Corruption and firm performance: Evidence from Greek firms

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Abstract

This article investigates the relationship between corruption and firm performance in Greece using firm level data. Corruption is overall negatively associated with firm size and growth at the firm level. We focus on the effect of 'administrative corruption', whereby firms engage in corrupt practices and bribery of government officials. We contrast the firm experience of corruption and the contextual experience of corruption at the sectoral level and find that the latter, contextual corruption is more important. The contextual effect of corruption identifies the magnitude of systemic corruption in Greece, indicating the need for reforms in an institutional environment that allows corrupt practices. Furthermore, firms of different size appear differently affected by corruption. This suggests that firm engagement in corruption is heterogeneous. Using quantile regressions, small and medium firms display a higher engagement in corrupt practices. However, their performance is less correlated with corruption than that of large firms.

Keywords: bribery, corruption, growth, firm size, Greece

JEL Classification: D73, O17, M21

1. Introduction

International organizations, policy makers and governments are increasingly interested in the effects of corruption on economic development, with anti-corruption strategies being promoted worldwide (Organization for Economic Cooperation and Development European, United Nations, World Bank, European Bank for Reconstruction and Development, Transparency International). More recently, corruption has been identified as a critical issue for the growth of the Greek economy and a major impediment for the implementation of necessary structural reforms (Christodoulakis et al., 2011). This article contributes to the empirical analysis of the impact of corruption on Greek firms. It disentangles the firm level impact of corruption from its contextual effect, and it analyses

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the heterogeneous effect of corruption on Greek firms of different size. Both firm level and contextual corruption is found to decrease firm sales and a robust negative relationship between firm corruption and growth is displayed. Furthermore, larger firms appear to suffer more from corruption than medium or small firms.

Corruption constitutes a serious impediment on economic growth at the country level (Mauro 1995; Mauro, 1997). However, at the firm level, profit maximizing firms would be expected to decide an optimal amount of corruption that would allow them to maximize their profits, while the contextual effect of corrupt practices on firm performance could be either positive or negative, depending on whether the negative spillovers of corrupt practices dominate the first potential positive effect. Hence, the effect of corruption on firm performance is ultimately an empirical question. This paper analyses the relationship between corruption, measured at the firm and industry levels, and firm performance. It is related to two main strands of literature.

The first strand of literature assesses corruption as an obstacle to economic growth. The close relation of corruption to economic growth, and the empirical findings on corruption as a serious impediment on growth and investment, have generated a higher interest in the study of corruption (Pradhan, 2000). There have been significant and consistent research findings that show that lower perceptions of corruption are highly correlated with increased economic development (La Porta et al., 1999; Ades and Di Tella, 1999; Treisman, 2003). Other studies have shown that corruption is an important obstacle to FDI inflows in the host country. Corruption in a country is related to lower levels of probable investment and it can increase the cost of negotiating with government officials for obtaining necessary licences and permits. Furthermore, it increases the risks associated with investment as it can increase costs and operational inefficiencies (Cuervo-Cazurro, 2006). Corruption can hamper growth by deterring entrepreneurship, wasting resources, hindering private investment, impeding the collection of taxes, and obstructing the implementation of necessary regulations.

The second strand of the empirical literature focuses on firm growth and demonstrates differing results. Some studies have supported the hypothesis that corruption can speed up the wheels of commerce and have a positive impact on firm development, by giving the possibility to overcome bureaucratic barriers and surpass timely processes (Wei, 1998). Kaufmann and Wei (1998) demonstrate that this can occur in very limited cases when bad regulations and harassment from officials are considered exogenous. However, they find a positive correlation in the tendency of firms to pay bribes and the time that is wasted on bureaucratic procedures. In some cases, firms engage in corrupt practices in an attempt to promote their short-term growth by facilitating transactions in the bureaucratic process. Ades and Di Tella (1999) show that higher corruption occurs in economies with trade barriers, where domestic businesses are less exposed to global competition, or where there are only few dominant businesses.

The paper builds on this existing literature and makes three main contributions. First, it examines the association between corruption and firm performance in Greece and identifies the sectors that are most affected. The main studies in this area remain at the country level, whereas firm level studies are more rare. In Greece, studies have mainly targeted political and grand corruption at the country level, whereas firm level studies assessing corruption as a business barrier have not been realized. The data on Greece from BEEPS 2005 remain largely unexamined. More specifically there has been no research produced analyzing corruption extensively on Greece to allow for any policy considerations. Occasionally part of the survey data on Greece was used to provide information on the business climate at the country level, for the purpose of comparative analysis with the other countries of the survey. The most interesting part of the article lies on the level of precision used. The data provide information on firms at the regional level that have not been discussed and analyzed to this moment. We find particularly interesting the possibility to examine the data on approximately 550 Greek firms and be able to draw conclusions at the regional and sectoral level. At present, there are household surveys, mainly conducted by Transparency International Greece from 2005, investigating corruption in Greece, and occasional surveys simply identifying barriers in doing business. Firm level surveys that assess corruption as a business barrier in Greece, using measures based on experience and not only perception of corruption, have not been implemented, whereas the BEEPS survey on Greece remains overall unexamined. The quality of this EBRD-World Bank survey and its implementation process ensure a high level of possible accuracy and reliability.

Second, the detailed analysis of the multifaceted impact of corruption on the firm level and the contextual effect of corruption at the sectoral level allows new policy conclusions to be drawn. Firms can engage in corrupt practices in an attempt to maximize their profits and overcome timely administrative processes. However, these practices are negatively and significantly associated with firm performance. This relation becomes more negative for firm size and growth when analyzed at the sectoral level. The assessment of the level of administrative corruption and the consequent growth and operational business barriers, in different sectors across Greek-based firms, outlines the degree and spread of corruption and identifies sector specific constraints.

Finally, research on the different impact corruption has depending on the size of the business has been scarce. However, size has been proven to be a significant factor in firm growth and performance. On the one hand, there are studies on large companies, or SMEs, and their effect on growth, which produce contrasting findings. On the other hand, there have been few comparative studies that provide information about all three types of companies at the firm level. Furthermore, the heterogeneous effect of corruption on firm growth based on size remains largely unexamined. We use quantile regressions to disentangle the heterogeneous effect of corruption on firm size. Small, medium and large enterprises appear to respond differently to several business constraints.

The paper is organized as follows. Section Two discusses the specificities of corruption in Greece and the features of the sample that are relevant for this analysis. Section Three describes the data construction and identifies the level of engagement of different manufacturing sectors in corrupt practices. Section Four describes our main empirical findings on firm performance and corruption at the firm and sectoral level. Section Five examines the heterogeneity of the relationship between corruption and firm size. Section Six concludes.

2. Greek institutional features and sample

Domestic bribery underlines institutional weaknesses

It is globally recognized that business corruption hampers a country's economic development and has a negative impact on the international business environment. Recent surveys on public sector corruption and disclosures of corporate scandals in Greece have drawn attention to firm level corruption, its causes and consequences, exposing weaknesses in the institutional framework of Greece.

Administrative corruption, which affects citizens and households across Greece, is depicted in the National Study on Corruption in Greece, an initiative by the Greek Chapter of Transparency International[1]. The study monitors public perceptions of corruption and experiences of bribery (Transparency International Greece, 2011). It recently showed a drop in the amount of bribes and corrupt practices in the public and private sector in 2010, possibly suggesting that the economic downturn in Greece is also affecting the amount of administrative corruption. The public sector services that appear to be demanding the largest amount of bribes are the hospitals, followed by the tax authorities, and then the urban authorities. In the private sector the most corrupt services, as experienced by citizens, are the health and legal services (Transparency International Greece, 2010).

Apart from corruption incidents in the public sector in Greece, in the last few years cases of corruption and foreign bribery in Greece have been disclosed by foreign companies or their subsidiaries to ensure contacts, particularly in the defense, pharmaceutical and telecom and security systems sector. The cost of bribery to secure contracts was transferred to Greek taxpayers, and the price of products was often particularly high to offset the costs of the unofficial payments (Corruption Watch, 2010; European Parliament, 2011). The culprits have subsequently been brought to justice by the Greek authorities (Transparency International, 2011). These cases underline the importance of compliance and ratification of global anti-corruption conventions. Multinationals and domestic companies should adopt ethical types of conduct that are in accordance with the laws and regulations forbidding transnational and domestic bribery (Boswell and Richardson, 2003). The introduction of corporate governance systems and the adoption of global anti-corruption conventions are crucial. The recent scandals also highlighted the importance of a solid and effective institutional framework in Greece.

The institutional environment is characterized by inadequacies in the legal framework regarding the criminal liability of corporations and the limited ability to prosecute politicians because of the Greek statute of limitation. This framework obstructs transparency in doing business, as it limits the penalties associated with cases of offering or accepting bribes. The justice system is also hampered by severe delays in the application of penalties

[1] In its fight against corruption, Transparency International (TI), founded in 1993, conducts surveys and provides annual corruption perceptions indices and surveys based on the direct experience of the respondents. These surveys have been widely used in recent years in the measurement and understanding of corruption.

(Transparency International, 2011). The enforcement system is characterized by significant inefficiencies and delays in the prosecution mechanisms. The lack of independence of the judiciary is associated with an increased risk of corruption. The judicial system should be strengthened and inefficient regulations and weak contracts should be eliminated to promote transparency in the government systems (Sulliman and Shkolnikov, 2004). Furthermore, the inadequacies in the framework for complaint mechanisms for whistle-blowing protection and complaints need to be tackled (Transparency International, 2011). These measures could encourage the development of public awareness and promote greater public accountability against corruption. This paper focuses on administrative corruption, whereby firms engage in unofficial payments with public officials.

Measures of corruption and sample

Corruption is generally defined as 'the abuse of public power for private gain' (Cuervo-Cazurra, 2006), and can also be defined as 'an arrangement that involves an exchange between two parties, the "demander" and the "supplier", which has an influence on the allocation of resources either immediately or in the future, and involves the use or abuse of public or collective responsibility for private ends' (Kwok and Tadesse, 2006). The prevalence of corruption is associated with 'someone having discretionary power to allocate resources' (Jain, 2001). This power is in the possession of three different categories of agents: the political elite, the administrators, and the legislators. The monitoring ability of the principal differs in each of these cases (Jain, 2001).

Corruption levels are difficult to measure, as they are based on informal and illegal practices that tend to be concealed (Bevan et al., 2000). However, various surveys have been designed to measure corruption, and the methods used in their formation are continuously reviewed (Knack, 2006). The existing empirical literature on corruption is based on measurements of corruption either through perception-based surveys, or through surveys based on the experiences of respondents. The former use subjective indices of how corruption is perceived and attempt to decrease the measurement error by using averages from different sources. They aim to measure the perceptions of how widespread or costly corruption is in certain countries, and aggregate results from various sources, country risk ratings by business consultancies, surveys of international or domestic business people, and polls of country inhabitants. The latter are based on measures of corruption experiences and are conducted through surveys of business people and citizens in various countries. These surveys focus on the respondents' direct experience of corruption, either the experience of their family or firm, and have been widely used in recent years for the measurement and understanding of corruption. They mainly try to measure the number of incidents in which the respondents have been expected to pay bribes (Treisman, 2007).

This paper uses the survey BEEPS, which is based on the experience and perceptions of managers[2]. It is a joint initiative of the European Bank for Reconstruction and

[2] Business Environment and Enterprise Performance Survey.

Development and the World Bank. The survey is based on face-to-face interviews with firm owners and managers. It has been widely used in the research on corruption initiated from 1999, based on firm level data in transition economies, to investigate the business environment. The survey is regularly conducted on the countries of Eastern Europe and Central Asia. We use the survey conducted on Greece as part of a survey on comparator countries of Western Europe and East Asia in 2004 and 2005[3].

Information for the establishment of the sample frame was used from the National Statistical Service of Greece and ICAP Greece. The sectoral composition in terms of manufacturing and services was established by their relative contribution to GDP. The sample design based on the BEEPS sector GDP contribution was determined at 28% for industry and 72% for services in Greece. For the sample of firms to be representative for Greece additional criteria had to be met regarding the size, ownership, exporter status and location of the firms. The number of firms interviewed is 546 and cover the regions of the Capital, Central West Macedonia, East Macedonia, Thrace, East Sterea, West Sterea, Thessaly, Epirus, and Peloponnese. All the firms in the sample are privately owned, 10% are foreign owned and 11% of firms are exporters. Firms that started to operate in the years 2002, 2003 and 2004 were not included in the sample (Synovate, 2005).

We examine administrative corruption, which involves firms engaging in or being forced to engage in bribery and unofficial payments or gifts to government officials. Firms may be asked or forced to bribe to obtain rightful licenses, choose to bribe to extract profits, and speed bureaucratic processes in an institutional environment that allows these practices. We identify administrative corruption, as the percentage of total annual sales that a firm similar to the one represented by the respondent will typically pay in unofficial payments and gifts to public officials. The percentage of total annual sales that similar firms give as bribes is a direct measure of corruption, based on actual financial results; the firms are asked about corruption directly related to the amount of bribes. This measure is therefore used to estimate the relation between corruption and firm performance. As a quantitative variable, it can provide valuable information on the extent and variation of corruption, and its impact on firm size and performance.

In the descriptive analysis we use two additional measures to identify administrative corruption. The first measure estimates the frequency of bribes that similar firms 'have to pay to get things done with regards to customs, taxes, licenses, regulations and services'. The second measure identifies corruption as an operational and growth barrier for doing business, from 1 for a low level of corruption to 4 if managers assess corruption as an important barrier for the operation and growth of the respondents' business (Synovate, 2005).

[3] The description of the data is largely based on the report that was prepared for EBRD and the World Bank by Synovate (Synovate, 2005), the firm responsible for the implementation of the BEEPS and the provision of data.

3. Descriptive Analysis

Descriptive Statistics

Table 1 presents descriptive statistics for the different measures of firm size, growth and corruption. However, it is important to note that it is very difficult to compare the different measures of corruption we use, as the questions they treat are different. Therefore, even if the results are lower, the impact on the firm size and performance could be higher.

Apart from the measures of corruption at the firm level, the measures of corruption are averaged at the industry level. The averages are leave-one-out averages. For example, for a given firm in the construction sector in Greece the average includes all the firms in the construction sector apart from the firm itself. This measure captures the contextual effect of corruption and avoids endogeneity concerns, as both firm level corruption and sales may be determined jointly by the firm and could be driven by similar unobservable firm characteristics.

Table 1: Descriptive statistics, sales, growth and corruption

Variable	Obs.	Mean	Std. Dev.	Min	Max
log sales	480	6.68	1.97	3.6	13.2
log sales in t-3	463	6.60	1.91	3.6	13.0
growth	463	0.02	0.22	-1.6	0.7
corruption	546	0.49	1.41	0.0	10.0
contextual corruption	473	0.52	0.82	0.0	10.0
corruption frequency	458	2.37	1.53	1	6
corruption barrier	529	1.69	1.00	1	4

Table 2 shows the correlations between sales, growth and corruption. The measures of corruption at the firm level are all positively correlated. At the firm level, corruption appears negative for firm size and growth, whereas at the sectoral level, contextual corruption appears more negative on firm performance. This underlines the importance of the sectoral environment for firm growth and operation.

Table 2: Correlations between sales, growth and corruption

	log sales	log sales in t-3	growth	corruption	contextual corruption	corruption frequency
log sales						
log sales in t-3	0.99					
growth	0.19	0.08				
corruption	-0.07	-0.06	-0.07			
contextual corruption	-0.08	-0.09	0.03	-0.01		
corruption frequency	0.16	0.15	0.06	0.31	-0.03	
corruption barrier	0.09	0.09	0.09	0.28	-0.02	0.46

A negative association between corruption and firm sales

Among the factors that drive firms to engage in corrupt practices are market expansion and profit maximization ambitions. Firms often engage in illegal practices and bribes to ensure the success of their establishment and operations at first (e.g. securing of operation licences), and then their expansion in a country. However, a corrupt environment deprives firms of equal market opportunities and increases the cost of doing business. Time and money consumed in bribing public officials and overcoming complexity in regulations raise business costs. In cases of high and widespread administrative corruption the operational ability of firms is obstructed. Moreover, their ability to enforce contracts and business opportunities is reduced (Sullivan and Shkolnikov, 2004).

Figure 1 presents the relationship between average corruption (the direct measure of corruption we use that is, as previously explained, the percentage of total annual sales paid in bribes to public officials, hereby referred to as corruption) and the log of total annual sales at the firm level in Greece. We observe a negative relation between corruption and the sales of the firm; when the extent of corruption is lower, the firm is characterized by a higher size of sales.

Figure 2 depicts the relationship between average corruption and growth[4] at the firm level in Greece. A negative relation appears between corruption and firm growth: when corruption increases, the growth of a firm slightly decreases.

[4] Growth is defined as the (log) size of sales in 2005 minus the (log) of sales in 2002, multiplied by 100.

Figure 1: Corruption and firm sales in Greece at the firm level

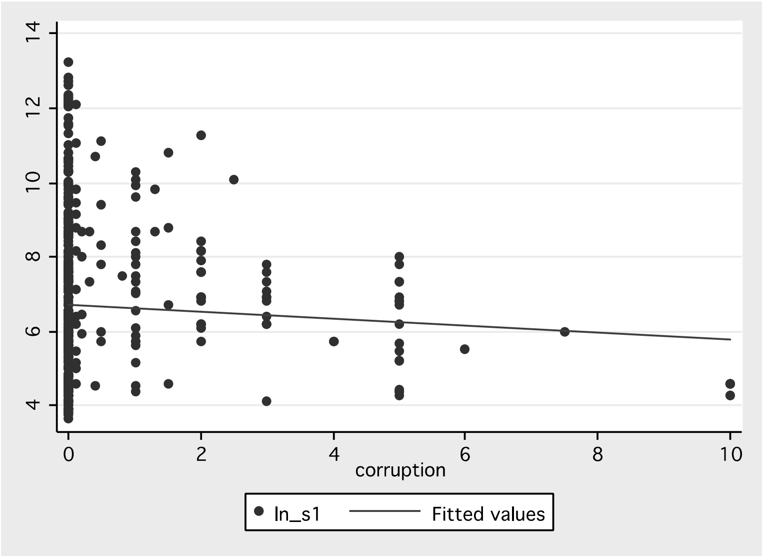
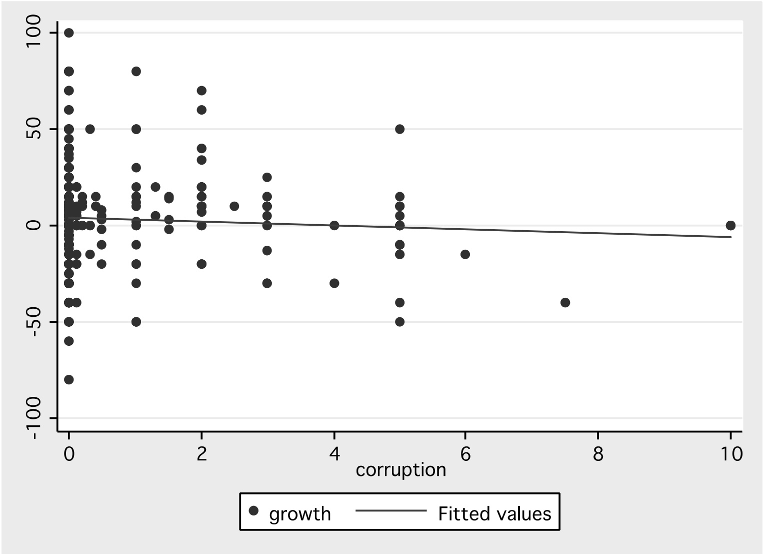


Figure 2: Corruption and firm growth in Greece at the firm level[5]



[5] Corruption in the survey is measured in 2005, whereas the growth of the firms is based on percentage change in sales in the last 3 years, during 2002–2005. It was not possible to use corruption in 2002, based on the previous BEEPS, because Greece was not surveyed. Therefore, by using the measure of corruption in 2005, the interpretation of the relation between corruption and growth of sales would be less clear, even though we would expect that the corruption levels would be similar across these years.

Figure 3 examines the different corruption patterns based on the size of the firms in Greece. Companies are divided into three main categories: those comprising 2 to 49 employees are categorized as small, medium up to 249, and large from 250 employees and above. Small and medium firms are then further divided into two subcategories, and large firms into three groups. In the case of administrative corruption (proportion of bribes), small firms, and especially the higher end of these, are the most affected. The lowest end of medium firms is also affected, whereas medium firms with 100-249 employees and large firms seem to be the least affected. Large firms with 500–999 employees seem to pay a very low, almost zero amount of bribes to public officials. The growth and associated power for large firms in the market and the increase of their experience could allow them to better position themselves and overcome possible operational barriers for their business. This finding is supported by the lower measures of corruption for large firms.

Figure 3: Average corruption and firm size in Greece

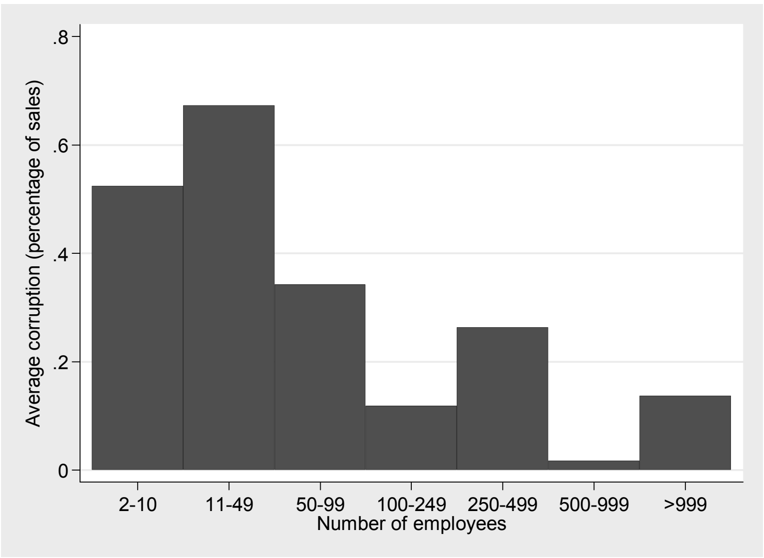


Figure 4 presents the average growth in firms of different sizes. The highest growth levels of around 15% are observed in large firms with over 999 employees, whereas the smallest levels are around 2.5% in micro firms of 2 to 10 employees. Similar, middle levels of growth, from around 5% to 8%, characterize small and medium-sized firms.

Figure 4: Average growth and firm size in Greece

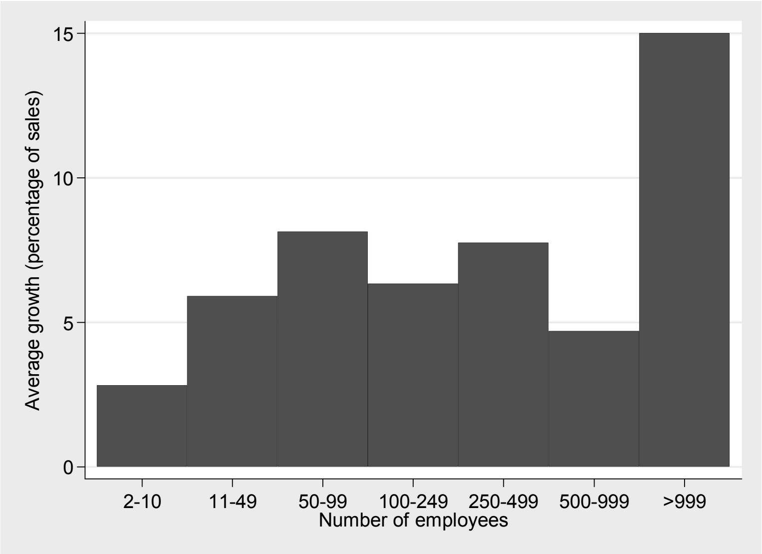
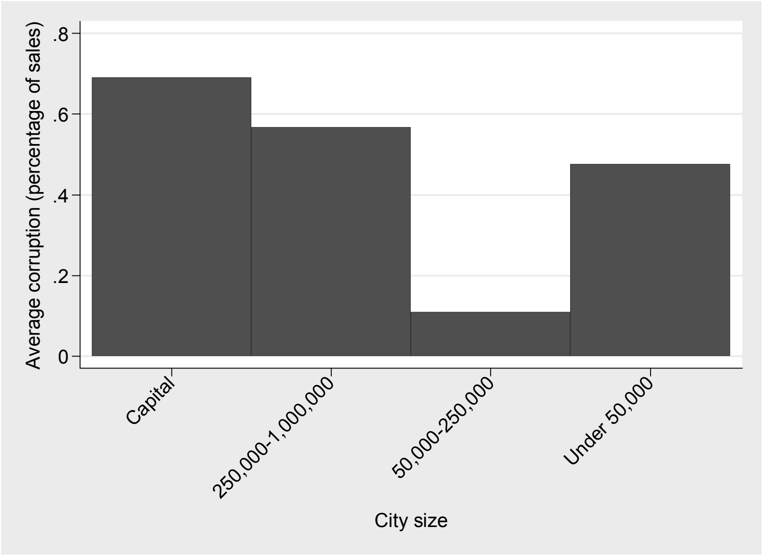


Figure 5 shows the geographical groups and our preferred measure of administrative corruption, the share of sales paid as bribes. The regional groups that altogether appear to be the most corrupt are the capital of Athens followed by cities with 250,000 to 1 million inhabitants, and finally cities with under 50,000 inhabitants. The level of engagement of cities with 50,000–250,000 inhabitants appears to be very low.

Figure 5: Average corruption across Greek cities



Administrative corruption across different sectors

Table 3 presents corruption as a barrier in doing business across manufacturing sectors. This question does not specify whether the firms or public officials initiate bribing. However, it underlines the effect of widespread corruption in the public sector that could have an impact on firm performance according to firm managers. In mining and quarrying, 40% of the firms identify corruption as a major obstacle. Firms in wholesale and retail trade identify corruption as a major barrier for the growth and operation of their business, 21% of the firms evaluate it as a minor obstacle, and 24% as a moderate or major obstacle. In manufacturing, corruption is also found as a very important obstacle in doing business; 24% judge it is a moderate or major obstacle, and 19% a minor obstacle. In transport, storage and communication, 19% of firms also perceive corruption as a major or moderate obstacle, and 19% as a minor one, while real estate, renting and business services present similar results. In construction, 15% of the firms recognize corruption as a moderate or major barrier, whereas 21% consider it a minor barrier. We observe similar results in the hotel and restaurants sector, where 17% of the firms consider it a moderate or major barrier, while 27% view it as a minor barrier.

Table 3: Corruption as a barrier to growth by sector

		Corruption barrier		
	Obs.	Minor	Moderate	Major
Mining and quarrying	5	0%	0%	40%
Construction	61	21%	5%	10%
Manufacturing	98	19%	10%	14%
Transport storage and communication	43	19%	7%	12%
Wholesale and retail trade	178	21%	11%	13%
Real estate, renting and business services	54	17%	6%	11%
Hotels and restaurants	89	27%	7%	10%
Other services	18	17%	11%	22%
All sectors	546	21%	8%	13%

Table 4 observes the assessment of corruption frequency across sectors in Greece. It therefore depicts the frequency of cases in which firms are forced to bribe and cases of institutionalized corruption, in which firms are forced to bribe in order to secure access to rightful processes. In mining and quarrying, 40% of the firms state that corruption is always occurring. In construction, 30% of firms estimate that corruption is frequently, usually or always taking place, and 50% that it seldom or sometimes occurs. In the hotels and restaurants sector, 25% of firms estimate that corruption is a practice that occurs frequently, usually or always, whereas 34% of them consider it occurs seldom or sometimes. Managers in wholesale and retail trade evaluate corruption as a frequent, usual or standard practice in 22% of the firms, and as a seldom or occasional practice in 42% of them. In real estate, renting and business services, 21% of firms assess that corruption occurs frequently, usually or always, and 33% consider it to occur seldom or sometimes. In transport, storage and communication, 20% of firms evaluate corruption as a frequent, usual or standard practice, and 25% of them as a seldom or occasional practice. In manufacturing, 18% of firms find that corruption occurs frequently, usually or always, while 35% estimate that corrupt practices seldom or sometimes occur.

Table 4: Frequency of corruption by sector

		Frequency of corruption					
	Obs.	Never	Seldom	Sometimes	Frequently	Usually	Always
Mining and quarrying	5	0%	0%	40%	20%	0%	40%
Construction	48	21%	27%	23%	13%	15%	2%
Manufacturing	77	47%	23%	12%	5%	9%	4%
Transport, storage and communication	40	55%	15%	10%	5%	5%	10%
Wholesale and retail trade	154	37%	29%	13%	7%	10%	5%
Real estate, renting and business services	46	46%	11%	22%	15%	2%	4%
Hotels and restaurants	72	42%	28%	6%	8%	13%	4%
Other services	16	44%	25%	13%	19%	0%	0%
All sectors	458	40%	24%	14%	9%	9%	5%

Table 5 displays unofficial payments and bribes paid as a share of sales by sector. The sensitivity of this question, linked to the disclosure of financial results, increases the possibility of underreporting (Synovate, 2005). Mining and quarrying emerges as the most corrupt sector, with an average of 1.28%, which supports the previous findings on the high frequency of corruption and evaluation of corruption as a major business barrier. Firms in transport and storage and firms in construction also report that unofficial payments and bribes are a significant part of their sales, at 0.8% and 0.7% respectively. The bribes in the hotels and restaurant sector and the wholesale and trade are estimated at around 0.5%. The lowest amount of bribes as a percentage of sectoral sales is observed in real estate and renting at around 0.32%, and in manufacturing at 0.26% of sales.

Table 5: Unofficial payments and bribes as share of sales by sector

Variable	Obs.	Mean	Std. Dev.	Min	Max
Mining and quarrying	5	1.28	1.00	0	2
Construction	61	0.70	1.46	0	5
Manufacturing	98	0.26	1.09	0	7.5
Transport, storage and communications	43	0.80	1.98	0	10
Wholesale and retail	178	0.45	1.40	0	10
Real estate, renting	54	0.32	1.06	0	5
Hotels and restaurant	89	0.47	1.21	0	5
Other services	18	1.12	2.61	0	10
Total	546	0.49	1.41	0	10

The level of corruption across sectors in Greece appears varied. The mining and quarrying sector and the construction sector display a pattern of regular engagement in bribing: an alarming 80% of the firms in these sectors respond that unofficial payments and bribes are taking place, while the average bribes amount to 1.28% and 0.7% of annual sales. Furthermore, corruption is particularly apparent in the wholesale and retail trade and the hotels and restaurant sector, where 64% and 59% of firms respond positively on corrupt payments. Firms in the transport, storage and communications sector display differing results. While the highest number of firms in the sector, 55%, responds that corruption never occurs, the level of corrupt payments is the second highest, at 0.8% of total annual sales. Based on the frequency of payments and bribes given as percentage of sales, less unofficial payments seem to occur in real estate, renting and business services sector, and the manufacturing sector. Nevertheless, around half of these firms respond positively on corrupt payments taking place.

The sectors that overall appear to be the most constrained by corruption are the wholesale and retail trade, the hotels and restaurants, and the manufacturing sector. Around half of the firms in the wholesale and retail trade (45%) consider corruption a barrier in doing business, and similarly the hotels and restaurants sector and the manufacturing sector appear severely hampered by corruption (44% and 43% respectively evaluated corruption as a barrier). Overall, firms in mining and quarrying display concerning results: 40% respond that corruption is a major obstacle in their operation, and 40% of firms that bribing is always occurring. In the sectors of transport storage and communication, construction and real estate, renting and business services, corruption is also considered an important constraint in business by 38%, 37% and 34% of firms respectively. The analysis on the sectoral level provides a detailed overview of the business constraints generated by corruption across different sectors in Greece. Overall, we observe that corruption, irrespective of the sectoral engagement in bribing, is considered a significant barrier in doing business across all sectors in Greece.

4. Firm and contextual corruption in Greece

Firm level corruption and firm performance

In recent years, it has been widely recognized that corruption is a significant barrier to the operation and growth of firms. Dal Bo and Rossi (2007) find evidence in Latin America that corruption is harmful for firm productivity. Using data on Mexican states, Laeven and Woodruff (2007) also find that Mexican states with more effective legal systems have larger firms. The harmful effect of corruption on firm performance is confirmed on a wide cross-section of countries by Beck et al. (2003). However, there have been findings in the literature on the possible positive effect of corruption for some firms (Wei, 1998). It has been supported that corruption could increase economic development, mainly because illegal practices and payments as 'speed money' could surpass bureaucratic delays; the acceptance of bribes in government employees could work as an incentive and increase their efficiency (Leff, 1964; Huntington, 1968); and because corruption is possibly the price people are forced to pay as a result of market failures (Acemoglu and Verdier, 2000).

Table 6 presents the estimates of a simple Ordinary Least Squares (OLS) regression of the log of firm sales and growth on corruption, and includes controls for city and sector. Corruption, measured as the share of sales paid for bribes, is significantly and negatively correlated with the level of sales and growth at the 5% and 10% significance level. When we control for city, the relationship between corruption and growth is similar, whereas the association between corruption and firm size becomes more negative and significant at the 1% significance level. When controlling for sector, the association between corruption and growth becomes more negative and significant at the 5% significance level, whereas the association between corruption and firm size remains negative but insignificant.

Table 6: Firm Size, Growth and Corruption[6]

	No controls	Control city	Control sector	No controls	Control city	Control sector
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Log Sales	Log sales	Log sales	Growth	Growth	Growth
Corruption	-0.093**	-0.126***	-0.061	-1.189*	-1.133*	-1.315**
	(0.041)	(0.045)	(0.039)	(0.645)	(0.645)	(0.666)
Observations	480	480	480	463	463	463
R-squared	0.005	0.078	0.197	0.007	0.023	0.080

Standard errors robust to heteroskedasticity in parentheses. ***, **, * indicate estimates significant at the 1%, 5% and 10% significance level, respectively. The dependent variable is the natural logarithm of total sales.

[6] The log of sales distribution is approximately normally distributed.

Contextual corruption and firm performance

We shall now focus on the association between contextual corruption, measured among the peers of the firms at sectoral level, and firm performance. At the sectoral level, we expect that the relationship between corruption, firm size and growth will be clearly negative. Firms that are not involved in corruption may have less access to resources and increased costs, and their sales could be hampered by the discrimination and misallocation of resources induced by the bribing firms.

Table 7 describes how contextual corruption at the sectoral level relates with firm sales and firm growth. The relationship between contextual corruption and firm growth, in specifications without any controls or controls for city, appears insignificant. However, the relationship between contextual corruption and firm size appears negative and significant once we control for the size of the city where the firms are located. The coefficient of contextual corruption on firm size without any controls is -0.18, and insignificant at the 10% significance level. When controlling for city, the effect of contextual corruption becomes more negative, with a coefficient of -0.21, and strongly significant at the 10% significance level.

These regressions do not include controls for industrial sectors, as the contextual corruption is computed at the sector level and would be highly collinear with the sectoral dummy variables. The identified association between contextual corruption at the sectoral level and firm sales indicates the systemic character of corruption. The association between administrative corruption at the firm level and firm size and growth appears negative (Table 6). However, we find that the extent of the administrative corruption among the firm peers displays a larger negative magnitude than the estimates based on firm-specific measures of corruption (Table 7). Overall, the contextual effect of corruption suggests that the corrupt behaviour at the firm level could have important spillovers on their peers and competitors. Firms do not appear to internalize the costs of their own corruption for other firms. Hence, the contextual corruption generated from a corrupt sectoral environment could be much more detrimental for firm sales and growth than firm level corruption.

Table 7: Firm size, growth and contextual corruption

	No controls	Control city	No control	Control city
	(1)	(2)	(3)	(4)
Variables	Log sales	Log sales	Growth	Growth
Contextual Corruption	-0.180	-0.212*	0.558	0.475
	(0.132)	(0.125)	(1.028)	(0.986)
Observations	417	417	404	404
R-squared	0.007	0.065	0.000	0.018

Standard errors in parentheses are clustered at the sectoral level. ***, **, * indicate estimates significant at the 1%, 5% and 10% significance level, respectively. The dependent variable is the natural logarithm of total sales.

5. The heterogeneity of the relationship between corruption and firm sales

We shall now focus on the heterogeneity of the relationship between corruption and the sales of different types of firms. The size of the firm has been related to firm size and performance. However, the different effect that corruption may have on firms depending on their size and the level of business constraints it imposes on them has not been analysed in firms across Greece. According to recent research from the World Bank and the EBRD, the firms that are the most influenced overall by business constraints are small rather than medium or large firms, and generally those firms that can achieve more growth and create more jobs (Transition Report 2005). However, the question as to whether SMEs can actually generate more growth has initiated a lot of debate.

A causal relationship between the share of SME and growth has not been established. Large firms are able to take advantage of economies of scale and can afford fixed R&D costs, therefore, they may be able to promote innovation and productivity more than SMEs (Beck et al., 2005). There is evidence that increased levels of innovation are related to larger firm size (Pagano and Schivardi, 2003). In terms of employment creation and quality, large firms can provide greater stability and quality in employment and they appear to be equally labour intensive as SMEs (Little et al., 1987; Rosenzweig, 1988).

However, SMEs are particularly important in an economy, and countries with faster rates of development are characterized by an increased share of SMEs and an increased SME growth rate (Beck et al., 2005). Empirical research finds that the SMEs[7] contribute more than 55% of GDP and 65% of employment in countries of high GDP per capital, and 70% of GDP and 95% of employment in countries of low GDP per capital (Ayyagari, 2007). Consequently, the protection of their operation is crucial for the economy.

Corruption and the distribution of firm size

In order to assess the relationship between corruption and the distribution of firm size, we use quantile regressions (Koenker and Basset, 1978). Ordinary least squares (OLS) regression is based on the mean of the conditional distribution of the regression's dependent variable. This approach is used for two main reasons. First, the average effect of corruption on firm sales is generally the main parameter of interest. Second, it can often be implicitly assumed that corruption has the same effect on large and small firms. However, corruption may distort the distribution of firm sales. The analysis is mainly descriptive and aims to offer an understanding of the extent of corruption in Greece and provide for the first time an indication of its possible impact on the business environment. Based on the absence of panel data, as the survey was solely implemented in Greece in 2005, and given the sample size, it is not possible to address all the omitted variable biases. Even though it is

[7] There have been various definitions of small, medium and large enterprises, and small and medium enterprises are often analysed together. According to the current definition of the European Union, small companies have less than 50 employees, medium more than 50 and less than 250, and large more than 250 employees.

not possible to ascertain direct causality, the correlations present some interesting patterns to identify which firms are likely to be most affected by corruption. Quantile regression models allow for a full characterization of the conditional distribution of firm sales with respect to the extent of corruption.[8]

Table 8 presents the estimates for the association between corruption and sales on the quantiles of the firm size distribution. The models used to construct these estimates control for city size[9] and we focus on the 0.1, 0.25, 0.5, 0.75 and 0.9 percentiles. Estimates at different quantiles can be interpreted as showing the response of the log of sales to the extent of corruption at different points in the conditional sales distribution. For example, the point estimate for corruption on the quantile 0.5, the median, indicates that the median of the distribution decreases by 3 percentage points (0.03 log point) when the share of sales paid as bribes increases by one percentage point. By comparison, the point estimate for the upper decile (quantile 0.9) indicates that the same increase of bribes would decrease the upper decile of firm size by nearly 25% (0.22 log points).

It is noteworthy that the quantile coefficients increase with the considered quantiles. The largest effect of corruption is on the top of the firm size distribution, the coefficients of the third quartile (percentile 0.75) and the upper decile (percentile 0.9) are roughly similar, around -0.22, while the other quantile coefficients are approximately 0.03 or close to zero for the lowest decile. This is justified as the average point estimates (Table 6) was around -0.1. This shows that the negative association between corruption and firm sales is larger for the firms belonging to the upper quantiles than for the smaller firms. Hence, corruption appears to have an important impact on the heterogeneity of firm size. Higher corruption tends to lower the average firm sales through the effect on the largest firms while the lower part of the firm size distribution is relatively unaffected.

Table 8: Corruption and the distribution of firm size, quantile regression estimates

	Quantile regression for log sales				
Quantile	0.1	0.25	0.5	0.75	0.9
	(1)	(2)	(3)	(4)	(5)
Corruption	0.000	-0.041	-0.030	-0.230**	-0.220
	(0.036)	(0.056)	(0.094)	(0.090)	(0.152)
Control for city size	Yes	Yes	Yes	Yes	Yes
Observations	480	480	480	480	480

Standard errors are bootstrapped using 100 replications. *** Denote estimates significant at the 1% level, ** at 5%, * at 1%.

[8] See Angrist and Pischke (2009) for a recent review of the benefits of quantile regressions.

[9] Other estimates not controlling for city size present a similar pattern.

These results are partly in line with previous results on less developed countries. Gallipoli and Goyette (2009) propose to explain the fact that the size heterogeneity across firms is greater for less developed countries than for developed countries by their larger degree of corruption. Using a sample of firms in Uganda, they suggest that small firms and entrepreneurs who would benefit from scaling-up sales and employment may refrain from doing so in order to remain informal and avoid tax liabilities and bribes. However, Emerson (2001) using a panel of countries finds that this mechanism ultimately leads to a lower share of large firms in the more corrupt economies. More recently, Dusha (2011) proposes a political economy model to rationalize these findings. In his model, corruption promotes entry at the low end of the productivity distribution and obstructs entry at the high-end, which has adverse effects on aggregate Total Factor Productivity.

Large firms face more impediments on their growth because of corruption than small and medium firms, while large firms engage in less corruption than smaller firms. Administrative corruption is found to be negatively and highly significantly related to business growth (Beck et al., 2002). Corruption is, according to much research, generally evaluated as an important barrier in doing business. Aidis and Mickiewicz (2006) in their research on firm perceptions of business barriers and growth expectancy in Lithuania find that finance issues, reduced purchasing power of customers, and the inefficiency of investment funds are the most important business barriers after high tax rates. Even though corruption is ranked as an important but not the most critical business barrier, it appears to have the most negative effect on growth expectancy, indicating it constitutes a major impediment on growth.

In Greece the growth and performance of SMEs are severely hampered by limited access to finance, limited access to the international market, and legal and administrative burdens. In economic downturns the growth prospect of SMEs is affected by limited access to finance, limited demand for their products and limited liquidity in the market. In order to support SMEs to overcome the economic crisis, the Greek government is prioritizing the implementation of concrete measures and necessary reforms, aiming to foster competition, productivity and innovation in the market, according to the priorities of the European Union (National Observatory for Small and Medium Enterprises, 2008). Large firms usually have more opportunities to avoid business constraints, as they can internalize much of their capital via the financial markets and financial intermediaries and are less affected by the situation in the public markets.

However, SMEs often have some advantages in comparison to large enterprises because they are characterized by greater flexibility and an ability to adapt in different market conditions (National Observatory for Small and Medium Enterprises, 2008). This ability to adapt could support the finding of the paper on SMEs being less hindered by corruption. Ayyagari et al., (2007) investigate the effect of financial and institutional barriers for SMEs and find robust evidence that financing constraints constitute a serious impediment to their growth and operation, and these constraints appear more significant than corruption. However, corrupt practices in doing business might be proven more inefficient and costly for large firms that compete at an international level. Such firms need to comply with international standards, adopt global business practices, and obtain the approval of the international business community through following legitimate policies. Another explanation why corruption can constitute a stronger barrier for the size and development of large firms is attributed to the fact that smaller firms are less noticeable and therefore they would be less approached for extracting rents, since their actual capacity to make unofficial payments would be limited. Additionally, smaller firms may be more financially constrained and therefore less likely targeted for bribes by public officials. However, as firms grow they would be more likely pressed for bribes. Consequently, the lack of business efficiency caused by widespread corruption could be more costly and difficult to circumvent for large firms.

The asymmetric relationship between corruption and firm sales

The relationship between corruption and sales is heterogeneous among firms of different size. However, there is a systemic impact of corruption, and small and medium firms are also affected indirectly, on the sectoral level, from contextual corruption as discussed in the previous section. Business corruption decreases competition and efficiency and develops a 'rent-seeking' environment. The demand of bribes by public officials for the acquisition of licences and permits could reduce the amount of firms that can enter the market and the growth of the existing ones (Sullivan and Shkolnikov, 2004).

The asymmetric effect of corruption on firm sales is confirmed when we look at the contextual effect of corruption. As before, contextual corruption is computed at the leave-one-out average of the firms of the same manufacturing sector. In Table 9 the effect of contextual corruption appears much more clearly in the upper tail of the firm sales distribution. Small firms appear again the least affected by corruption, the point estimate for the lowest decile being negative (-0.061) but insignificant at the 10% level. However there are substantial differences with the previous estimates at the firm level. The impact of contextual corruption appears more consistent and negative across quantiles. The quantile estimate of the first quartile (-0.131) is already significant at the 10% level and the median effect (-0.266) is only marginally smaller than the effect on the upper quartile and the top decile (-0.332 and -0.334). This means that contextual corruption, contrary to firm level corruption, tends to shift downward the whole distribution of firm sales, even if the largest firms are still the most affected.

This systemic and contextual risk of corruption could be limited by improving the institutions that shape the business environment in Greece, thereby supporting the operation of large firms and SMEs. There have been policies addressed directly to the growth of SMEs, however, the results of the study show that large firms may be more hampered by administrative corruption. The overall improvement on the institutional environment could be beneficial for firms of different size and could promote entrepreneurship.

Table 9: Contextual corruption and the distribution of firm size, quantile regression estimates

	Quantile regression for log sales				
Quantile	0.1	0.25	0.5	0.75	0.9
	(1)	(2)	(3)	(4)	(5)
Contextual corruption	-0.061	-0.131	-0.266*	-0.332	-0.334
	(0.099)	(0.118)	(0.149)	(0.247)	(0.375)
Control for city size	Yes	Yes	Yes	Yes	Yes
Observations	417	417	417	417	417

Standard errors are block-bootstrapped using 100 replications at the sectoral level. *** Denote estimates significant at the 1% level, ** at 5%, and * at 1%, respectively. The contextual corruption is computed at the leave-one-out average of the firms of the same manufacturing sector.

In a study by the Athens Chamber of Commerce and Industry, more than 1,100 respondents evaluated the main business constraints in firms across Greece. Corruption between firms and the public sector was identified as a major obstacle in doing business, as was bureaucracy in the public services, the large size of the public sector in Greece, and the inability to combat the unofficial economy and trade. The main factor identified to hinder entrepreneurship is the lack of stability and predictability of changes in the tax, employment and insurance regulations. Access to finance was also identified as a significant barrier in doing business (Athens Chamber of Commerce and Industry, 2011).

Measures that could boost the overall business environment in Greece include a reduction of the operational cost of enterprises and administrative burdens and a simplification of the business environment through changes in public administration. Overall, the obstacles for starting a business should be decreased (Ioannidis, 2004). Business barriers in the entry and operation of a firm create an ideal environment for corruption to occur. In the cases where, in order to acquire a licence for the start-up of a company, bribery is required, many companies are driven to the informal economy (Sullivan and Shkolnikov, 2004). The procedures for business licences and business registrations should be decreased and simplified. The upgrade of public sector services through e-government could simplify procedures for setting up and operating a business, decrease time spent with public officials and improve effectiveness and transparency in the system. Reducing the discretion public officials have to interpret the regulations and raising tax compliance could also have a positive result in combating corruption (Sullivan and Shkolnikov, 2004). The modernization of the public administration and the implementation of reforms to simplify the regulatory environment could support business, decrease corruption and reinforce the international competitiveness of Greek firms (Ioannidis, 2004).

6. Conclusion

The study analyses administrative corruption as a business barrier to firm size and performance in Greece, and identifies the sectors that are most hampered by corruption and the sectors most prone to corrupt behaviour. The contextual effect of corruption, measured by the extent of corrupt practices in the firm sector, appears to be more detrimental to firm performance than the firm experience of corruption. Hence, both the sector and the firm environment determine the overall, negative, and systemic effect of corruption on firms in Greece. However, firms respond differently to business barriers and the relationship between corruption and firm growth appears to be significantly affected by the size of the company. Firm performance may be affected by corruption irrespective of the degree of actual firm engagement. Small, medium and large firms are affected differently by administrative corruption, and the degree of their engagement in corrupt practices varies. We found that corruption appears more detrimental for the sales in large firms. As large firms represent the major part of employment, this underlines the importance of institutional reforms that will improve the overall framework for doing business in Greece and target the most vulnerable sectors and firms.

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