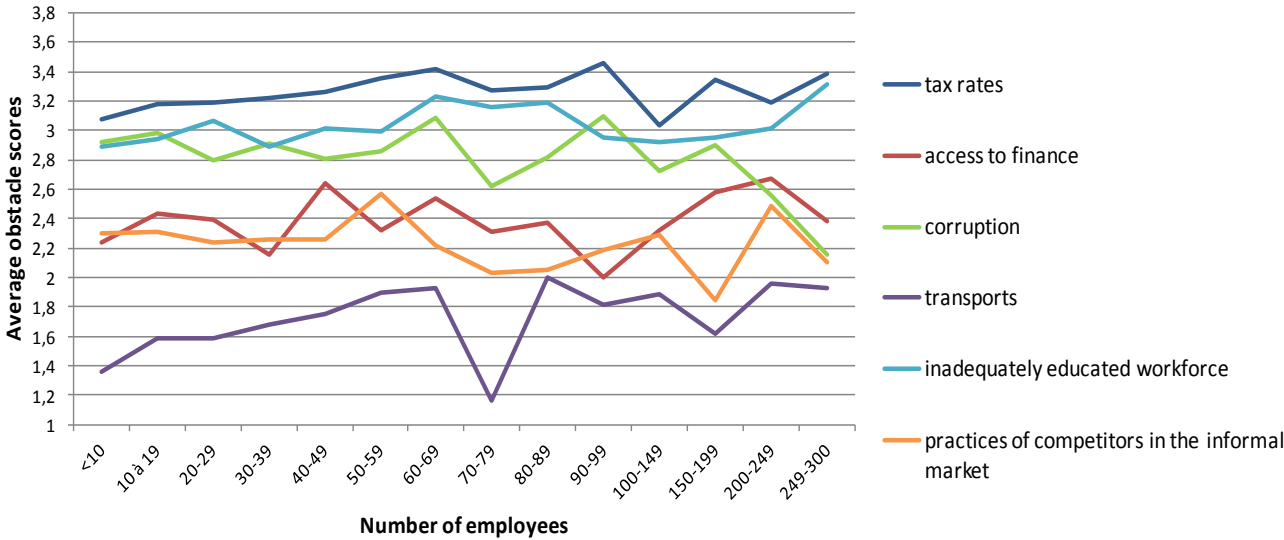
In China, the mean obstacle scores do not vary in function of the number of employees, except for the highest. Chinese companies employing 250 or more workers report the highest scores on almost every obstacle.

Chart 6.8.2.C. Average obstacle score by the number of employees, China
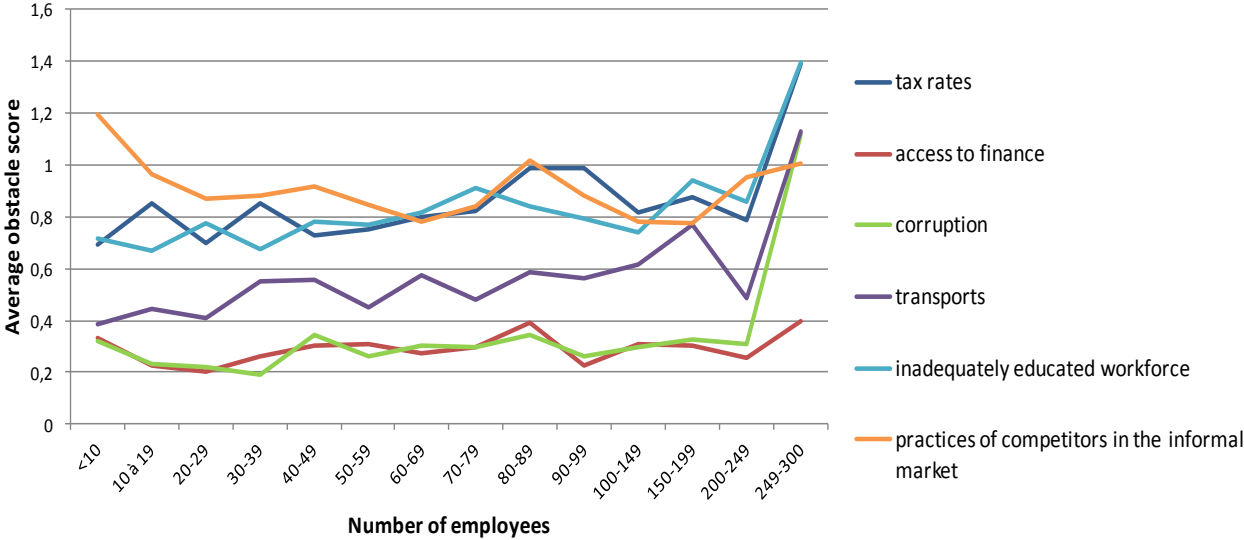
Table 6.8.2 Portrait of typical firms affected by each obstacle

Obstacle	China	Brazil
Transport	Large exporting SME *(Table 6.7.1)*	
Informal competition	Micro and small SMEs with poorly qualified workforce operating in the lower income regions *(Table 6.4.1)*	
Corruption	Micro and small SMEs in the low-income region *(Table 6.6.1)*	
Tax rates	Large local player *(Table 6.2.1)*	Large exporting SME *(Table 6.2.1)*
Access to finance	SMEs with less internal resources available *(Table 6.5.2)*	Micro and small enterprises with less internal resources available, in low-income regions *(Table 6.5.2)*
Inadequately educated workforce	Micro and Small enterprises in labor intensive industries in middle/high income region *(Table 6.3.1)*	Micro and Small enterprises in labor intensive industries in low income region *(Table 6.3.1)*

7. RESULTS ON CLUSTER ANALYSIS[40]

As the WBES only gave access to two differentiated sets of data, it was a real challenge to identify similar patterns between Chinese and Brazilian data. Cluster analysis provided the opportunity to study large samples, mixing Chinese and Brazilian companies in clusters. The main goals of these cluster analyses were not to spot differences between the two countries, but to emphasize the similar features of companies in function of their scores on business obstacles. Clustering gives us the opportunity to examine whether firms' inner characteristics transcend the country trait. The idea was to pair obstacles that were responding to different underlying forces in order to distribute firms according to their level of vulnerability to one or the other obstacle. In the end, the three cluster analyses should help us to anticipate the behaviors of firms depending on their own characteristics and the country where they are located.

To build the cluster analysis, only the 6 obstacles, already addressed in the country analysis, were included. The other obstacles were not considered.

For the purpose of cluster analysis, 3 sets of paired-obstacles were tested for segmentation in 6 clusters:

- Tax rates vs. Access to finance (CA1) : tax rates were often reported as a big firm obstacles while access to finance seem to affect smaller organizations
- Practices of competitors in the informal market vs. Corruption (CA2) : as corruption seem to only be reported by Brazilian companies, it was interesting to compare it to a more recurring obstacle faced by firms in both countries
- Inadequately educated workforce vs. Transports (CA3): transports seem to be affecting more Chinese firms. With CA3, we expect a symmetry effect related to CA2.

7. 1. Cluster Analysis 1 (CA1): Tax rates vs. Access to finance

The first cluster analysis tests the sensitivity of firms to tax rates vs. access to finance. By looking at those two major constraints to firms operations, we intend to assess the size bias, access to finance affecting predominantly small firms and larger firms being more vulnerable to tax rates. We aim to shed some lights on the obstacles consequences depending on the types of firms they are impacting.

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[40] In this section, all obstacle scores refer to Table 5.3.1

Using the K-clustering method, we came up with 6 different clusters, with distinct levels of vulnerability to access to finance and tax rates. Cluster A contains firms that are scoring high on tax rates, but low on access to finance: we expect these firms to be predominantly of bigger sizes, considering our previous findings on section 6. Cluster B contains firms that score a medium obstacle on both obstacles. These firms are not sensible to one obstacle more than the other. Cluster C shows firms whose owners exclusively score 4 ("very severe") on tax rates and face moderate to major financing challenges. Cluster D contains firms that are affected by the two obstacles at the highest level. It does not discriminate between obstacles. We will refer to this cluster as the "most affected cluster". On the opposite, cluster E includes firms who are not or not significantly affected by either of the two obstacles. We expect this cluster to be predominantly composed with Chinese firms. We will refer to this cluster as the "least affected cluster". Finally, Cluster F is quite large and contains firms that are significantly affected by both obstacles but face more financing constraints than tax rates obstacles.

Chart 7.1.1 Clustering 1 : Access to Finance vs. Tax rates[41]
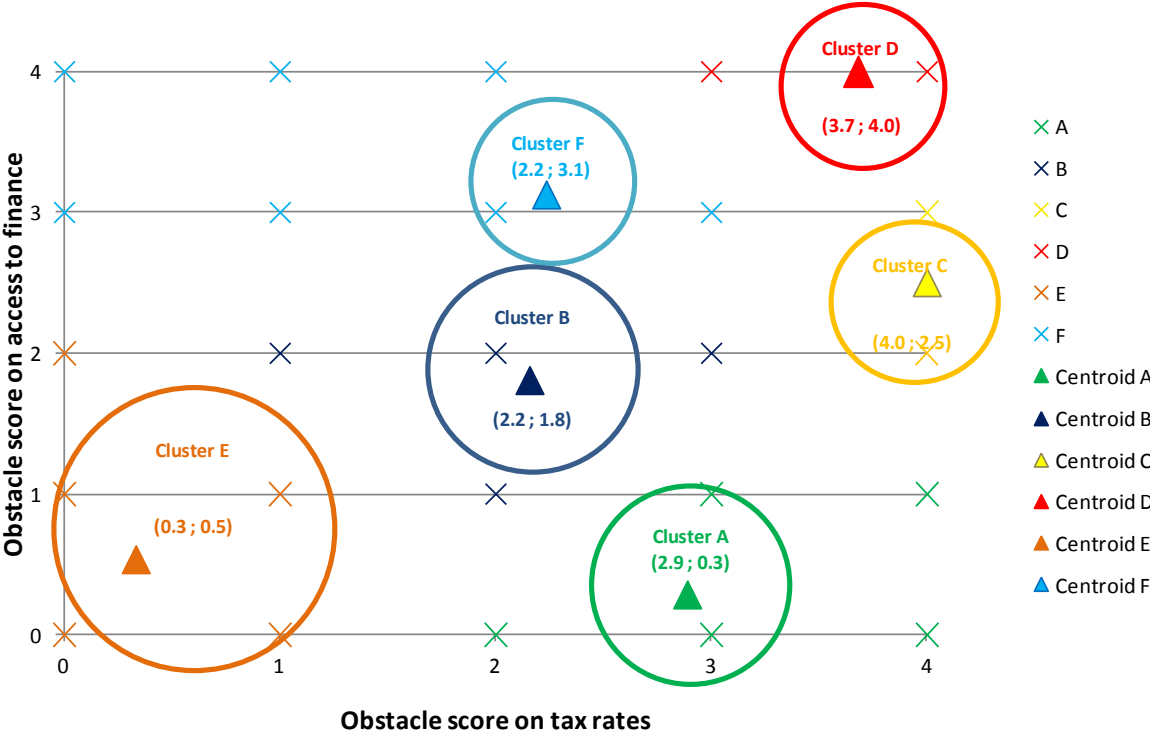
(a) *A strong country bias in firm distribution*

As expected, we observed a strong country bias in firms' distribution between clusters (Table 7.1.1). No Chinese companies are located in the most affected cluster, and 65% of them are located in the

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[41] *On this chart, clusters centroids represent the average score of the clusters on both obstacles. The different intersections represent possible combinations of scores inside a cluster*

least affected cluster. By contrast, the most affected cluster is exclusively composed of Brazilian companies. Chinese companies seem to be more vulnerable to tax rates than access to finance: they represent 47% of cluster A, but only 23% of cluster F.

Table 7.1.1. Country distribution and aggregated cluster scores, CA1

	CLUSTER E	CLUSTER A	CLUSTER B	CLUSTER F	CLUSTER C	CLUSTER D
Brazil	40	291	267	273	346	323
China	1417	259	379	80	13	0
Aggregated scores[42]	0.9	3.2	4.0	5.4	6.5	7.7

(b) The size-obstacle relation

As shown in Table 7.1.2, the least affected cluster has average sales 4 times superior and a number of employees two thirds higher than the most affected cluster; while the latter has average annual sales half the average. This is mainly explained by the fact that the least affected companies are mainly Chinese, and the average sales of Chinese companies are more than three times higher than for Brazilian companies.

When eliminating the country bias, the size factor is not necessarily obvious: the 40 Brazilian companies in the least affected clusters have annual sales 45% smaller than the national average (A.7.1). Chinese firms from the least affected cluster have also average sales lower than the national average. It seems to point out that the relation between aggregated scores and firm size is only relevant in international comparisons but does not apply to national ones: within a given country, the smallest companies seem to be the less vulnerable to access to finance and tax rates combined.

In fact, firm size has a positive impact on access to finance and a negative impact on the perception of tax rates. In cluster A, which is composed of firms that are not affected by the lack of financing but are vulnerable to tax rates, both Brazilian and Chinese firms have annual sales significantly higher than the national average (Table 7.1.2).

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[42] See Table 5.1.1 : Aggregated scores are the sum of clusters' average scores on tax rates and access to finance

Table 7.1.2. Cluster average annual sales and obstacle scores, CA1

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE F	AVERAGE C	AVERAGE D
Average annual sales in USD (x 1000)	2,557	2,087	2,234	1,449	901	822
Score on tax rates	0.3	2.9	2.2	2.2	4.0	3.7
Score on access to finance	0.5	0.3	1.8	3.1	2.5	4.0
Aggregated score	**0.9**	**3.2**	**4.0**	**5.4**	**6.5**	**7.7**

(c) Obstacle scores and performances

First, low scores on the two obstacles are related to greater international diversification (Table 7.1.3). The least affected cluster shows the highest proportion of annual sales sent directly or indirectly as exports. Then, firms from the most affected cluster are, as expected, the worst performing ones in terms of capacity utilization and sales growth. Comparing cluster C (moderate sensitivity to access to finance, very high sensitivity to tax rates) and with cluster F (high sensitivity to access to finance, moderate sensitivity to tax rates) there is no clear evidence that access to finance is damaging more sales and employees increase than tax rates obstacles. Indeed, cluster C and cluster F do not register radically different performance indicators.

Companies from cluster A are quite immune to other obstacles (they score 1.3 on average for other obstacles, equivalent to a minor obstacle), suggesting that companies only complaining about tax rates are not challenged in any other way by their business environment. It suggests that tax rates are affecting already developed and performing firms.

Surprisingly, Cluster B, which is proportionately distributed between Brazilian and Chinese firms, and has second highest average annual sales, shows the highest scores on performance indicators (sales and employees evolution, second cluster in terms of capacity utilization). It also scores better than average on foreign ownership.

Table 7.1.3. Clusters performances : international differentiation, capacity utilization and sales and employees number's evolution

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE F	AVERAGE C	AVERAGE D
% of national sales	90.2	93	94.1	96.1	96.3	97.1
% of indirect exports	3.9	3	2.6	2.3	1.4	1.6
% of direct exports	5.9	4	3.3	1.5	2.3	1.3
Capacity utilizat.(%)	86	83	84	78	79	77
sales evolution in 3 y. : % of MSMEs that experienced an increase	66%	61%	68%	47%	42%	40%
Employees evolution in 3 y. : % of MSMEs that experienced an increase	67%	63%	75%	58%	54%	57%
Average score on other obstacles	0.4	1.3	1.3	1.8	2.5	2.7

(d) Obstacle score and availability of internal resources

There is a clear relation between aggregated scores and the availability of internal funds (Table 7.1.4). Companies from the most affected cluster rely more heavily on borrowing from banks to finance their working capital, as they may generate relatively less internal funds. Those companies rely more on private commercial banks to finance their working capital and new investments, whereas companies from the least affected cluster turn more to state-owned banks. This is explained by the fact the Chinese banking sector is still massively dominated by the central authority, and Chinese firms are located in the less affected clusters. The fact the private banking sector in Brazil is reaching smaller companies may suggest that it is more efficient than the state-owned Chinese system in addressing the financial needs and specificities of MSMEs.

Table 7.1.4. Clusters' financing profiles, CA1

% of working capital financed by :	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE F	AVERAGE C	AVERAGE D
Internal funds/ Retained Earnings	91	77	73	56	51	41
Borrowed from banks	5	11	14	22	22	27
Borrowed from NBFI	1	1	1	3	3	5
Credit on suppliers/ advances from customers	3	10	11	16	21	23
Others (moneylenders, friends, relatives…)	1	1	1	3	2	4
Line of credit from financial institution	23%	45%	46%	56%	64%	63%
type of institution that financed this loan (majority)	16% SOB	20% SOB	26% SOB	31% PCB	36% PCB	38% PCB

(e) Obstacle scores and credit constraint

There is a paradox in obstacle scores registered on access to finance and firms that are actually credit constrained within clusters. The least affected cluster does not show the lowest proportion of credit constrained firms: actually, only 23% of firms from cluster E had a credit line in a financial institution and 32% of the companies did not apply for a credit line although they were in need of financing (Table 7.1.5), which is more than for the most affected cluster (24%). Since 207 out of the 234 Cluster E companies that are credit constrained are Chinese, it adds weight to the assumption that Chinese firms are underestimating the obstacles they face regarding access to finance. Most of them do not feel that there is a real challenge to find formal sources of financing because they have sufficient funds to provide for their expenses, but it does not mean than the Chinese financial system is efficient. In fact, they may be pushed to self-sufficiency by the very deficiency of the financial system.

The lowest share of credit constrained firms is found in cluster A (13%). Since the cluster annual sales are not higher than average, we may assume than firms that score very low on access to finance and quite high on tax rates are actually getting easier access to financing than other firms.

Cluster B, scoring moderate on both obstacles and proportionately distributed between China and Brazil, shows the highest share of credit constrained firms. Since it is also the top performing cluster, it seems to invalidate the assumption that credit constraint is a major obstacle to firm growth.

Table 7.1.5. Credit constrained firms' distribution across clusters, CA1

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE F	AVERAGE C	AVERAGE D
% of companies that applied to new loans or line of credit in 2007 (B) or 2011 (C)?	19%	29%	35%	48%	52%	55%
% credit-constrained firms	32%	9%	36%	30%	18%	24%

(f) *Conclusions*

There is a clear correlation between clusters' aggregated average scores on obstacles and the average size of companies within clusters : the bigger the company, the less likely the aggregated score is going to be high (Chart 7. 1.2). Nevertheless, as discussed previously, this correlation is mostly caused by the country bias. Looking at over performing (Cluster B) and underperforming clusters (E; C), we cannot conclude that access to finance is more a growth constraint than tax rates, even considering that correlation is not causation.

Chart 7.1.2 Average sales within cluster in function of aggregated cluster score on obstacles, CA1
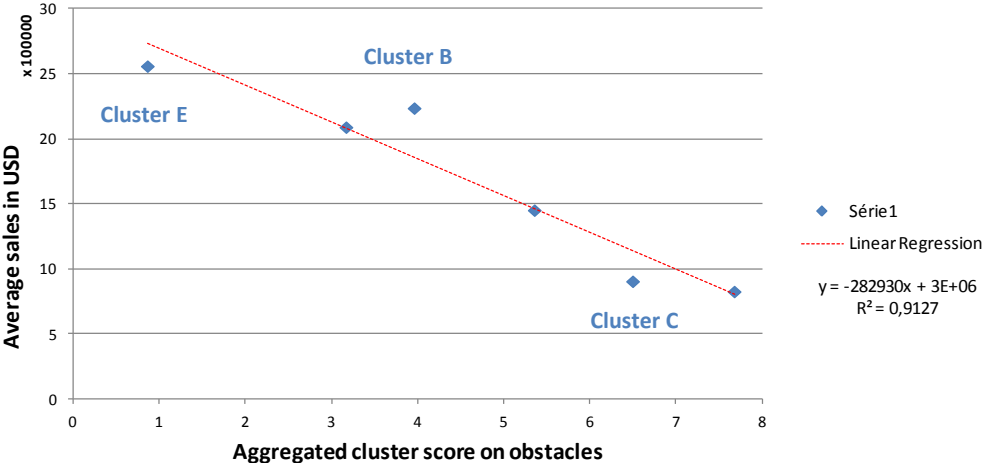
There is also a clear negative correlation between capacity utilization and the aggregated impact of those same obstacles, which seems to suggest that tax rates and access to finance combined have a negative impact on firm performances. (Chart 7.1.3). The fact that cluster B, which is more affected by tax rates than access to finance, is over performing and that cluster F, being more vulnerable to access to finance, underperforms compared to what could have been predicted from the regression results, suggests that the lack of access to finance may prevent firms from using their full production potential.

Chart 7.1.3. Cluster's average capacity utilization in function of aggregated cluster score on obstacles, CA1
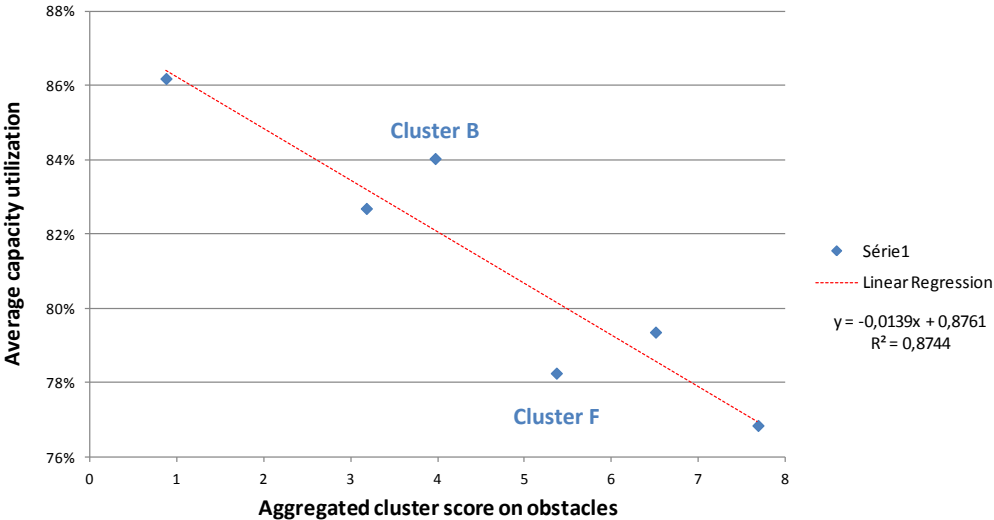
There is no apparent relation between the score on access to finance and the share of credit constrained firms within clusters for Chinese firms, although this relation is observed for Brazilian firms. It implies that Chinese firms either underestimate the financing obstacle or have adapted to it and are less affected by it.

The obstacle on access to finance does not affect performance and sales growth on its own, it is more the aggregated score that has to be taken into account, suggesting than performances are closely related to the firms sales.

7.   2. Cluster Analysis 2 (CA2): Informal competition vs. corruption

In pairing informal competition and corruption in the second cluster analysis, we have two objectives: first, given than almost no Chinese companies reported corruption as a significant obstacle, we want to observe if their perceptions on this obstacle match with the absence of actual occurrences of corruption

(bribery during tax inspection, informal payment to get a construction permit, gifts to get connected to any infrastructure). Secondly, since corruption seems to be only impacting Brazilian firms, we want to identify the importance of Brazil's country bias: does only small firms located in poor Northern states report high obstacles related to growth, or is it generalized to any type of Brazilian companies?

Chart 7.2.1. Clustering 2: Practices of competitors in the informal market vs. Corruption[43]
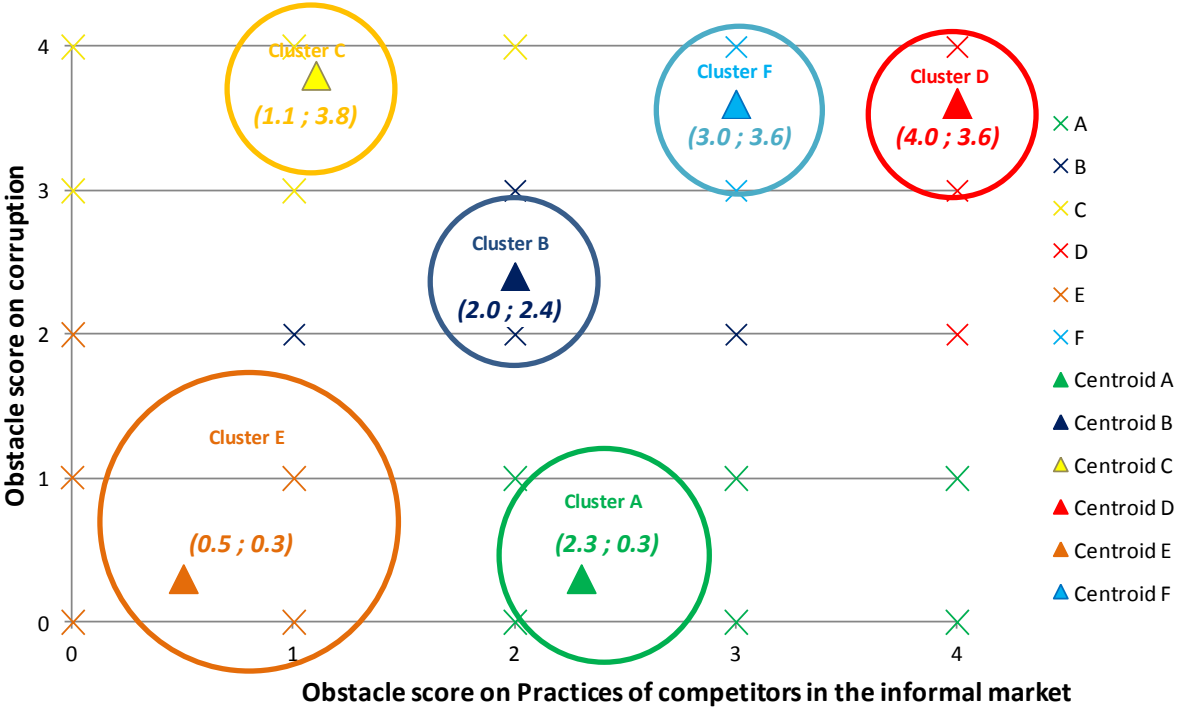
In this analysis, Cluster A represents firms that show low sensitivity to corruption but relatively high sensitivity to practices of competitors in the informal market. Cluster C is relatively weakly affected by practices of competitors in the informal market but shows the highest average scores on corruption, it will be Cluster A's symmetric: we expect this cluster to be predominantly composed of Brazilian companies. Cluster B shows non discriminating firms, scoring moderate on both obstacles. Cluster D is the most affected cluster, scoring maximum obstacle on informal competition and a very high obstacle on corruption, whereas Cluster E is the least affected cluster. Those two clusters will help us identify apparent relations between the clusters' aggregated scores on obstacles and different variables (including firms own characteristics and country variables). Cluster F is affected by both obstacles with a predominance of the corruption obstacle.

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[43] *On this chart, clusters centroids represent the average score of the clusters on both obstacles. The different intersections represent possible combinations of scores inside a cluster.*

(a) Country bias

In CA2, even more Chinese companies are located in the least affected cluster (75% of them). This cluster accounts for 48% of the whole sample, with 92% of cluster E companies being Chinese (Table 7.2.1). Economic inequalities inside countries also seem to affect the results: in the least affected cluster, 80% of the Brazilian firms are from the richest states (SP, RJ, DF, SC, RG, MG, PA) and only 8% from the poorest states (Bahia, Ceára, Pernambuco, Maranhão, Paraíba).

Table 7.2.1. Country distribution and aggregated scores on obstacles, CA2

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE F	AVERAGE D
Brazil	143	162	237	418	238	333
China	1600	445	64	14	2	2
Aggregated score	**0.8**	**2.6**	**4.3**	**4.9**	**6.6**	**7.6**

(b) The size bias

The least affected cluster has average sales four times higher than the most affected cluster (Table 7.2.2). Micro companies are predominantly found in most affected clusters (cluster D and F). Once we eliminate the country bias, the relation between enterprise size and aggregated score is still important. In Brazil, for instance, companies from the least affected cluster have average sales twice the value of companies from the most affected cluster. The same pattern is observed in China.

Table 7.2.2. Average annual sales per cluster, CA2

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE F	AVERAGE D
Average annual sales in $ (x1000)	2,729	2,169	1,158	907	742	682

(c) Competition intensity and vulnerability to informal competitors

Comparing cluster A (more sensitive to informal competition), cluster B (medium scores on both obstacles) and cluster C (more sensitive to corruption), we can observe than the number of competitors seem to influence the score on informal competition: the more the competitors, the more likely a cluster is expected to score high on informal competition (A.7.2.1). However, this relation is not observed in the least affected cluster, where competition intensity is high while scores on informal competition are low.

(d) *Score on corruption and occurrences of informal payments*

In general, top performing clusters seem to be less prone to informal payments than clusters with high aggregated scores (Table 7.2.3). For instance, Cluster E firms seem clearly better-off than average: only 2.4% of the companies that applied for electrical connection had to pay a bribe, compared to 15.6% for companies from the most affected cluster. Regarding government officials' corruption, only 0.3% of cluster E firms admitted paying informal gifts or bribes during tax inspection, compared to 16.3% for Cluster D companies, but these figures have to been taken carefully given that Cluster E is predominantly composed of Chinese companies which are reluctant to admit to paying bribes. Still, no cluster is free from occurrences of bribery: for instance, 12% of the least affected companies say an informal payment is needed to secure a construction permit.

Table 7.2.3. Occurrences of bribery per cluster, CA2

% of companies that admitted paying for : (% of those who applied)	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE F	AVERAGE D
Electrical connection	2.4%	6.5%	11.1%	8.1%	14.3%	15.6%
Water connection	4.3%	7.1%	14.3%	6.7%	5.6%	6.3%
Phone connection	1.5%	4.9%	4.0%	3.9%	3.2%	4.1%
Construction permit (% of those who applied)	11.9%	14.1%	17.8%	11.8%	15.6%	14.3%
Tax inspections (% of those who were inspected)	0.3%	1.2%	6.0%	13.1%	18.0%	16.3%
Import license	4.3%	8.7%	11.6%	1.8%	3.8%	5.0%
Operating license	7.3%	10.9%	12.0%	2.0%	6.9%	18.3%

(e) *Obstacle score and performance*

Regarding international diversification, 5% of companies within the least affected cluster mainly sell on international markets, and only 13% are predominantly selling locally. The opposite repartition can be found for the most affected cluster, where 28% of companies sell mainly locally and 1% mainly internationally. International diversification, as shown in Table 7.2.4, is directly linked to aggregated scores on both obstacles, which seems to point out that those obstacles are mainly affecting local operating companies. The least affected cluster also seems to have performed better than any other cluster in the past years in terms of sales and employees increase and capacity utilization. Interestingly, the least performing cluster in terms of sales and number of employees increase is not the most affected cluster, but Cluster F. Since this cluster has an average score for all the other obstacles lower than Cluster D, we may only suspect that its higher score on corruption explains its bad performances.

Table 7.2.4. Clusters' aggregated scores and performances, CA2

	AVERAGE E	**AVERAGE A**	**AVERAGE B**	**AVERAGE C**	**AVERAGE F**	**AVERAGE D**
Aggregated score	**0.8**	**2.6**	**4.3**	**4.9**	**6.6**	**7.6**
sales evolution in 3 years : % Increased	68.4	66.7	52.2	42.6	38.8	40.0
employees evolution 3 years : % Increased	70.6	65.9	57.1	57.9	54.2	56.4
% of National sales	90.6	92.6	96.0	95.8	97.6	98.0
capacity utilization (%)	87.0	80.2	79.4	80.5	79.0	76.3
Average score on other obstacles	0.5	0.9	2.0	2.4	2.6	2.7

(f) *Conclusions*

There is a clear size-obstacle correlation in this cluster (Chart 7.2.2). Moreover, this correlation is negative and exponential, meaning that the potential positive effect of getting bigger in size is more important for micro and small companies than for medium-sized companies.

Chart 7.2.2. Average annual sales within cluster in function of aggregated scores on corruption and informal competition, CA2
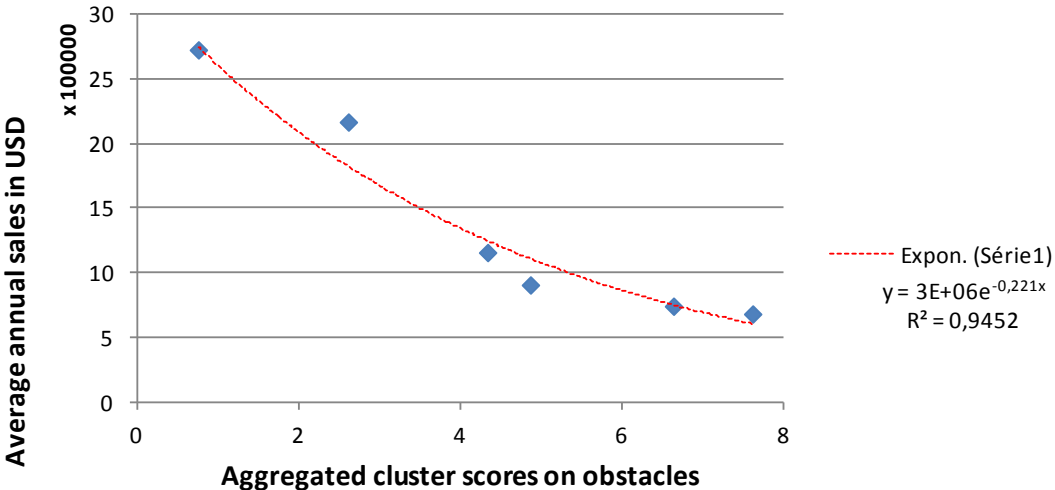
There is not a strong apparent relation between scores on only corruption and the way respondents assess their judicial system (A.7.2.2), but there is a strong correlation with aggregated scores: it suggests that the most affected companies may be located in regions when law enforcement is not efficient.

Clusters that score the highest on corruption also report more informal gifts to secure contract, to get access to infrastructure or during tax inspections than less affected clusters. Nevertheless, perceptions on corruption are not linked with the proportion of companies that admitted to paying bribes for infrastructure connection or to secure permits and contracts. We find it quite understandable given that corruption is always taboo and respondents may not give objective answers.

Another anomaly lies in the fact that there is no apparent relation between the number of competitors in the main market and perceived obstacles on practices of competitors in the informal market. Quite on the opposite, the least affected cluster reports the highest number of competitors on the main market.

When looking at performances (Chart 7.2.3), it is important to notice than clusters performing under the average (Clusters C and Cluster F) are the ones showing the highest scores on corruption (3.75 and 3.64 respectively), while the cluster that outperforms the others on sales increase (Cluster A) shows the lowest score on corruption (0.27). The same variations are observed for the evolution in the number of employees. It can be evidence that corruption is a more essential factor explaining sales increase than informal competition, although causality has to be tested.

Chart 7.2.3. Cluster's performance in terms of sales increase in function of aggregated scores on corruption and informal competition, CA2

The chart shows:
- y-axis: Ave% of companies that experienced increasing sales in a 3 year time (20% to 80%)
- x-axis: aggregated cluster score on obstacles (0 to 8)
- Labels: Cluster A, Cluster C, Cluster F
- Legend: Expon. (Série1)
- $y = 0{,}7631e^{-0{,}094x}$
- $R^2 = 0{,}882$
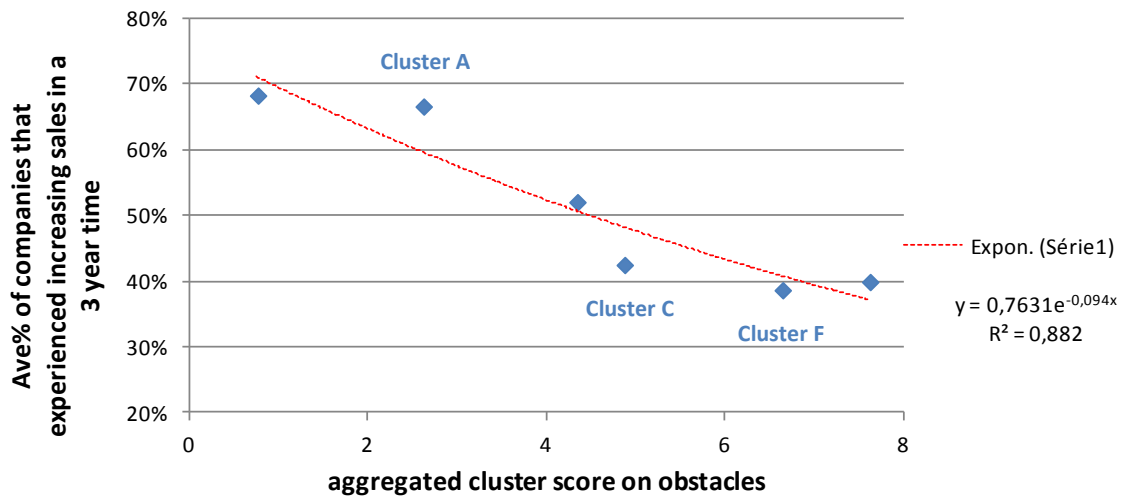
7.   3. Cluster Analysis 3: Inadequately educated workforce vs. transports

The purpose of this cluster analysis is to identify China's country bias, as well as to objectify the size bias, since transports are mostly affecting large companies and inadequately educated workforce the smaller ones. In CA3, we included obstacles related to transports, which are generally low for Brazilian companies. As a result, average aggregated scores are lower than for other cluster analyses (CA1 and CA2). It also implies that cluster F* does not represent the same reality as in the other two cluster analyses, as it scores significantly lower on both obstacles.

Cluster A shows a great sensitivity to the human capital obstacle while being immune to the transport obstacle. This cluster may have lower than average size, and may be selling mainly locally. Cluster B shows medium scores for both obstacles, although it scores a bit higher on the transport obstacle than for inadequately educated workforce. Cluster C shows a medium score on the obstacle related to transport but is very affected by the inadequately educated workforce, we expect this cluster to be mainly composed of Brazilian firms. Cluster D is the most affected cluster, scoring high on both obstacles whereas Cluster E is the least affected cluster, scoring low on both obstacles. Finally, cluster F* scores medium on inadequately educated workforce and low on transports.

Chart 7.3.1. Clustering 3: Inadequately educated workforce vs. Transports
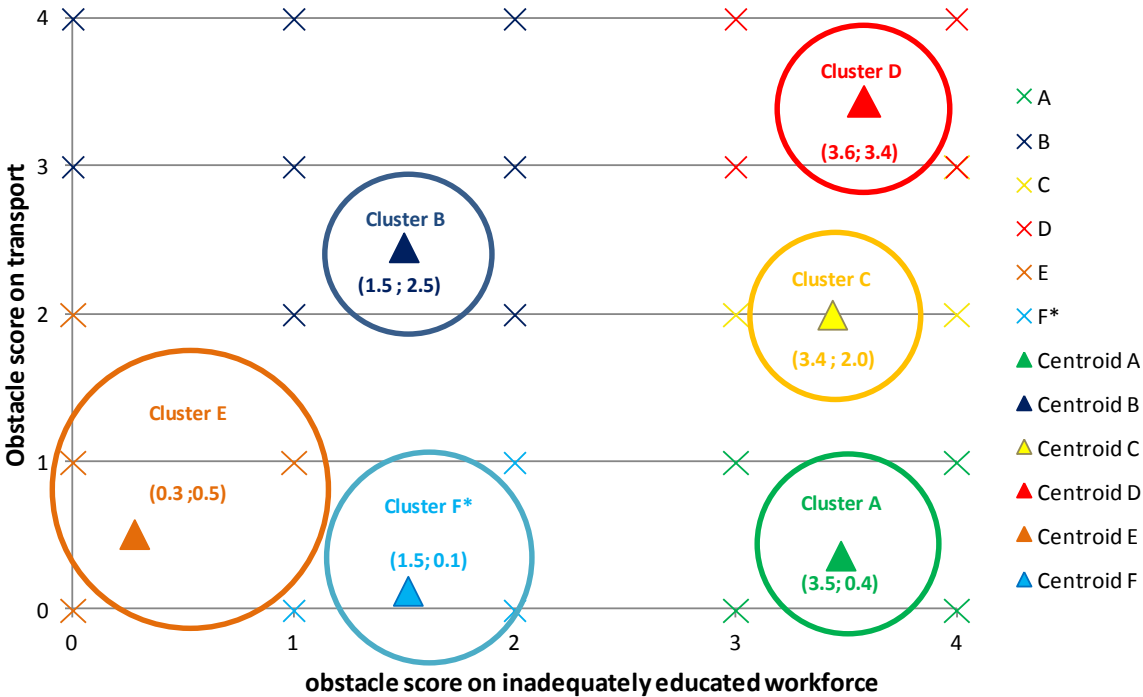
(a) The country bias

Even though transport is often reported as the biggest obstacles to business operations in China, most of Chinese firms are located in the least affected cluster (1330, a lower share than in CA1 and CA2). In Brazil, where transports are not reported as the most pressing issue, only 81 firms are located in the least affected cluster (Table 7.3.1). It means that either Brazilians have to face so many obstacles that transport, without being the biggest, is still a major issue; or that Chinese people do not rate the transport obstacle according to the actual constraint they face. Countries internal inequalities between regions also affect the distribution between the most affected and the least affected cluster: 65 out of the 81 Brazilian companies contained in the least affected cluster are from the rich South-South-Eastern Region, and only 7 firms from the poorest Brazilian states are included in this cluster.

Table 7.3.1. Country distribution per cluster, CA3

	AVERAGE E	AVERAGE F*	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE D
Brazil	81	151	475	174	299	345
China	1330	648	46	129	9	5
Aggregated scores	0.8	1.6	3.8	4.0	5.4	7.0

(b) A strong size bias

For this analysis again, average sales is a very strong explanatory factor. The least affected cluster (E) shows the higher share of medium companies and the smallest share of micro firms. It has the highest average annual sales, almost 3 times the average of cluster D (Table 7.3.2). Cluster A is rather peculiar, because while it shows a low score on aggregated obstacles, and lower scores on both obstacles than the most affected cluster, it contains the smallest companies on average: average annual sales in this cluster are USD 898,000 which is 4% less than in the most affected cluster, and the average number of employees is 38 compared to 47 for the most affected cluster. Cluster A is also composed of 11% of micro-firms, compared to 8% in Cluster D. As cluster A scores the second lowest on transports (0.4), and the second highest on inadequately educated workforce, we may hypothesize that there is a positive relation between size and access to skilled workers, and a negative relation between size and the impact of bad transport infrastructures on business operations.

Table 7.3.2. Average annual sales and obstacle scores

	AVERAGE E	AVERAGE F*	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE D
Average annual sales in USD (x1000)	2,661	2,445	897	1,926	1,092	934
Obstacle score on Inadequately educated workforce	0.3	1.5	3.5	1.5	3.4	3.6
Obstacle score on Transports	0.5	0.1	0.4	2.5	2.0	3.4
Aggregated scores	0.8	1.6	3.8	4.0	5.4	7.0

(c) Labor characteristics and obstacle on inadequately educated workforce

The clusters that perform well on access to educated workforce have generally a higher number of employees, and at the same time the annual labor cost represents a lower share of their sales (Table 7.3.3) Thus they are bigger, less labor intensive companies than in the more affected clusters. Surprisingly, the top scoring clusters on this obstacle (B, E, F) have a lower share of skilled production workers in their employees. Those clusters also have the highest share of production workers trained: for instance, 81% of cluster E companies provide training for their full time employees, compared to only 36% in the most affected cluster. It suggests that companies that are not affected by the poor quality of available human capital do not necessarily evolve in an environment with adequately skilled workers but rather are big enough, and have a low enough demand, to provide training to their employees in order to get the right skills at the right occupation.

When looking at educational attainment, Cluster E companies have an average of 9.6% university graduates in their workforce, compared to only 6.5% for Cluster A. This proportion seems closely related to average annual sales, meaning that the bigger a company gets, the more attractive to graduates it becomes.

Table 7.3.3. Labor characteristics and scores on inadequately educated workforce

	AVERAGE E	AVERAGE B	AVERAGE F*	AVERAGE C	AVERAGE A	AVERAGE D
Inadequately educated worforce	0.3	1.50	1.52	3.4	3.5	3.6
Production workers	58.0	52.8	32.0	45.8	34.3	37.4
Non production workers	16.8	16.5	9.4	13.5	11.3	11.2
% skilled production workers	45%	47%	66%	48%	62%	61%
% of labor force with university degree	9.6	9.1	6.5	7.9	7.2	7.6
% FTE employees trained	81%	74%	36%	51%	41%	36%
% of labor cost on annual sales	14%	16%	29%	19%	35%	34%

(d) Obstacle scores and performances

In CA3, performances are not directly linked to aggregated scores. Performances seem to be more negatively related with scores on inadequately educated workforce (Table 7.3.4). For instance, Cluster A significantly underperforms in terms of capacity utilization, international diversification, sales and employee number evolution compared to what could have been predicted from its aggregated score. Cluster A is scoring very low on transports because it is composed mostly of small companies operating locally, and it is scoring very high on inadequately educated workforce.

Table 7.3.4 Scores on inadequately educated workforce and average cluster performances

	AVERAGE E	AVERAGE B	AVERAGE F*	AVERAGE C	AVERAGE A	AVERAGE D
Inadequately educated worforce	**0.3**	**1.50**	**1.52**	**3.4**	**3.5**	**3.6**
Capacity utilization	85.5	80.8	84.8	79.0	79.8	78.8
Sales evolution in 3 years	67%	61%	70%	42%	43%	42%
Employees evolution in 3 years	66%	67%	70%	65%	55%	55%
% of exports	9.9	7.9	7.0	3.1	3.9	2.5

The interesting fact is that that Cluster B, scoring moderate on both obstacles, exceeds the expectations in terms of sales and employees number evolution, outperforming the least affected cluster in terms of workforce growth. This pattern, combined with results on Cluster A, supports the assumption that companies affected by bad transport infrastructure are less growth constrained than companies affected by a poor quality available workforce.

(a) Conclusions

In this cluster analysis, aggregated scores on obstacles are less correlated with average firm sizes, especially average annual sales. If we look at Chart 7.3.2, clusters whose annual sales are below the prediction (Cluster A and Cluster C) both score high on inadequately educated workforce; while clusters whose annual sales are above average (Cluster B and Cluster D) both score high on transports. It suggests that inadequately educated workforce is a more significant growth constraint to firms than transports, or that bad transports affect already developed enterprises.
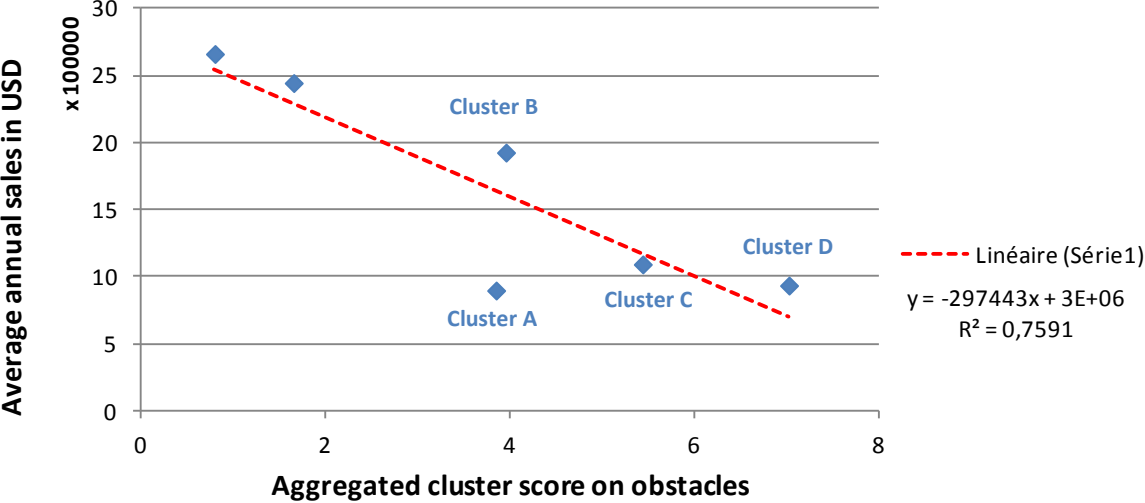
High scores on inadequately educated workforce are correlated with lower proportion of firms experiencing sales and number of employees increase. It is also correlated with lower proportions of firms providing full time employees with training, which suggest that the most affected firms by the poor quality of human capital available are the ones unable or not big enough to invest in human capital. Companies suffering the least from this obstacle are not necessarily evolving in a better environment, but are resourceful enough to prevent their firms from suffering from a low quality workforce.

7. 4. Homogeneity and heterogeneity of clusters

In analyzing the homogeneity and heterogeneity between clusters in the three cluster analyses, we aim to find if the same firms are invariably located in the most affected clusters and the least affected clusters, or if depending on the obstacles, the firms affected are different.

Table 7.4.1. Firms duplicates contained in the least affected cluster

Clusters compared	CA1/CA2	CA1/CA3	CA2/CA3
Number of companies common to the two clusters	2294	1886	2026
Percentage of similar companies included in the least affected cluster	72%	66%	64%

Chart 7.4.1 Firms duplicates contained in the least affected cluster
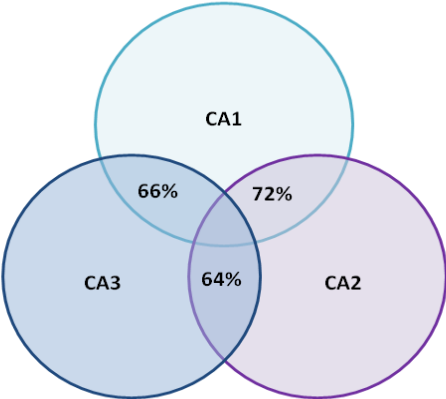
When comparing the least affected clusters in the three cluster analyses, we observe that the proportion of duplicates contained in these cluster is very high (about 2/3). It suggests that companies in the least affected cluster are very likely to score the lowest on other obstacles. These firms are mainly Chinese, and show higher levels of average sales and a bigger average payroll.

Table 7.4.2.. Firms duplicates contained in the most affected cluster

Clusters compared	CA1/CA2	CA1/CA3	CA2/ CA3
Number of companies common to the two clusters	232	210	240
Percentage of similar companies included in the most affected cluster	35%	31%	35%

Chart 7.4.2 Firms duplicates contained in the most affected cluster
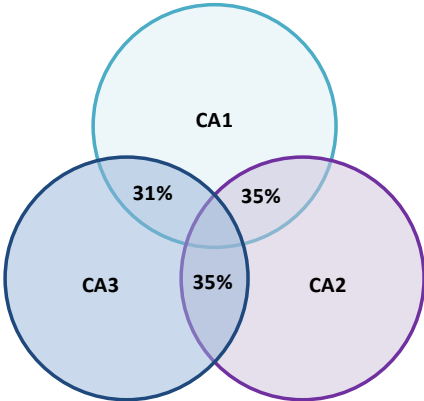
In the most affected cluster, the duplicate proportion is half the one of the least affected cluster. Companies that are very affected by a set of obstacles are very likely to score differently on other obstacles. Since Brazilian companies are overrepresented in the most affected cluster and Chinese companies in the least affected cluster, we might suppose that Brazilian companies follow a more

heterogeneous pattern concerning obstacles while Chinese companies follow a more binary pattern. Indeed, in CA2 and CA3, more than 9 out 10 Chinese companies were either located in the least affected cluster or in the second least affected.

Regional location seems to be a more significant determinant of companies' scores in Brazil than in China: indeed, the share of Brazilian companies from the low income states is higher in the most affected cluster than in the whole sample (A.7.4).

We have seen that Brazilian companies spread along the entire range of possible scores, and have differentiated answers according to the obstacle assessed; contrary to Chinese companies that mostly answer that they are not affected or that the obstacle assessed is a minor constraint to their operations. It confirms the assumption that Chinese respondents use self-censorship when assessing the main obstacles to their operations.

8. DISCUSSION AND CONCLUSION

8. 1. Limitations to representativeness

The WBES is a valuable tool for it allows comparison on large samples thanks to a standardized methodology. Nevertheless, representativeness issues still remain.

First, in order to get reliable and quantitative data, the WBES only includes firms that have registered formally. When in Brazil and in China, the informal sector is quite large, excluding it represents a significant limitation to the samples' representativeness. In order to produce a more faithful picture of the countries' business environment, the WBES would benefit from gathering additional information on informal firms and to assess the challenges those types of organizations are coping with.

Secondly, the WBES does not include companies operating in the agricultural sector, and considerably under-represents the service industries (especially for the Brazilian sample). It makes sense given the questions that are asked, which are mainly targeting manufacturing activities. However, doing so, the WBES is neglecting two crucial sectors to the Chinese and the Brazilian economies. The service industry accounted for 68.1% of Brazil's GDP in 2013, and 46.1% of Chinese GDP in 2012. According to the OECD (2011), agriculture in Brazil still employed 19.3% of the labor force in 2009, and contributed to 5.5% of the country's GDP. Between 2010 and 2013, the share of the agriculture sector in the Chinese GDP remains stable at 10%[44]

Finally, even though both samples cover a large range of firms, they are still rather limited in scope compared to the total number of companies. Even if we only consider registered SMEs (according to the respective national definitions), our analysis only examines 0.095% of Chinese SMEs and 0.027% of Brazilian SMEs.[45] This limitation is also observed in the territorial distribution of firms: in Brazil, 12 out of 27 states were not included in the analysis. In China, it is even worse, with 22 out of 34 provinces (2/3 of the total) excluded from the sample.

8. 2. The issue of answers' reliability

Even if the WBES has been designed to avoid reliability biases, counterchecking for respondent contradictions or paradoxes between answers, the questionnaire is still affected by this problem given that it is based on subjective perceptions of obstacles rather than objective observations. This

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[44] World Bank National Account Data : http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS
[45] Estimates calculated with the official accounts on SME registration : 5.8 million in Brazil (2008) and 2.3 million in China in 2009.

subjectivity is very interesting to study in order to analyze the gap between perceptions and the actual situation business owners are facing in their respective countries, but it can lead to significant country biases. Here we have provided evidence that Chinese respondents were not assessing obstacles on the same scale as Brazilian respondents. They almost systematically under-estimated obstacles that they were facing in their daily operations, resulting in very low scores on every obstacle tested. In this case, these low scores are not sufficient evidence that they are operating in a business-friendly environment. Reliability becomes an acute issue for both countries when investigating corruption and informal practices: almost no respondent admitted giving informal gifts or paying to facilitate their operations, and even fewer provided figures to estimate the amount of these payments. To further test answers' reliability, it would be interesting to compare the WBES with other questionnaires. Using a questionnaire referring to the same topics but asking the questions differently, we would be able to track variations in respondents' answers and eliminate part of the problem.

8.   3. Methodological limitations

As discussed before, the current standardized version of the WBES was conceived a few years ago, so not enough time has passed to allow us to exploit time series. Because of this, we lack the sufficient hindsight to gain a more objective view of the countries' situation. Since data is only collected on a yearly basis, it simply takes one year of globally poor economic performances to get a grim perspective on a country. Moreover, since a three-year period elapsed between the two data collection phases (2008-2009 for Brazil and 2011 for China), it created a significant temporal bias. As we observed in the samples' analysis, Brazilian firms reported significantly lower performances than Chinese firms. Additionally, in this analysis, Brazil seems to lag behind in terms of infrastructure and institutional development. But given the temporal bias, a fair amount of these differences in performances and level of economic development can be explained by the countries' evolution between 2008-2009 and 2011. Indeed, during the three years separating the two surveys, the Brazilian GDP has significantly increased, and the global economic crisis has struck most countries provoking a wave of bankruptcies.

Another methodological issue stems from sample segmentation. First, as discussed before, there are many different thresholds for SMEs, and we had to adopt one clear common definition. In doing so, this work introduced a segmentation bias. For instance, the threshold for micro-firms was relatively low, resulting in a limited sample to analyze (only 114 companies). Having set the thresholds differently, we might have come up with significant differences in the results. We also voluntarily chose to focus on a set of 6 obstacles, neglecting the others: analyzing them could possibly have led to

different conclusions. In the cluster analysis, we limited the segmentation to 6 clusters in order to the calculations to be manageable. Using more sophisticated software, we could have developed a more precise segmentation in order to reach detailed conclusions.

One major methodological limitation was the practical impossibility of using more sophisticated econometric techniques. This research aims to serve as a basis for further investigations.

Notwithstanding these limitations, the country comparison and cluster analysis allow us to draw important final conclusions, which will enable us to anticipate the main obstacles face by a company taking into account its own characteristics and the environment where it is operating.

8.   4. The obstacles most often perceived are the same in the two countries

One main finding of this research is that regardless of the country, the 4 obstacles most often cited as "biggest obstacles to firms' operations" are: (a) tax rates, (b) access to finance, (c) practices of competitors in the informal market and (d) inadequately educated workforce. They are also the obstacles for which both Brazilian and Chinese firms score the highest on average. The only variation observed between China and Brazil is the obstacles' intensity and order of importance. These similarities allow us to assume that there may be a defining pattern regarding obstacles to business in emerging countries. Implied in the expression "emerging economies" is that institutions have yet to develop to be efficient. In situations with institutional deficiencies, firms in emerging countries are confronted, more than elsewhere, with informal competitors and the lack of financing and human capital.

8.   5. There is a strong country explanatory variable

Brazilian firms report significantly higher hurdles than China and are generally more affected by them, in terms of lower performances (higher share of companies experiencing sales decrease, lower capacity utilization). Part of this result is explained by the lower quality of infrastructure and higher levels of bureaucracy in Brazil (Table 6.8.1). We observe similar patterns in China and Brazil regarding tax rates, transport, informal competition and corruption: those obstacles affect the same type of firms in each country. Other obstacles do not affect the same types of firms in Brazil and in China: for instance, Brazilian firms which have easier access to finance tend to have higher annual average sales whereas in China this relation is not so evident. Similarly, the lack of adequately educated workforce strikes poor states predominantly in Brazil whereas it is more perceived in rich states in China, indicating that not only firm characteristics have to be considered, but also country characteristics when trying to explain growth constraints. We observe regional differences for both

countries, but they seem to be greater determinants of obstacle scores in China. Regional location seems to play a role in the level of informality, access to finance and corruption: for those three obstacles, the North-East in Brazil (and Amazonas) reported significantly higher obstacles.

Firms in Brazil tend to follow more heterogeneous patterns compared to firms in China, who have quite a binary behavior, which may indicate that several factors have an impact on the way Brazilian firms perceive obstacles.

Looking at cluster analyses, Brazilian firms are distributed almost evenly in every cluster, whereas Chinese firms are located predominantly in 2 or 3 clusters. Two thirds of Chinese companies report not being affected at all by a given obstacle, while the rest scores moderate to high on only one of them.

8.   6. Chinese respondents underestimate the obstacles they face

Comparing Chinese respondents' results on perceived obstacles and the actual challenges Chinese business are facing (share of credit constrained firms, share of firms that bribe public officers), we reach the conclusion that Chinese business owners considerably underestimate the obstacles to their operations. Whether this is intentional or not, it has an impact on the comparison's consistency between Brazil and China, which we tried to address in the analysis. For instance, evidence has been found that a lot of Chinese respondents that did not perceive any obstacle on access to finance were actually credit constrained. The reason for this underestimation may be that Chinese firms are less impacted than Brazilian firms by the same obstacle intensity, as a higher share of Chinese companies register satisfactory performances.

8.   7. There is a clear size-obstacle relation, which does not follow the same trend for every obstacle

The separate results on Brazil and China, as well as the three cluster analyses, were indicative of a strong relation between enterprises' size and the way they perceived obstacles to their business. In most cases, size shields firms from obstacles: it is especially true when it comes to informal competition, corruption or access to finance. This advantage given to bigger companies can explain a significant share of the score gap between Chinese and Brazilian companies, since Chinese companies are more than twice bigger in terms of average annual sales. Nevertheless, in some cases, enterprise size has the opposite effect: firms that are growing are experiencing a greater tax burden and are more dependent on transport infrastructure to deliver their products to distant markets. Micro-firms may sometimes be better-off than slightly larger counterparts (A.6.1.1 & A.6.1.4), since their interactions

with the business environment are more limited. For instance, micro-firms are often acting on a local level so they do not necessarily require good transport infrastructure. Micro-firms' owners do not engage often in big investment decisions, so their need for external financing is minimal.

8.   8. Bigger companies counteract the deficiencies of their business environment

One interesting finding is that bigger companies do not necessarily operate in better business environments than smaller companies, but are actually big enough to offset their environment deficiencies by investing on their own private solutions. For instance, they invest in training to cope with the lack of available skilled workforce, or they use their own resources instead of external financing to face the poor quality of their banking system. Those companies will perceive lower obstacles even though the investments and funding practices they are engaging in could have been carried out differently in a more efficient setting.

8.   9. Corruption and an inadequately educated workforce have a negative impact on firms' performance

Firms most affected by corruption and a poor level of human capital available were performing significantly worse than average on sales growth, number of employees increase and capacity utilization. Contrary to what was expected, we could not find any relation between lower access to finance and worse performance. It may be explained by the fact that Chinese respondents understated this obstacle, distorting the results.

8.   10. Portrait of typical firms affected by each obstacle

Obstacles related to transport, informal competition and corruption are respectively affecting the same categories of firms in Brazil and in China. Bad transportation seems to have a more negative impact on large exporting SMEs, while informal competition and corruption represent a bigger constraint to the operations of micro and small enterprises. Tax rates appear to be a bigger burden for large firms, but they are predominantly affecting local players in China as opposed to exporting SMEs in Brazil. On the other hand, an inadequately educated workforce constitutes a bigger impediment to micro and small firms. This obstacle is predominant in low income states in Brazil whereas it mostly affects middle and high income provinces in China. Finally, Chinese small and medium firms are the most vulnerable to access to finance, while in Brazil, it is the micro enterprises that suffer most from this obstacle.

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LIST OF APPENDICES

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Appendix 6.1 1.Obstacles faced by Microfirms in Brazil

Transports
- Does not apply
- Major obstacle — 12%
- Minor Obstacle — 14%
- Moderate obstacle — 23%
- No Obstacle — 40%
- Very Severe Obstacle — 9%, 2%

Custom & trade regulations
- Does not apply — 16%
- Don't know — 1%
- Major obstacle — 8%
- Minor Obstacle — 3%
- Moderate obstacle — 18%
- No Obstacle — 46%
- Very Severe Obstacle — 8%

Electricity
- Don't know — 1%
- Major obstacle — 13%
- Minor Obstacle — 7%
- Moderate obstacle — 15%
- No Obstacle — 28%
- Very Severe Obstacle — 36%

Telecommunications
- Don't know
- Major obstacle — 2%
- Minor Obstacle — 1%
- Moderate obstacle — 2%
- No Obstacle — 4%
- Very Severe Obstacle — 9%, 81%

Access to land
- Does not apply — 2%
- Major obstacle — 18%
- Minor Obstacle — 11%
- Moderate obstacle — 16%
- No Obstacle — 39%
- Very Severe Obstacle — 14%

Tax rates
- Major obstacle — 34%
- Minor Obstacle — 1%
- Moderate obstacle — 22%
- No Obstacle — 4%
- Very Severe Obstacle — 39%

Tax administration
- Major obstacle — 29%
- Minor Obstacle — 3%
- Moderate obstacle — 25%
- No Obstacle — 8%
- Very Severe Obstacle — 35%

Crime, theft and disorder
- Major obstacle — 27%
- Minor Obstacle — 6%
- Moderate obstacle — 17%
- No Obstacle — 12%
- Very Severe Obstacle — 38%

Business licensing permits
- c — 1%
- Major obstacle — 26%
- Minor Obstacle — 10%
- Moderate obstacle — 24%
- No Obstacle — 22%
- Very Severe Obstacle — 17%

Polical instability
- Does not apply — 2%
- Don't know — 1%
- Major obstacle — 24%
- Minor Obstacle — 6%
- Moderate obstacle — 21%
- No Obstacle — 20%
- Very Severe Obstacle — 26%

Corruption
- Major obstacle — 25%
- Minor Obstacle — 3%
- Moderate obstacle — 14%
- No Obstacle — 13%
- Very Severe Obstacle — 45%

Courts
- Does not apply — 1%
- Don't know — 1%
- Major obstacle — 22%
- Minor Obstacle — 12%
- Moderate obstacle — 22%
- No Obstacle — 22%
- Very Severe Obstacle — 20%

Access to finance
- Major obstacle — 26%
- Minor Obstacle — 6%
- Moderate obstacle — 19%
- No Obstacle — 21%
- Very Severe Obstacle — 28%

Labor regulation
- Major obstacle — 22%
- Minor Obstacle — 8%
- Moderate obstacle — 27%
- No Obstacle — 11%
- Very Severe Obstacle — 32%

Inadequately educated workforce
- Does not apply — 1%
- Major obstacle — 15%
- Minor Obstacle — 15%
- Moderate obstacle — 31%
- No Obstacle — 23%
- Very Severe Obstacle — 15%

Practices of competitors in the informal market
- Major obstacle — 27%
- Minor Obstacle — 5%
- Moderate obstacle — 32%
- No Obstacle — 10%
- Very Severe Obstacle — 26%

Appendix. 6.1.2.Obstacles faced by small firms in Brazil

Transports
- Does not apply
- Don't know
- Major obstacle — 16%
- Minor Obstacle — 16%
- Moderate obstacle — 26%
- No Obstacle — 31%
- Very Severe Obstacle — 10%
- 1%, 0%

Custom & trade regulations
- Does not apply — 15%
- Don't know — 3%
- Major obstacle — 12%
- Minor Obstacle — 9%
- Moderate obstacle — 16%
- No Obstacle — 35%
- Very Severe Obstacle — 10%

Electricity
- Does not apply — 0%
- Don't know — 0%
- Major obstacle — 15%
- Minor Obstacle — 10%
- Moderate obstacle — 15%
- No Obstacle — 29%
- Very Severe Obstacle — 31%

Telecommunications
- Don't know
- Major obstacle — 2%
- Minor Obstacle — 1%
- Moderate obstacle — 0%
- No Obstacle — 4%
- Very Severe Obstacle — 88%
- 2%, 3%

Access to land
- Does not apply — 1%
- Don't know — 2%
- Major obstacle — 22%
- Minor Obstacle — 10%
- Moderate obstacle — 20%
- No Obstacle — 31%
- Very Severe Obstacle — 14%

Tax rates
- Don't know — 0%
- Major obstacle — 40%
- Minor Obstacle — 2%
- Moderate obstacle — 12%
- No Obstacle — 3%
- Very Severe Obstacle — 43%

Tax administration
- Don't know — 1%
- Major obstacle — 36%
- Minor Obstacle — 5%
- Moderate obstacle — 19%
- No Obstacle — 3%
- Very Severe Obstacle — 36%

Crime, theft and disorder
- Does not apply — 0%
- Major obstacle — 24%
- Minor Obstacle — 9%
- Moderate obstacle — 22%
- No Obstacle — 9%
- Very Severe Obstacle — 36%

Business licensing permits
- Don't know — 1%
- c — 0%
- Major obstacle — 26%
- Minor Obstacle — 12%
- Moderate obstacle — 28%
- No Obstacle — 14%
- Very Severe Obstacle — 19%

Polical instability
- Does not apply — 0%
- Don't know — 1%
- Major obstacle — 25%
- Minor Obstacle — 11%
- Moderate obstacle — 25%
- No Obstacle — 12%
- Very Severe Obstacle — 26%

Corruption
- Does not apply — 1%
- Don't know — 1%
- Major obstacle — 24%
- Minor Obstacle — 6%
- Moderate obstacle — 11%
- No Obstacle — 9%
- Very Severe Obstacle — 48%

Courts
- Does not apply — 1%
- Don't know — 1%
- Major obstacle — 22%
- Minor Obstacle — 12%
- Moderate obstacle — 22%
- No Obstacle — 17%
- Very Severe Obstacle — 25%

Access to finance
- Does not apply — 1%
- Don't know — 0%
- Major obstacle — 27%
- Minor Obstacle — 9%
- Moderate obstacle — 27%
- No Obstacle — 13%
- Very Severe Obstacle — 23%

Labor regulation
- Don't know — 0%
- Major obstacle — 26%
- Minor Obstacle — 8%
- Moderate obstacle — 25%
- No Obstacle — 11%
- Very Severe Obstacle — 30%

Inadequately educated workforce
- Does not apply — 1%
- Don't know — 0%
- Major obstacle — 16%
- Minor Obstacle — 16%
- Moderate obstacle — 26%
- No Obstacle — 31%
- Very Severe Obstacle — 10%

Practices of competitors in the informal market
- Does not apply — 0%
- Major obstacle — 22%
- Minor Obstacle — 10%
- Moderate obstacle — 28%
- No Obstacle — 15%
- Very Severe Obstacle — 25%

Appendix 6.1.3. Obstacles faced by Medium firms in Brazil

Transports
- Does not apply
- Major obstacle: 15%
- Minor Obstacle: 15%
- Moderate obstacle: 31%
- No Obstacle: 23%
- Very Severe Obstacle: 15%
- 1%

Custom & trade regulations
- Does not apply: 12%
- Don't know: 1%
- Major obstacle: 17%
- Minor Obstacle: 8%
- Moderate obstacle: 23%
- No Obstacle: 25%
- Very Severe Obstacle: 14%

Electricity
- Does not apply: 0%
- Major obstacle: 16%
- Minor Obstacle: 10%
- Moderate obstacle: 17%
- No Obstacle: 29%
- Very Severe Obstacle: 28%

Telecommunications
- Does not apply: 90%
- Don't know
- Major obstacle: 2%
- Minor Obstacle: 2%
- Moderate obstacle: 2%
- No Obstacle: 3%
- Very Severe Obstacle
- 0%

Access to land
- Does not apply: 0%
- Don't know: 0%
- Major obstacle: 21%
- Minor Obstacle: 10%
- Moderate obstacle: 22%
- No Obstacle: 34%
- Very Severe Obstacle: 13%

Tax rates
- Major obstacle: 38%
- Minor Obstacle: 1%
- Moderate obstacle: 13%
- No Obstacle: 2%
- Very Severe Obstacle: 46%

Tax administration
- Major obstacle: 37%
- Minor Obstacle: 3%
- Moderate obstacle: 20%
- No Obstacle: 2%
- Very Severe Obstacle: 38%

Crime, theft and disorder
- Does not apply: 0%
- Major obstacle: 21%
- Minor Obstacle: 11%
- Moderate obstacle: 23%
- No Obstacle: 10%
- Very Severe Obstacle: 35%

Business licensing permits
- Don't know: 1%
- c: 0%
- Major obstacle: 27%
- Minor Obstacle: 14%
- Moderate obstacle: 27%
- No Obstacle: 10%
- Very Severe Obstacle: 21%

Polical instability
- Does not apply: 0%
- Major obstacle: 24%
- Minor Obstacle: 15%
- Moderate obstacle: 24%
- No Obstacle: 11%
- Very Severe Obstacle: 26%

Corruption
- Does not apply: 0%
- Major obstacle: 21%
- Minor Obstacle: 10%
- Moderate obstacle: 15%
- No Obstacle: 11%
- Very Severe Obstacle: 43%

Courts
- Does not apply: 0%
- Don't know: 1%
- Major obstacle: 21%
- Minor Obstacle: 15%
- Moderate obstacle: 25%
- No Obstacle: 16%
- Very Severe Obstacle: 22%

Access to finance
- Does not apply: 0%
- Don't know: 1%
- Major obstacle: 28%
- Minor Obstacle: 9%
- Moderate obstacle: 27%
- No Obstacle: 13%
- Very Severe Obstacle: 22%

Labor regulation
- Don't know: 0%
- Major obstacle: 29%
- Minor Obstacle: 4%
- Moderate obstacle: 24%
- No Obstacle: 7%
- Very Severe Obstacle: 36%

Inadequately educated workforce
- Does not apply: 1%
- Major obstacle: 15%
- Minor Obstacle: 15%
- Moderate obstacle: 31%
- No Obstacle: 23%
- Very Severe Obstacle: 15%

Practices of competitors in the informal market
- Does not apply: 2%
- Major obstacle: 17%
- Minor Obstacle: 10%
- Moderate obstacle: 29%
- No Obstacle: 19%
- Very Severe Obstacle: 23%

Appendix 6.1.4.: Obstacles faced by micro firms in China

Transports
- Minor obstacle: 28%
- No obstacle: 72%

Custom & trade regulations
- Does not apply: 3%
- Minor obstacle: 16%
- No obstacle: 81%

Electricity
- Minor obstacle: 22%
- Moderate obstacle: 6%
- No obstacle: 72%

Telecommunications
- Minor obstacle: 28%
- Moderate obstacle: 6%
- No obstacle: 63%
- Very severe obstacle: 3%

Access to land
- No obstacle: 66%
- Moderate obstacle: 12%
- Minor obstacle: 19%
- Very severe obstacle: 3%

Tax rates
- Major obstacle: 3%
- Minor obstacle: 44%
- Moderate obstacle: 9%
- No obstacle: 44%

Tax administration
- Don't know: 0%
- Major obstacle: 2%
- Minor obstacle: 27%
- Moderate obstacle: 12%
- No obstacle: 59%

Crime, theft and disorder
- Does not apply: 3%
- Major obstacle: 3%
- Minor obstacle: 16%
- No obstacle: 72%
- Very severe obstacle: 6%

Business licensing permits
- No obstacle: 66%
- Moderate obstacle: 12%
- Minor obstacle: 19%
- Very severe obstacle: 3%

Polical instability
- Major obstacle: 3%
- Minor obstacle: 19%
- Moderate obstacle: 9%
- No obstacle: 69%

Corruption
- No obstacle: 66%
- Moderate obstacle: 12%
- Minor obstacle: 19%
- Very severe obstacle: 3%

Courts
- Minor obstacle: 22%
- Moderate obstacle: 6%
- No obstacle: 72%

Access to finance
- Does not apply: 7%
- Major obstacle: 3%
- Minor obstacle: 28%
- Moderate obstacle: 6%
- No obstacle: 56%

Labor regulation
- Minor obstacle: 25%
- Moderate obstacle: 9%
- No obstacle: 66%

Inadequately educated workforce
- Minor obstacle: 34%
- Moderate obstacle: 25%
- No obstacle: 41%

Practices of competitors in the informal market
- Does not apply: 3%
- Don't know: 3%
- Major obstacle: 9%
- Minor obstacle: 25%
- Moderate obstacle: 16%
- No obstacle: 38%
- Very severe obstacle: 6%

Appendix. 6.1.5. Obstacles faced by small firms in China

Transports
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

0% / 1% / 0% / 1% / 28% / 6% / 64%

Custom & trade regulations
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

0% / 0% / 5% / 17% / 1% / 77%

Electricity
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 1% / 27% / 6% / 65%

Telecommunications
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle
- Don't know

1% / 0% / 1% / 18% / 3% / 77%

Access to land
- No obstacle
- Moderate obstacle
- Minor obstacle
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle

0% / 1% / 0% / 1% / 19% / 3% / 76%

Tax rates
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 6% / 29% / 16% / 48%

Tax administration
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle

0% / 2% / 27% / 12% / 59%

Crime, theft and disorder
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 0% / 18% / 2% / 79%

Business licensing permits
- No obstacle
- Moderate obstacle
- Minor obstacle
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle

0% / 1% / 0% / 1% / 19% / 3% / 76%

Polical instability
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 0% / 1% / 17% / 2% / 79%

Corruption
- No obstacle
- Moderate obstacle
- Minor obstacle
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle

1% / 0% / 1% / 19% / 3% / 76%

Courts
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 0% / 19% / 2% / 78%

Access to finance
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

0% / 1% / 0% / 4% / 38% / 15% / 42%

Labor regulation
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

0% / 1% / 32% / 7% / 60%

Inadequately educated workforce
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

0% / 0% / 2% / 39% / 12% / 47%

Practices of competitors in the informal market
- Does not apply
- Don't know
- Major obstacle
- Minor obstacle
- Moderate obstacle
- No obstacle
- Very severe obstacle

1% / 0% / 0% / 5% / 40% / 20% / 34%

Appendix 6. 1.6. Obstacles faced by medium firms in China

Transports

- Does not apply
- Don't know
- Major obstacle
- Minor obstacle — 30%
- Moderate obstacle — 9%
- No obstacle — 58%
- Very severe obstacle
- 0%, 1%, 0%, 2%

Custom & trade regulations

- Does not apply — 3%
- Don't know
- Major obstacle
- Minor obstacle — 17%
- Moderate obstacle — 4%
- No obstacle — 75%
- Very severe obstacle
- 0%, 0%, 1%, 0%

Electricity

- Don't know
- Major obstacle
- Minor obstacle — 29%
- Moderate obstacle — 8%
- No obstacle — 61%
- Very severe obstacle
- 0%, 1%, 1%

Telecommunications

- Minor obstacle — 25%
- No obstacle — 75%

Access to land

- No obstacle — 73%
- Moderate obstacle — 4%
- Minor obstacle — 21%
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle
- 0%, 1%, 0%, 0%, 1%

Tax rates

- Don't know
- Major obstacle — 8%
- Minor obstacle — 28%
- Moderate obstacle — 20%
- No obstacle — 43%
- Very severe obstacle
- Does not apply
- 0%, 1%, 0%

Tax administration

- Don't know
- Major obstacle
- Minor obstacle — 27%
- Moderate obstacle — 12%
- No obstacle — 59%
- 0%, 2%

Crime, theft and disorder

- Does not apply
- Major obstacle
- Minor obstacle — 22%
- Moderate obstacle — 2%
- No obstacle — 75%
- Very severe obstacle
- 1%, 0%, 0%

Business licensing permits

- No obstacle — 73%
- Moderate obstacle — 4%
- Minor obstacle — 21%
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle
- 0%, 1%, 0%, 1%

Polical instability

- Does not apply
- Don't know
- Major obstacle
- Minor obstacle — 18%
- Moderate obstacle — 4%
- No obstacle — 75%
- Very severe obstacle
- 0%, 1%, 1%, 1%

Corruption

- No obstacle — 73%
- Moderate obstacle — 4%
- Minor obstacle — 21%
- Very severe obstacle
- Does not apply
- Don't know
- Major obstacle
- 0%, 1%, 0%, 1%

Courts

- Does not apply
- Don't know
- Major obstacle
- Minor obstacle — 22%
- Moderate obstacle — 3%
- No obstacle — 73%
- Very severe obstacle
- 1%, 0%, 1%, 0%

Access to finance

- Does not apply
- Don't know
- Major obstacle — 4%
- Minor obstacle — 36%
- Moderate obstacle — 17%
- No obstacle — 42%
- Very severe obstacle
- 1%, 0%, 0%

Labor regulation

- Major obstacle
- Minor obstacle — 31%
- Moderate obstacle — 10%
- No obstacle — 58%
- Very severe obstacle
- 0%, 1%

Inadequately educated workforce

- Major obstacle — 3%
- Minor obstacle — 36%
- Moderate obstacle — 17%
- No obstacle — 44%
- Very severe obstacle
- 0%

Practices of competitors in the informal market

- Does not apply
- Don't know
- Major obstacle — 3%
- Minor obstacle — 37%
- Moderate obstacle — 18%
- No obstacle — 40%
- Very severe obstacle
- 0%, 1%, 1%

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Appendix. 6.1.7. Average obstacles by state, Brazil

Brazilian states	Average Obstacle score
Amazonas	2.82
Bahia	2.49
Ceará	2.55
Distrito Federal	2.35
Goiás	2.24
Maranhão	1.50
Mato Grosso	2.23
Minas Gerais	2.40
Paraíba	2.37
Paraná	2.26
Pernambuco	2.63
Rio de Janeiro	2.29
Rio Grande do Sul	2.43
Santa Catarina	2.37
São Paulo	2.41
Average	**2.40**

Appendix 6.1.8. Average obstacles by state, China

Chinese provinces	Average Obstacle score
Anhui	0.29
Beijing	0.28
Guangdong	0.64
Hebei	0.39
Henan	0.62
Hubei	1.08
Jiangsu	0.59
Liaoning	0.29
Shandong	0.40
Shanghai	0.60
Sichuan	0.48
Zheijiang	0.56
Average	**0.52**

Appendix.6.1.9. Biggest obstacles to business for micro, small and medium enterprises in Brazil

A. Microenterprises
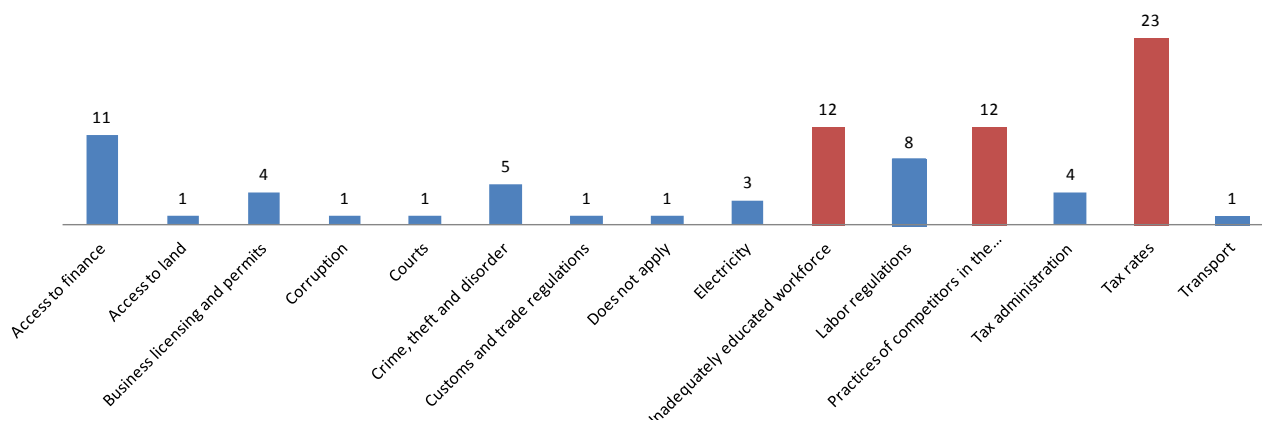
B. Small enterprises
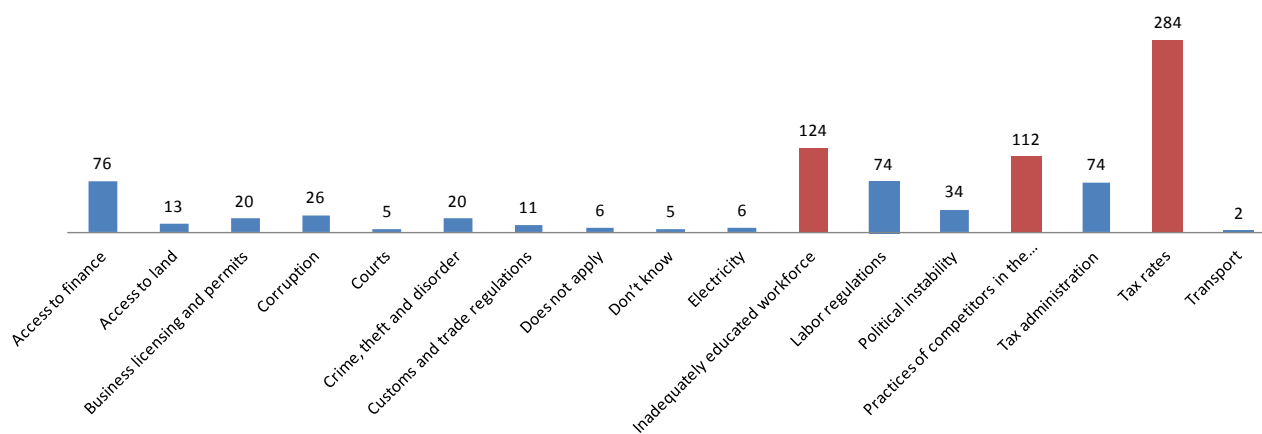
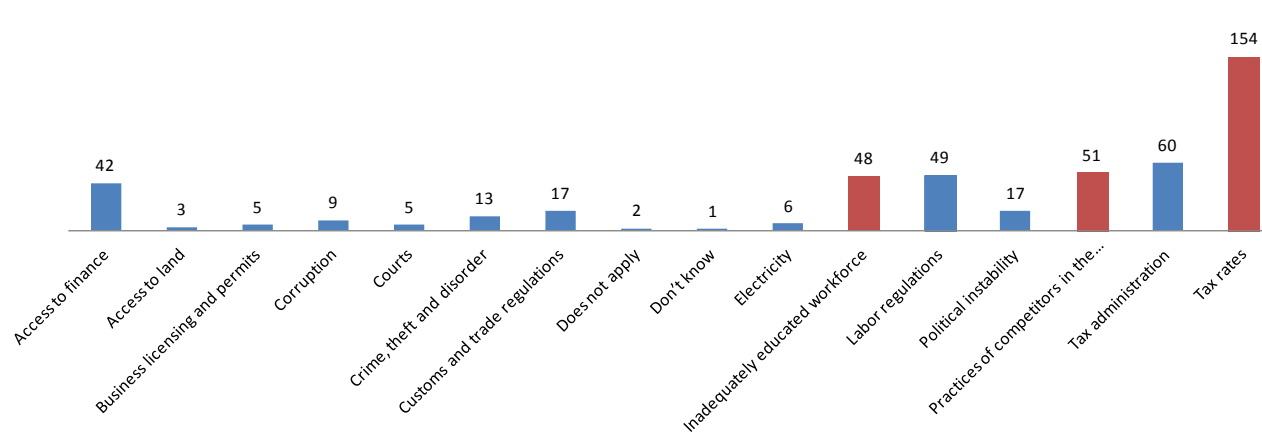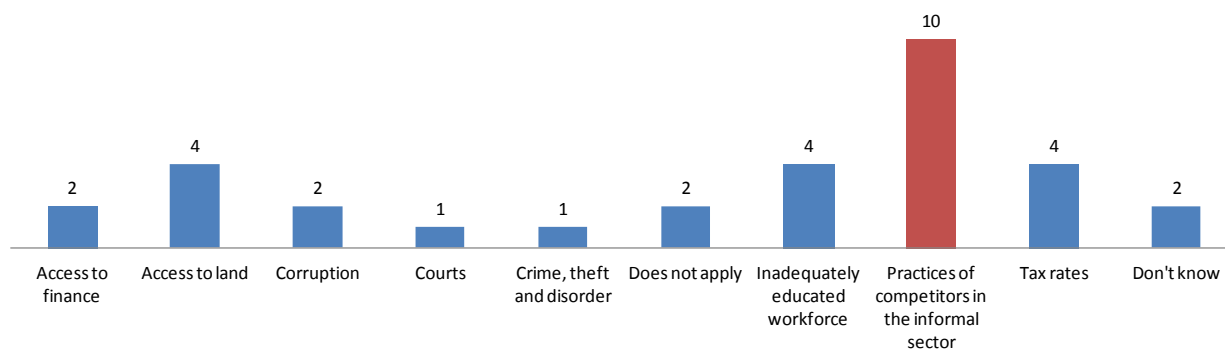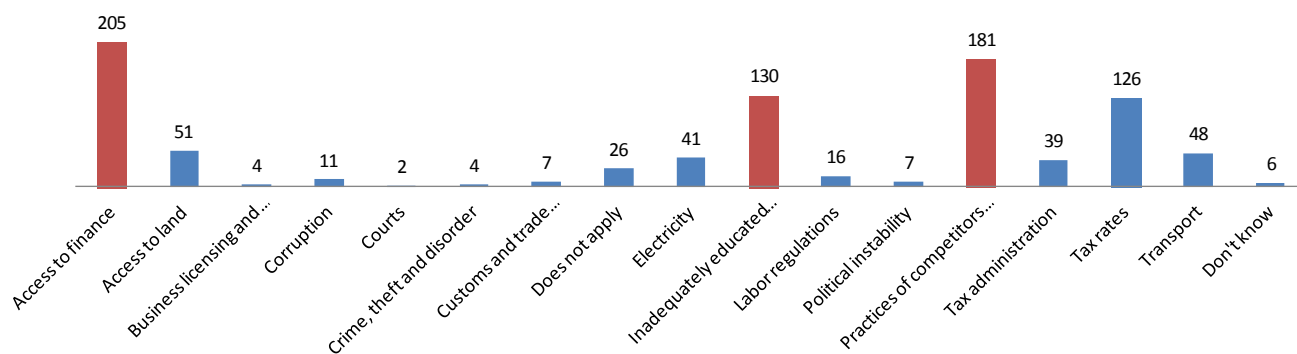

C. Medium enterprises

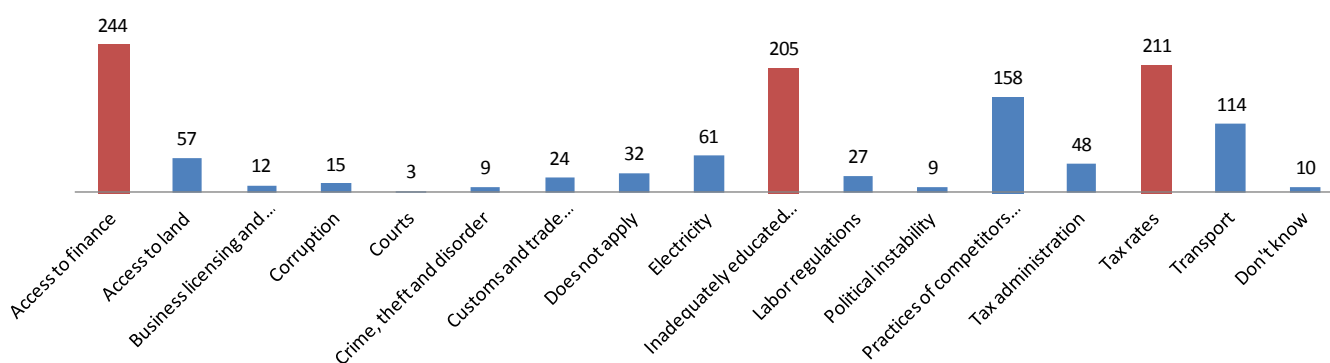**Appendix.6.1.10. Biggest obstacles faced by micro, small and medium enterprises in China**

A. Micro enterprises

B. Small enterprises

C. Medium enterprises

Appendix 6.2.1 Tax rates and International diversification in Brazil

Main market	Nomber of companies	Average score on tax rates
No answer	413	3.08
Don't know	19	3.37
International - main product sold mostly to nations outside country where establishment is located	16	3.56
Local - main product sold mostly in same municipality where establishment is located	448	3.19
National - main product sold mostly across the country where establishment is located	661	3.26
Total	1557	3.20

Appendix 6.2.2 Tax rates and International diversification in China

Main market	Nomber of companies	Average score on tax rates
No answer	856	0.79
International - main product sold mostly to nations outside country where establishment is located	110	0.66
Local - main product sold mostly in same municipality where establishment is located	286	0.98
National - main product sold mostly across the country where establishment is located	927	0.81
Total	2179	0.82

Appendix 6.3.1. Average percentage of the university graduates in the workforce in function of obstacle scores on inadequately educated workforce, Brazil

Proportion of university degree in the labor force employed
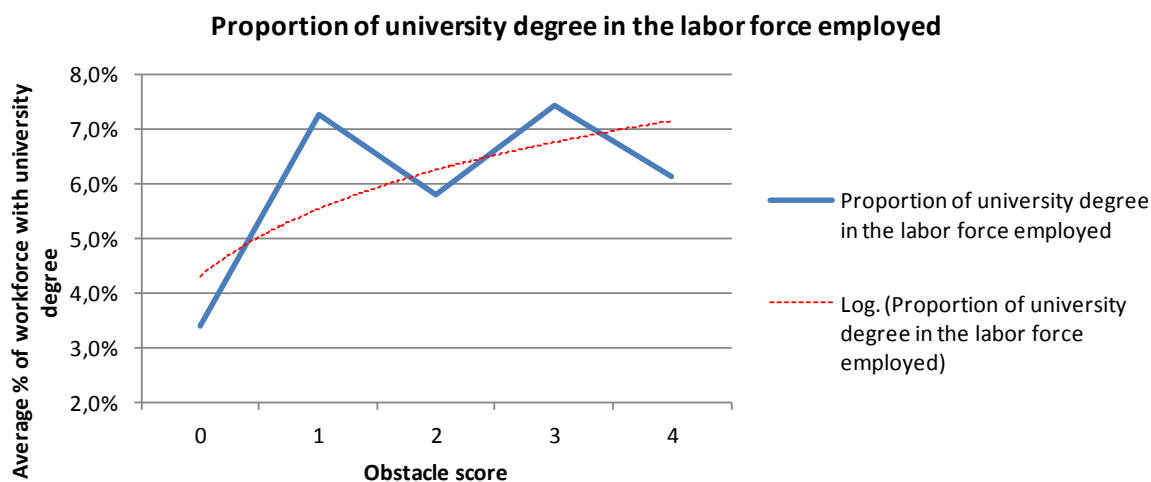
Appendix.6.4.1. Informal competition and international diversification in Brazil

Main market for main product	Number of companies	Average score on Practices of competitors in the informal market
International - main product sold mostly to nations outside country where establishment is located	16	1.67
Local - main product sold mostly in same municipality where establishment is located	448	2.41
National - main product sold mostly across the country where the establishment is located	661	2.24
No answer	*413*	*2.21*
Don't know	*19*	*2.47*
Total général	1557	2.28

Appendix.6.4.2. Informal competition and international diversification in China

Main market for main product	Number of companies	Average score on Practices of competitors in the informal market
International - main product sold mostly to nations outside country where establishment is located	110	0.70
Local - main product sold mostly in same municipality where establishment is located	286	1.07
National - main product sold mostly across the country where establishment is located	927	0.82
No answer	856	0.96
Total général	2179	0.90

Appendix.6.4.3. Average score on Practices of competitors in the informal market for low-income, middle-income and high-income states in China

Chinese regional repartion	Average score on Practices of competitors in the informal market	Number of companies
Low income states	0,81	621
Middle income state	0,94	1047
High-income states	0,93	509

Appendix.6.4.4.Average score on Practices of competitors in the informal market by Brazilian states (decreasing order)

State	Number of enterprises surveyed	Average score on Practices of competitors in the informal market
Amazonas	45	2.70
Ceará	82	2.65
Bahia	91	2.51
Pernambuco	41	2.44
Paraíba	14	2.36
Maranhão	3	2.33
Distrito Federal	37	2.30
São Paulo	352	2.29
Paraná	135	2.07
Minas Gerais	157	2.26
Rio Grande do Sul	159	2.25
Santa Catarina	166	2.23
Mato Grosso	50	2.18
Goiás	72	2.17
Rio de Janeiro	153	2.08
Total	1557	2.28

Appendix. 6.4.5. Average score on Practices of competitors in the informal market for Chinese Micro, Small and Medium-sized firms

Categories	Number of enterprises	Average score on Practices of competitors in the informal market
Don't know	*3*	*0.33*
MEDIUM	1240	0.85
MICRO	32	1.17
SMALL	904	0.97
Total	2179	0.90

Appendix.6.4.6 Average scores on Practices of competitors in the informal market in function of sales evolution

Sales evolution	China		Brazil	
	Number of enteprises	Average score on Practices of competitors in the informal market	Number of enteprises	Average score on Practices of competitors in the informal market
Increased	1582	0,93	619	2.23
Remained the same	306	0,83	296	2.29
Decreased	273	0,82	190	2.58
Was not in business 3 years ago	10	0,70	-	-
Don't know	8	0,50	4	3.00
No answer	-	-	448	2.20

Appendix 6.5.1.Application to new loans in Brazil

Reason firms did not apply to new loans	Number of companies	% of total
NA : Applied to new loans	769	49%
Application procedures for loans or lines of cr. are complex	32	2%
Collateral requirements are too high	40	3%
Did not think it would be approved	40	3%
Don't know	7	0%
Interest rates are not favorable	114	7%
No need for a loan - establishment has sufficient capital	531	34%
Other	22	1%
Size of loan or maturity are insufficient	2	0%
Total	1557	100%

Appendix.6.5.2 Capacity utilization in function of obstacle scores on access to finance, Brazil

Obstacle score	Average capacity utilization (%)	Number of companies concerned
0	80	213
1	81	138
2	80	418
3	77	414
4	77	358
Does not apply	77	10
Don't know	78	6

Appendix.6.5.3. Application to new loans in China

Reason firms did not apply to new loans	Number of companies	% of total
Applied for new loans	526	24%
Application procedures for loans or lines of credit are complex	202	9%
Collateral requirements are too high	146	7%
Did not think it would be approved	80	4%
Don't know	17	1%
Interest rates are not favorable	161	7%
No need for a loan - establishment has sufficient capital	898	41%
Other	27	1%
Size of loan and maturity are insufficient	122	6%
Total	2179	100%

Appendix. 6.6.1.Corruption by Brazilian state

States	Average score on corruption
Amazonas	3.21
Bahia	2.96
Ceará	3.28
Distrito Federal	2.54
Goiás	2.63
Maranhão	2.00
Mato Grosso	2.76
Minas Gerais	2.84
Paraíba	2.86
Paraná	2.52
Pernambuco	3.05
Santa Catarina	3.07
São Paulo	2.89
Average	2.88

Appendix. 6.7.1. International diversification and obstacles on transports, China

| Main market	Number of companies	Average score on transport
No answer	856	0.49
International - main product sold mostly to nations outside country where establishment is located	110	0.55
Local - main product sold mostly in same municipality where establishment is located	286	0.47
National - main product sold mostly across the country where establishment is located	927	0.54

Appendix 7.1. Firms distribution in clusters by country and average sales, CA1

	Brazil		China	
Clusters	Number of firms	Average sales	Number of firms	Average sales
A	291	985100	259	3253105
B	267	838272	379	3128435
C	346	867306	13	1711385
D	323	787982	3	4253900
E	40	586129	1417	2605709
F	273	810332	80	3490729
TOTAL	1540	851012	2151	2805737

Appendix 7.2.1. Competition intensity and companies' distribution between clusters

	AVERAGE E	AVERAGE A	AVERAGE B	AVERAGE C	AVERAGE F	AVERAGE D
More than 5 competitors in the main market	85%	86%	62%	54%	69%	70%
2 to 5 in the main market	11%	13%	34%	34%	27%	26%
duopoly in the main market	2%	0%	1%	2%	2%	1%
monopoly in the main market	2%	1%	2%	9%	2%	3%

Appendix 7.2.2 Cluster's appreciation of the judicial system in function of aggregated scores on corruption and informal competition, CA2
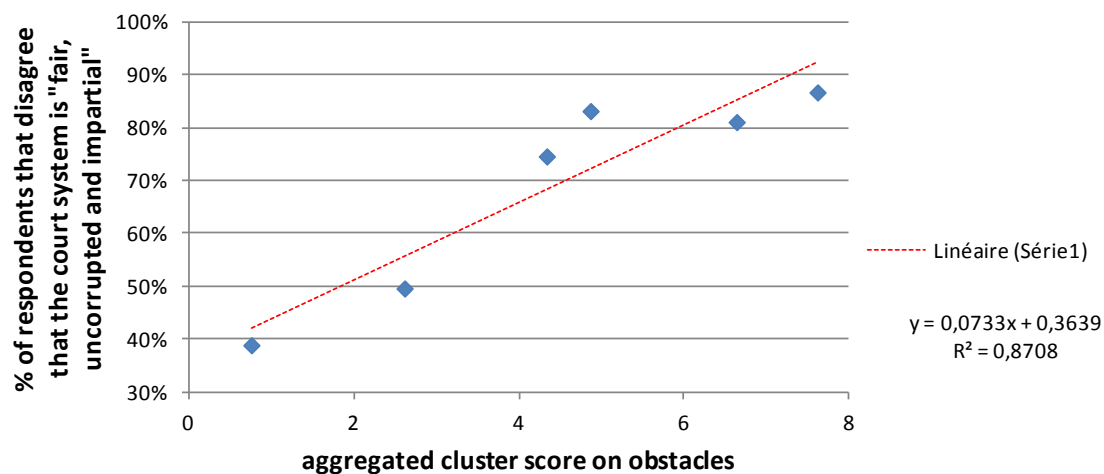
Appendix 7.4. Percentage of Brazilian companies from the low income states in each cluster, CA1, CA2 and CA3

	Cluster A	Cluster B	Cluster C	Cluster D	Cluster E	Cluster F	TOTAL
CA1	13%	14%	22%	26%	3%	21%	**15%**
CA2	9%	19%	25%	27%	5%	16%	**15%**
CA3	29%	9%	23%	27%	3%	8%	**14%**