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The presence of foreign firms in Ghana

The role of
physical, financial,
and governance
infrastructure

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**The Presence of Foreign Firms in Ghana:
The Role of Physical, Financial and Governance Infrastructure**

ABSTRACT

Using a new wave of firm-level data from the World Bank's Enterprise Surveys, this study examines the linkages between foreign firm participation and the investment climate in Ghana. The analysis of the binding constraints of direct investment is split between objective and subjective measures of the investment climate. While the subjective measures indicate accessing finance is the main constraint to doing business, the objective measures suggest foreign firm participation is affected by a multiplicity of institutional, physical and finance related infrastructures, namely the administration of financial statements, power outages and the judicial system. A breakdown of the effects of the binding constraints by ownership, firm size, industry and region is also provided.

JEL Classification: F21, F23, O12

Keywords: Firm-level data, investment climate, investment constraints

1. INTRODUCTION

Most investment projects undertaken in developing countries involve foreign participation – as either investors or sponsors of the project. Since 2008, global investments in infrastructural projects have tilted in favour of the developing countries from relatively equal shares of the previous decade split between the developed and the developing countries (UNCTAD, 2015).

Foreign investment represents an important channel through which resources, human capital and technological progress are transferred to developing countries. Specifically, the presence of foreign firms supplements the necessary capital accumulation in production that can improve growth prospect (Lee et al., 1998; Xu, 2000; Girma, 2002). Foreign firms also enhance the human resource base in developing countries through managerial experience, entrepreneurial expertise and technological skills. These skills can be passed on through joint partnerships with domestic firms and training programmes, thereby improving both the quantity and the quality of output (Gorg et al., 2004). Furthermore, foreign firms bring technological know-how and expertise that contribute to the upgrade of production processes and the efficiency of output. In addition, foreign firms engaged in trade generate foreign exchange through exports – a welcome benefit for developing countries which run current account deficits.

In recognition of the benefits of foreign direct investment (FDI), rationalising the motives for investing abroad and understanding the determining factors of direct investment in recipient countries remains an important issue from the perspective of developing countries. Focusing on the linkages between the investment climate and FDI at the firm level, several studies have highlighted the importance of infrastructure in

bringing in foreign capital. Among other factors, Cheng and Kwan (2000) suggest a good infrastructure is essential for attracting FDI into 29 Chinese regions over the period 1985 to 1995. In a study of the evolving FDI determinants into 30 Chinese provinces from 1986 to 1998, Sun et al. (2002) indicate the need to improve the investment environment. For a group of eight Latin American and Asian countries, Dollar et al. (2006) find that a better investment climate increases the probability to export and invest abroad. In particular, time and monetary measures of hard infrastructure (for example, electricity and telecommunications) as well as soft infrastructure (such as customs administration) help explain differences in FDI. Using foreign affiliate data for a large sample of developing countries, the findings by Kinda (2010) suggest the main deterrents of FDI are physical infrastructure, financing constraints and institutional problems, issues especially relevant for FDI in sub-Saharan African countries.

As a continent, Africa comprises the largest number of developing countries, yet African developing countries attracted only 4 per cent of global FDI in 2013 while only 3 per cent went to sub-Saharan African countries (UNCTAD, 2015). This is strikingly low given that global investment flows have tilted in favour of the developing countries since 2012 (see Figure 1). Despite rising volumes of FDI, most has ended up in a few countries. Indeed, four-fifths of global FDI is concentrated in 20 countries other than the poorest of the developing countries (UNCTAD, 2015).

Despite undertaking a programme of liberalisation during the 1990s African inward FDI remains subdued, partly reflecting increased competition for FDI and partly reflecting a lingering objection to foreign capital. Indeed, Moss et al. (2005) refer to a deeply-rooted scepticism within Africa towards foreign investment owing to historical,

ideological and political reasons manifested through a range of barriers, including the nationalisation of foreign firms, state intervention and legal restrictions on foreign investment. While economic policy reforms have largely removed the direct barriers to investment, many indirect barriers remain in place, constraining inward investment from otherwise higher levels.

Ghana was one of the first sub-Saharan African countries to carry out market-friendly economic reforms¹ while the introduction of a multi-party democratic system in 1992 has helped contribute to political stability (Barthel et al., 2008). On the basis of its record in implementing political and economic reforms, Barthel et al. (2008) examine the determinants of FDI for Ghana using enterprise survey data for 2007.

Using newly available data from the World Bank's Enterprise Surveys (ES), this study updates and extends the literature on the linkages between FDI and the investment climate in Ghana. Specifically, the FDI effects of the institutional, physical and finance related aspects of the business environment in which firms operate are examined using a new wave of data for 2013. This information is important from a developing country perspective given their generally poor infrastructure, limited access to finance, weak institutions and shortages of skilled labour (Kinda, 2010).

An underdeveloped physical infrastructure reduces connectivity with suppliers and customers, thereby increasing transaction costs (Bigsten and Söderbom, 2006) while also infringing on market access (Kinda, 2010). Limited access to local finance increases

¹ Ghana's economic reforms began with the Economic Recovery Programme (ERP) in 1983, followed by the adoption of the Petroleum Exploration and Production Law in 1984 and the Minerals and Mining Law in 1986. During the 1990s, the Investment Code was enacted (1994), closely followed by the Free Zone Act in 1995 (Abdulai, 2005; Barthel et al., 2008).

risk and reduces profit opportunities for foreign investors (Kinda, 2010). For example, restricted financial services for overdraft facilities, loans or payments can retard business opportunities while financial transactions with employees and customers are also curtailed. Weak institutions lead to low and uncertain returns on investments (Dollar et al., 2006). This is because bureaucratic and corrupt government officials along with inefficient regulation of infrastructure and financial services lead to an unreliable provision of services.

The contributions are three-fold. First, in examining the role of infrastructure to attracting FDI into Ghana at the firm level, this study contributes to the relatively scarce literature on FDI at a disaggregated level in contrast to most studies which use aggregated FDI data. These studies assume no variation within a country and hence fail to provide policy direction at a local regional level. Second, the sensitivity of various infrastructures – using both composite indexes and subcomponents of financial, physical and institutional infrastructure – are analysed as binding determinants of FDI in the manufacturing and services sectors in Ghana. Understanding firm capabilities and the ability to attract foreign firm participation in investment projects is important in terms of attracting the right type of FDI inflows into Ghana. It is also essential to attracting future FDI and hence advancing the growth and development prospects of Ghana. Third, both subjective and objective measures of infrastructural determinants of FDI are used to ensure robustness of results and hence inform appropriate policy prescriptions.

The paper is structured as follows. Section 2 provides an overview of FDI in Ghana using firm-level data. The econometric specification for the binding constraints of FDI is presented in Section 3. Split between objective and subjective measures of the

investment climate, the results are discussed in Section 4. Section 5 concludes and outlines the policy implications of the results.

2. DATA AND DESCRIPTIVE STATISTICS

FDI flows into Ghana remain depressed up until the reforms of the 1990s, have risen sharply during the last decade before declining in the wake of the global financial crisis and rising again in its aftermath (see Figure 2). At their height, FDI inflows into Ghana accounted for over 10 per cent of GDP (UNCTAD, 2015).

To examine the nature of the relationship between foreign firm participation in Ghana and the various types of infrastructure, information on a firm's capital structure from the World Bank's Enterprise Survey is used. The survey data provide information on 720 firms operating in the manufacturing and services industries² and covers the major urban areas in Ghana.³

Table 1 shows the breakdown for the 720 firms according to firm size and ownership in both the manufacturing and services industries across four Ghanaian regions. Of the four regions, half the number of firms in both sectors are located in Accra, not surprising as Accra is Ghana's capital and largest city by population density with links to resources and access to finance, helped by the presence of government and official

² Although much of the foreign investment in Ghana is directed at large mining projects, an analysis of non-mining investment by firms is important because of the very different environment they face. Specifically, firms operating in the extractive sectors can avoid many barriers to investment, especially with respect to security and infrastructural weaknesses while, at the same time, their large size and negotiating ability can insulate them from bureaucracy and other regulations (Moss et al., 2005).

³ Geographically Ghana is divided into ten regions, but in economic terms data availability allow the analysis for only four regions (Accra, Tema, Northern region and Takoradi).

offices and associated patronage of service provision. At the other end of the spectrum, Takoradi has the least number of firms; located in the western region of Ghana, its chief industries reflect its timber and mineral resources (timber, plywood, shipbuilding, railway repair and more recently crude oil).

A comparison of the two industries shows the manufacturing sector has the highest representation of firms, almost twice the number of firms in the services sector for small sized firms and one-third more for large sized firms, although for medium sized firms the numbers are roughly equal. This pattern also holds true for Accra; in facilitating the trade of merchandise goods, its coastal location and port makes it a likely contributing factor to the presence of manufacturing firms.

Most firms operating in Ghana are of domestic origin, outnumbering foreign firms⁴ by five to one. This pattern holds for both industries and across all four regions and while domestic firms dominate foreign firms across the size classifications, the disparity is not as great for large firms.⁵ Of the domestic firms, small firms are predominant in both sectors while medium- and large-sized firms are much fewer in number. Foreign firm participation in larger-sized firms is even more limited with zero values indicating the absence of foreign medium- and large-sized firms in Takoradi and the Northern region. There are instances across the regions, however, when large firms are more numerous than domestic firms. Tema, for example, has five large foreign firms and only two large domestic firms in the manufacturing sector, likely related to the pull factor

⁴ Foreign firms are defined as those with more than 10 per cent of foreign ownership. Of the 115 foreign firms, 90 firms are fully owned with 100 percentage foreign ownership.

⁵ Combining the manufacturing and services sectors, there are 37 large domestic firms (28 + 9) and 32 large foreign firms (14 + 18).

of its region's port. Similarly, for Tema's services sector. Large foreign firms also outnumber large domestic firms in Accra's services sector.

Note that for foreign firms operating in the services sector, most firms are medium or large in size. Bigger firms, on average, contribute more to the economy in their use of sophisticated technology in production and skills profile as well as higher levels of employment and income expenditure, which promote growth (Crespo et al., 2012). Furthermore, larger firms also contribute substantially to tax revenue collected from corporation taxes and taxes on exports.

Clearly, the data underscore the importance of understanding the rationale for the limited presence of foreign firms in the Ghanaian non-mining sector and putting in place appropriate policies to attract foreign investment. This is because the potential benefits that foreign firms bring may well extend beyond resources, skills and technology; compared with local firms; investment by foreign firms is often executed more efficiently, thus contributing to investment targets required for growth.

The mean values for a selection of domestic and foreign firm characteristics are shown in Table 2. Foreign firms, on average, employ more workers than domestic firms. They also provide more training for their staff and hire management with more experience, lending support to the hypothesis of FDI spillovers (Alfaro et al., 2004). Foreign firms also engage in more trade, thus boosting government revenue receipts. In fact, the import of services is the only category for which the mean value for domestic firms is higher than their foreign counterparts.

On the whole, the distribution of firms by size and sector indicate an insufficient number of foreign firms – especially those of medium to large size – are in operation.

Yet, a comparison of firm characteristics suggest foreign firms are, on average, more efficient in their contributions to the Ghanaian economy. Therefore, understanding the binding constraints that deter foreign investment in Ghana is imperative.

The Enterprise Survey data available from the World Bank provides information on the main constraints that hinder the location, operation and profitability of both domestic and foreign firms alike. Figure 3 shows a summary of the constraints most commonly cited by firms. Accounting for almost half of all responses (49 per cent), access to finance is most frequently cited as a constraint to doing business. Indeed, 90 per cent of domestic firms and 81 per cent of foreign firms identified accessing finance as a constraint to their operations.⁶

Access to finance and more broadly, the level of financial development is crucial for an economy's growth prospects (Levine, 2005). At the firm level, a good financial system facilitates the smooth operation of firms through lines of credit, overdraft provision, advances and banker's acceptance. These services enable firms to meet both short term and long term financial requirements of investment projects. A good financial infrastructure is not exclusive to domestic firms; foreign firms also benefit from greater financial depth (Alfaro et al. 2004). For example, the transfer of funds from the parent company to its subsidiary – especially in the case of vertical FDI– will be frustrated by a weak financial system.

⁶ See Figures 2a to 6b in the Appendix for a graphical representation of the constraints to doing business.

Second in the rankings of constraints is a country's physical infrastructure, captured by access and reliability of electricity.⁷ Comprising one fifth of all constraints cited, most firms (88 per cent of domestic firms and 90 per cent of foreign firms) have experienced power outages lasting over eight days on average. These power outages represent over 12 per cent of losses to annual sales, potentially discouraging firms from investing in Ghana.

A good physical infrastructure is essential to provide linkages between the stages of the production process; transportation networks are vital from the initial stage of accessing raw materials through to the end stage of delivering final products to wholesalers, retailers or final consumers. A proper functioning and stable form of communications is also necessary to conduct firms operations smoothly.

For foreign firms engaged in trade with the mother country or third markets, the effect of physical constraints can be magnified. This is because multiple modes of transport can be involved; the movement of finished products to final destinations can involve some combination of roads, railways or ships. Therefore, goods for export are exposed to additional infrastructure constraints leading to potential delays in delivery and extra costs. As foreign firms export and import more than domestic firms (see Table 2), transport costs incurred are therefore likely to be higher.

The remaining set of constraints shown in Figure 3 are derived from institutions. Taken together, they account for one third of all constraints cited. The importance of institutions to attracting foreign investment and the development of an economy have

⁷ The effects of additional physical infrastructural constraints are quantified in the empirical section, including access to water supply and telecommunications.

previously been highlighted (Acemoglu et al., 2002; Dollar et al., 2003; La Porta et al., 2004; Rodrik et al., 2004). Institutions create an environment conducive for the creation and operation of firms. This includes a firm's ability to secure land through the presence of effective administration and support from the purchase to the legal documentation of ownership, captured by the number of days it takes a firm to obtain a permit. In Ghana, three-quarters of firms (74 per cent) confirmed that issues relating to land access constrained business, not surprising as it takes an average of 51 days to obtain a construction permit. Of these firms, four-fifths of foreign firms indicated this institutional constraint could potentially affect the attractiveness of Ghana to foreign investors.

Other institutional constraints found to impact foreign firms' investment in Ghana include tax rates and its administration, business licences and permits, corruption, and the court system (La Porta et al., 2001). Such impediments negatively affect the normal running of a business. For example, firms can struggle to get permits required for business operations or the conduct of trade abroad. In addition, firms can be subject to paying higher taxes than expected or they may be coerced into making unofficial payment to tax officials. Furthermore, feeble court systems that are unable to uphold the law in a consistent manner can deter firms – especially foreign firms – from investing in such a business environment (Du et al., 2012). Alternatively, ineffectual court systems can create reputational problems. Diamond (1991) shows that such reputational problems lead to penalties in subsequent transactions. Firms seek alternative ways to deal with the problem, which in turn, can lead to a higher level of corruption. On average, 60 per cent or more firms find these institutional factors as constraints to the operation of their

business. A similar pattern emerges for both domestic and foreign firms, the latter implying institutional constraints can hamper the inflow of FDI into Ghana.

3. MODEL SPECIFICATION

Using firm-level data, the determining factors of FDI into Ghana are specified as follows:

$$FDI_{ijk} = \beta_1 X_{ijk} + \beta_2 Z_{ijk} + \omega_i + \varepsilon_{ijk} \quad (1)$$

where the dependent variable, FDI_{ijk} , representing a foreign firm k operating in industry i in region j is denoted by a dummy variable which takes the value of unity when at least 10 per cent of the firm's capital structure is foreign and zero otherwise. The set of explanatory variables consists of a vector of structural constraints, X_{ijk} and a vector of control variables, Z_{ijk} . Equation (1) also includes industry specific effects, ω_i , to control for heterogeneity across industries. The random error term is denoted as ε_{ijk} .

The structural constraints faced by firms in Ghana refer to three infrastructural indicators, namely (1) finance related infrastructure, (2) physical infrastructure and (3) governance related infrastructure derived from institutions. The survey data include both subjective and objective measures of the investment climate. Subjective variables are used to gauge the relative importance of each issue to the firm while the set of objective variables measure the effect of the investment climate on foreign firm participation.

Using subjective variables relating to firms' perceptions of the constraints they face in business, the structural constraints are proxied by an index variable ranging from zero (no obstacles) to four (severe obstacles). First, finance related infrastructure, *FINANCE*, is measured by a firm's access to finance. Second, physical infrastructure, *INFRAS*, is measured by access to transport, electricity and telecommunications. Last,

the institutional infrastructure, *INST*, reflects the ease with which licenses and business permits can be acquired, the ability to register land and buildings, the payment of taxes and tax administration, customs and trade regulations and whether corruption leads to demands for informal payments, gifts, bribes and protection payments. An indicator for the quality of human capital and other firm characteristics are included as control variables in the model.

Alternatively, the various aspects of the investment climate can be captured by objective variables or time and monetary costs experienced by the firm. Accordingly, the structural constraints are defined as follows. First, finance related infrastructure is captured by a firm's history of credit or loans with a financial institution and whether its financial statements have been checked and certified by an external auditor. Second, in view of the recent energy crisis in Ghana the physical infrastructure variables refer to the number of power outages experienced in a typical month and the associated losses as a share of sales. Third, the institutional environment is picked up by the frequency of inspections and requirements for meetings by tax officials and whether the court system is fair, impartial and uncorrupted. The full model specification is as follows:

$$\begin{aligned}
 FDI_{ijk} = & \lambda_0 + \lambda_1 FINANCE_{ijk} + \lambda_2 INFRAS_{ijk} + \lambda_3 INST_{ijk} \\
 & + \lambda_4 SKILL_j + \lambda_5 AGE_k + \lambda_6 SIZE_k + \lambda_6 INDUSTRY_i \\
 & + \varepsilon_{ijk}
 \end{aligned} \tag{2}$$

where the constraints to doing business are represented by the financial, physical and institutional infrastructural factors proxied by subjectively and objectively defined data and the firm characteristics refer to skilled labour, the age and size of the firm and the industry in which the firm operates.

4. EMPIRICAL RESULTS

4.1 Logit regression results using subjectively defined constraints

Table 3 presents the logit regression results using subjective measures for the constraints to doing business. Columns (1) to (3) incrementally expand the set of structural constraints with infrastructural indicators related to finance and the physical and institutional environment.

The results suggest accessing finance is a significant constraint to doing business across the models. Credit constraints arising from market imperfections such as asymmetric information and agency problems often characterise developing countries (Stiglitz and Weiss, 1981). Financial imperfections translate into binding constraints only if firms have a desire to invest (Bigsten and Söderbom, 2006). In Ghana, the extent of the informal economy acts as a key structural impediment to the financial system (Adams et al., 2014). A large informal economy curtails the number of financial institutions which, in turn, restricts credit decisions on commercial feasibility and discourages borrowing for investment projects. Indeed, the availability of credit to the private sector has declined steadily over time. Even where credit is available, the cost of capital can be problematic as lending carries the risk of non-repayment.

The country's physical infrastructure – whether defined in terms of firms' perceptions of transport, power or online communications – does not materially constrain foreign firm participation. While Africa's telecommunications infrastructure has

improved,⁸ its relatively underdeveloped transport network and recent energy crisis which tend to put off potential investors are not supported by the results.

The quality of institutions vary hence their effects can vary. Different aspects of institutional quality can also vary. While corruption,⁹ tax rates¹⁰ and access to land constrain FDI, only the latter is statistically significant. In general, the system of managing land and property in Ghana is cumbersome while institutional barriers restrict investment in housing development and mortgage services.

A neutral effect is obtained for firms' perceptions of getting a license or permit and similarly for tax administration. On the other hand, customs and trade regulations encourage FDI significantly. By contributing indirectly to the cost of trade nontariff barriers (NTBs) limit access to markets, but their effects depend on the prevailing type of FDI. Whereas a negative effect would suggest trade costs have a deterring effect on vertically-integrated FDI (VFDI), the positive effect points to the presence of horizontally integrated FDI (HFDI) as firms circumvent protectionist measures by producing goods locally.

Several firm-level characteristics are also important in attracting foreign firms. High quality foreign investment requires technical skills to build knowledge-based

⁸ Interconnectedness has improved with the buildup of fibre optic cable, although high internet prices limit internet penetration (Adams et al., 2014).

⁹ Ghana has experienced turbulent periods of army rule and political uncertainty since gaining independence in 1957, but is now lauded as a beacon of peace and stability among African nations.

¹⁰ This result is consistent with the finding that the rate of tax discourages FDI in other developing countries, but not in subSaharan African countries, explained by the fact that tax incentives have a smaller effect in the presence of structural problems (Kinda, 2010).

industries hence the importance of an educated and trained labour force. As international firms tend to be headquartered in skilled-labour-abundant countries, the positive coefficient sign for skilled labour suggests foreign firms bring manpower as well as investment from their country of origin. The size of the firm also matters for FDI. In particular, foreign investment tends to be either medium or large in size.

The analysis is also extended to exploit information on the varying degrees of ownership of a subsidiary ranging from full outright ownership (100 per cent) to ownership of more than half (50-99 per cent) and less than half the subsidiary's stock (10-49 per cent)¹¹ as well as the classification of firms into small-, medium- and large-sized firms.¹² Information by sector and location also allows for the possibility of examining the sensitivity of FDI to the various infrastructural constraints across the manufacturing and services sectors and across four different regions in Ghana. The results are shown in Table 4.

(i) Breakdown by ownership

In terms of ownership, similar results are obtained for firms that are majority- or fully-owned by the foreign firm. In particular, access to finance remains an important constraint, but less so for fully owned firms likely reflecting the possibility of internal financing between the parent enterprise and its affiliates and hence less dependence on local finance. The positive and significant effect of customs and trade regulations is also

¹¹ Ownership of 10 per cent or more of a subsidiary's stock is sufficient to qualify for direct control of business operations.

¹² The size classification is based on the number of employees. Small firms are those with 5-19 employees, medium firms have 20-99 employees and large firms have 100 or more employees.

upheld, suggesting firms with higher foreign ownership are of the horizontal type motivated to produce locally and avoid nontariff barriers. As before, access to land is marginally significant. The firm characteristics relating to an educated and skilled workforce along with large size also remain intact as key determinants of FDI. A high degree of foreign ownership is also associated with the manufacturing industry.

Firms with smaller foreign firm participation of less than 50 per cent accrue opposite coefficient signs. Accessing finance becomes a stimulus as firms with greater local knowledge tap into informal sources of finance including family and friends. This time, customs and trade regulations act as a deterrent as trade related costs impede FDI of the vertical type. Similarly, for skilled labour and large firm size as firms with higher local ownership depend more on the local pool of labour and tend to be smaller in size.

(ii) Breakdown by firm size

Rerunning the model for the various firm size classifications, access to finance is found to be a marginal constraint for small firms only and is insignificant for larger sized firms which typically have alternative sources available from within the company.

Transport is introduced as an additional constraint for medium-sized firms. The Ghanaian transport network is mainly served by roads that connect all the major urban and rural areas while expansion of the Trans-African Highway network, currently linking Ghana with its neighbouring countries, will eventually tie it with many more member countries of the Economic Community of West African States (ECOWAS), aimed with promoting economic integration. Although the alternative modes of transport are undergoing major investment and expansion, the general state of the transport network remains severely underdeveloped by international standards. In particular, the limited

coverage and domestic lines of Ghana's railway system which has no international connections impairs the international exchange of commodities.

For large firms, access to land becomes a significant barrier to business operations, although this is mitigated by greater ease in obtaining a license or a permit. Corruption is also found to be a marginally significant obstacle for large firms. Note that the firm characteristics indicate manufacturing is negatively associated with large firms¹³ and positively associated with small firms.

(iii) Breakdown by industry

Producing goods requires the physical units of land, buildings and machinery. As the only and significant institutional barrier to the manufacturing industry, gaining access to land can delay or even halt the initial start-up phase of foreign investment.

For the services industry, transport and corruption represent the main infrastructural constraints. While the provision of services does not involve the carriage of bulky raw materials or inventories, services personnel need to avail of an efficient and timely transport network to deliver services – all the more important if service provision involves high frequency external service suppliers. The effect of corruption is smaller in magnitude, but is significant. While manufacturing tends to be associated with 'footloose' FDI, services are often location-specific and therefore are easier targets for corrupt officials seeking bribes and additional payments. Insofar as services may be operating semi-informally, it is also possible that bribes may help avoid higher penalties associated with non-compliance of tax requirements (Aterido et al., 2011). Large size is a

¹³ In the industry-based regressions, large firm size is positively associated with manufacturing; the small sample size may account for the inconsistency in the results.

common firm characteristic for both industries while customs and trade regulations have an additional FDI promoting effect on services.

(iv) Breakdown by region

Interestingly, the results suggest Accra, Ghana's richest region, is not significantly affected by the constraints impinging on the less privileged regions, apart from the marginal significance of access to land. New office space is not easily accommodated in Ghana's capital city, putting upward pressure on rental rates. The problem of accessing land and property is compounded by underinvestment in recreational facilities.

The Northern region is mainly affected by electricity constraints. Clearly, power cuts and fluctuations in hydroelectric current have a greater effect in the more rural regions where own supplies of power generators are more limited. In Takoradi, access to finance and obtaining a license or a permit are the main constraints faced by firms.

Of the four regions, business operations in Tema are significantly impaired by the greatest number of constraints, including constraints relating to transport, access to land and tax rates. Although Tema hosts Ghana's largest seaport, Takoradi's smaller port is better served by the railway network linking it with Kumasi, Sunyani and Cape Coast via the Ghana Western Rail Line. Founded on a small fishing village, the city of Tema's population is shrinking, perhaps not unrelated to the spatial issue of accessing land and buildings. While financial charges and taxes are also found to be a key constraint to doing business, the administration of taxes encourages FDI. Finally, the positive effect of customs and trade regulations suggest FDI is of the horizontal type. In terms of firm

characteristics, small-sized firms characterise the Northern and Tema regions, while large firms dominate the firm characteristics for Accra.

4.2 Logit regression results using objectively defined constraints

Using objectively defined data for the financial, physical and institutional factors that potentially affect firm-level FDI, the results are shown in Table 5. The monetary based factors are revealing insofar as the baseline results suggest accessing credit or a loan is significant. However, the much more important financial variable that influences foreign participation is significant. Administering financial statements and the auditing of accounts represents a binding constraint to foreign participation, but is mitigated by tax-related administration. The limitations of Ghana's physical infrastructure also becomes apparent as energy outages and their associated losses become important deterrents of FDI. Finally, without a fully functioning judiciary, an essential ingredient for investment is called into question.

A breakdown by ownership and industry is also shown in Table 5. As before, similar results are obtained for firms that are majority- or fully-owned by the foreign firm. In addition to the auditing and judicial constraints, majority-owned firms are also significantly constrained by losses due to electric blackouts; the marginal significance for fully-owned firms likely reflecting the use of own generators. Indeed, Moss et al., (2005) have previously highlighted foreign-domestic differences in infrastructural investment by East African countries with 80 per cent of foreign firms reporting ownership of a generator compared with less than half for local firms. As before, opposite coefficient signs are obtained for firms with smaller foreign firm participation of less than 50 per cent as local knowledge of the auditing and judicial systems stimulate FDI and similarly

for power losses while tax inspections infringe the decision to invest. In contrast to the industry regressions using subjective definitions, the manufacturing sector is negatively affected by the financial (auditing) and physical (power losses) environment as well as the judiciary. The number of power outages and tax inspections are more important for services based FDI.

An outstanding issue remains: it is possible that the results suffer from endogeneity bias. While the objective measures help reduce endogeneity due to measurement error,¹⁴ the potential problem of reverse causality still remains. Among other factors, foreign investment is determined by the financial environment, but arguably the reverse may also hold true. To help relieve the problem of simultaneity, an instrumental variable (IV) approach is used. Following Kinda (2010), sector-region averages are used as an instrument for the potentially endogenous variables. The model is then reestimated using two-stage least-squares (2SLS), which produces consistent estimates and ivprobit which better deals with bias. The results shown in Table 5 broadly accord with the baseline model results except that the significance of the courts system is reduced to marginal significance according to ivprobit.¹⁵

¹⁴ In using information on actual access to bank loans and the frequency of outages and the costs associated with these outages, objective measures of the business environment improve on subjective measures which only use the extent to which firms complain about finance or electricity (Aterido et al. 2011).

¹⁵ Also, we estimated the objective regression with additional firms characteristics. This result is presented in table 6 in the appendix. Results confirm the robustness of the arguments discussed with the other estimations.

5. SUMMARY AND CONCLUSIONS

FDI is integral to the acceleration of growth in many developing countries, therefore studying the factors that determine FDI remains an important issue from a development point of view. Most studies on FDI – whether for a time-series analysis of a single country or a panel of cross-countries – use aggregated data, but these studies offer little by way of specific information on the firm’s environment that policy makers can influence.

This study presents detailed disaggregated results relevant for key stakeholders to push the frontiers of foreign investment in Ghana. Using newly available information for 2013, the infrastructural determinants of FDI in Ghana are explored using firm-level evidence. Specifically, the potential determinants of FDI are examined focusing on three types of constraints covering the financial, physical and institutional environment. The logit regression technique is used to analyse the nature of the relationship between foreign firm participation and the business environment. For robustness, 2SLS and ivprobit are implemented to deal with potential endogeneity issues.

Of the three types of infrastructure examined, the financial environment is found to be the most binding constraint of FDI. Using subjectively defined measures, the role of finance needs to be addressed if Ghana is seeking to attract more inward investment. More interesting are the results in relation to the objectively defined measures of finance which are specific to firms. Using two variables, one capturing the management and administration of finance and the other capturing established lines of credit for firms, the latter is identified as having the right environment to attract FDI while the former indicated an inappropriate or absence of auditing procedure has a negative effect on FDI.

This result raises the need for policy to be initiated not only to address the ability to access finance, but also to improve financial management. Governments can promote education on good financial practices for firms in Ghana through the Ghana Audit Service. They could also introduce or enforce laws along these lines to encourage firms to improve the management of their finances as a business. This can significantly improve the number of joint partnerships with foreign firms in Ghana.

At the cost of reducing the number of observations, the analysis is also disaggregated by ownership, firm size, sector and region. The nature of the relationship between the presence of foreign firms and financial administration constraints also holds for the manufacturing industry and across majority- and fully-owned foreign firms. Along the regional dimension, access to finance was found to be significantly binding for Takoradi. Examining the data by size, the results show that financial constraints to attracting foreign capital most strongly affect small firms. This outcome raises concerns for relevant stakeholders given that a greater percentage of the firms in the sample are small firms. Policy makers must target the small firm industry and provide financial assistance either through state owned banks or microfinance institutions to ameliorate this constraint. In doing so, they create an environment that can attract foreign capital.

In the case of Ghana's physical infrastructure, the breakdown by region reveals important direction for policy. Electricity is a significant constraint for the Northern region. If Government can significantly improve electrification of the North – where access to land is less of a problem – attracting foreign firms, especially manufacturing firms, to these parts of Ghana is made easier. Indeed, the results from the objectively defined measures highlight the negative impact of power outages on attracting foreign

firms. Government and all stakeholders must take necessary measures to provide sustainable electricity or explore alternative ways of providing power for firms.

Finally, the institutional constraints indicated access to land represents an important deterrent to FDI in Ghana. By region, land access is a significant binding constraint for Tema and is marginally significant for Accra. Given their urbanised nature, this presents a real issue for manufacturing firms. Indeed, the breakdown by industry confirmed that manufacturing firms are significantly impeded by access to land. By size, large firms are most affected. Collectively, these results highlight where government policy should be targeted when it comes to addressing institutional problems. As the capital city, Accra is host to many government offices that typically interact with firms. Government must focus on the court system, licensing offices and tax offices to ensure they deliver a fair and efficient service that complements the smooth functioning of firms. All in all, these policy recommendations would contribute towards providing the necessary economic environment to attracting foreign firms to Ghana.

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Table 1 Distribution of firms by ownership, region, industry and firm size^a

	Manufacturing					Services					Grand Total
	Small	Medium	Large	Unknown	Total	Small	Medium	Large	Unknown	Total	
<i>Domestic firms</i>											
Accra	130	30	10	13	183	76	16	7	12	111	294
North	60	2	12	17	91	35	9	0	7	51	142
Takoradi	15	1	4	5	25	21	4	0	2	27	52
Tema	58	10	2	3	73	23	18	2	1	44	117
Total	263	43	28	38	372	155	47	9	22	233	605
<i>Foreign firms</i>											
Accra	16	9	9	4	38	4	9	13	0	26	64
North	4	0	0	1	5	0	0	0	0	0	5
Takoradi	3	0	0	0	3	2	0	0	0	2	5
Tema	15	7	5	0	27	0	8	5	1	14	41
Total	38	16	14	5	73	6	17	18	1	42	115
Grand Total	301	59	42	43	445	161	64	27	23	275	720

Source: Author calculations using Enterprise Survey data, World Bank.

^a Size classification is based on the number of employees. Small firms are those with 5-19 employees, medium firms have 20-99 employees and large firms have 100 or more employees. The unknown size group captures firms from the Chamber of Commerce and Industry in Ghana of unknown size (World Bank, 2013). Industry classifications have been aggregated into the manufacturing and services sectors.

Table 2 Firm characteristics

	Manufacturing	Services	Total
<i>Domestic firms</i>			
Employees	29.38	18.53	25.20
Formal training	0.37	0.43	0.39
Managerial experience	16.60	14.00	15.60
Exporting	7.83	2.25	5.68
Importing	44.37	51.67	44.51
<i>Foreign firms</i>			
Employees	75.93	63.93	71.55
Formal training	0.40	0.49	0.43
Managerial experience	17.93	14.17	16.56
Exporting	22.95	12.17	19.01
Importing	57.17	40.00	56.35
<i>Total firms</i>			
Employees	37.02	25.47	32.61
Formal training	0.37	0.44	0.40
Managerial experience	16.82	14.02	15.75
Exporting	10.31	3.77	7.81
Importing	46.46	47.78	46.49

Source: Enterprise Survey, World Bank.

Table 3 Constraints to doing business^{a,b}

Regressors	Financial	Physical	Institutional
<i>Constraints to Doing Business</i>			
Access to finance	-0.12** (0.05)	-0.12** (0.05)	-0.13** (0.06)
Transport	–	-0.04 (0.06)	-0.11 (0.09)
Electricity	–	-0.03 (0.10)	-0.06 (0.12)
Telecommunications	–	0.09 (0.10)	0.03 (0.10)
Licensing and permits	–	–	0.02 (0.08)
Access to land	–	–	-0.12* (0.07)
Tax rates	–	–	-0.20×10 ⁻² (0.13)
Tax administration	–	–	0.05 (0.10)
Customs and trade regulations	–	–	0.27** (0.13)
Corruption	–	–	-0.04 (0.03)
<i>Firm characteristics</i>			
Skilled workforce	0.29** (0.10)	0.29** (0.09)	0.26** (0.10)
Age	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Firm size: Small	-0.02 (0.48)	-0.01 (0.02)	0.08 (0.54)
Firm size: Medium	1.33** (0.49)	1.30** (0.48)	1.21** (0.53)
Firm size: Large	2.21** (0.51)	2.20** (0.50)	2.19** (0.55)
Manufacturing	0.23 (0.22)	0.26 (0.23)	0.35 (0.23)
Constant	-2.26** (0.55)	-2.25** (0.61)	-2.25** (0.69)
No. of obs	710	710	710
Pseudo R^2	0.13	0.13	0.16

^a Logit regression of FDI where the dependent variable is defined as the percentage of firms owned by private foreign individuals, companies or organisations.

^b Robust standard errors are reported in parentheses.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table 4 Constraints to doing business by ownership, firm size, industry and region using subjective data^a

	Ownership (%)			Firm Size			Industry		Region			
	100	50-99	10-49	Small	Medium	Large	Manuf	Services	Accra	North	Takoradi	Tema
<i>Constraints to Doing Business</i>												
Access to finance	-0.12* (0.06)	-0.13** (0.06)	0.13** (0.06)	-0.16* (0.01)	0.09 (0.14)	-0.19 (0.34)	-0.12 (0.08)	-0.19 (0.17)	-0.08 (0.08)	-0.71 (0.49)	-5.46** (2.60)	-0.13 (0.19)
Transport	-0.14 (0.09)	-0.15 (0.10)	0.13 (0.10)	-0.12 (0.18)	-0.29** (0.15)	-0.46 (0.40)	-0.06 (0.11)	-0.32** (0.16)	0.05 (0.13)	-0.16 (0.52)	4.05 (2.63)	-1.12*** (0.32)
Electricity	-0.05 (0.14)	-0.05 (0.12)	0.04 (0.13)	-0.09 (0.12)	0.31 (0.29)	0.27 (0.29)	-0.11 (0.14)	-0.10 (0.16)	0.02 (0.13)	-0.96** (0.44)	-2.05 (1.28)	-0.19 (0.25)
Telecommunication ^b	0.04 (0.11)	0.04 (0.11)	-0.04 (0.11)	-	-	-	-	-	-	-	-	-
Licensing and permits	0.04 (0.08)	0.03 (0.08)	-0.03 (0.08)	-0.20* (0.11)	-0.08 (0.16)	1.32*** (0.44)	0.20×10 ⁻² (0.10)	0.08 (0.16)	0.04 (0.11)	0.39 (0.30)	-12.55** (6.01)	0.02 (0.16)
Access to land	-0.13* (0.07)	-0.11* (0.07)	-0.11* (0.07)	-0.14 (0.10)	-0.40×10 ⁻² (0.14)	-0.57** (0.27)	-0.25** (0.11)	0.16 (0.13)	-0.18* (0.10)	0.01 (0.56)	1.51* (0.79)	-0.77** (0.36)
Tax rates	0.10 (0.14)	-0.03 (0.12)	-0.40×10 ⁻² (0.13)	-0.09 (0.23)	-0.20 (0.42)	-0.23 (0.43)	0.15 (0.18)	-0.24 (0.15)	0.07 (0.13)	-3.06 (1.95)	0.21 (1.24)	-1.19*** (0.44)
Tax administration	-0.02 (0.10)	0.03 (0.10)	0.60×10 ⁻² (0.10)	0.16 (0.20)	0.42 (0.34)	-0.20 (0.46)	-0.08 (0.13)	0.40* (0.24)	-0.11 (0.10)	1.59 (1.62)	4.65* (2.44)	1.56*** (0.50)
Customs and trade regulations	0.33** (0.14)	0.36** (0.13)	-0.37*** (0.14)	0.50*** (0.16)	0.06 (0.22)	0.94** (0.43)	0.22 (0.14)	0.55*** (0.18)	0.09 (0.10)	-0.11 (0.19)	-0.75 (0.61)	1.52*** (0.40)
Corruption	-0.06 (0.04)	-0.05 (0.04)	0.06 (0.04)	-0.04 (0.06)	-0.03 (0.05)	-0.48* (0.28)	-0.02 (0.05)	-0.10** (0.05)	-0.05 (0.05)	0.06 (0.34)	1.14* (0.61)	0.03 (0.10)
<i>Firm characteristics</i>												
Skilled workforce	0.26** (0.11)	0.25** (0.11)	-0.22** (0.10)	0.18 (0.16)	0.40 (0.31)	0.61* (0.31)	0.21* (0.12)	0.44* (0.24)	0.25* (0.13)	0.30 (0.25)	5.15* (2.73)	0.25 (0.27)
Age	-0.03** (0.02)	-0.03 (0.02)	0.02 (0.02)	-0.01 (0.03)	0.01 (0.02)	-0.03 (0.03)	-0.02 (0.02)	0.01 (0.02)	-0.03* (0.02)	-0.21 (0.13)	0.08* (0.05)	-0.01 (0.04)
Firm size: Small	-0.10 (0.62)	-0.11 (0.58)	0.15 (0.58)	-	-	-	-0.03 (0.58)	-0.09 (1.44)	-0.75 (0.67)	-2.48*** (0.83)	-	-2.60*** (1.01)
Firm size: Medium	0.82 (0.61)	1.08* (0.55)	-1.01* (0.56)	-	-	-	0.93 (0.59)	1.77 (1.39)	0.83 (0.71)	-	-	-1.33 (1.00)
Firm size: Large	2.19** (0.62)	2.07** (0.58)	-2.06*** (0.58)	-	-	-	1.24** (0.61)	4.18*** (1.47)	2.08*** (0.71)	-	-	-
Manufacturing	0.61** (0.26)	0.47* (0.25)	-0.59** (0.25)	1.39*** (0.47)	-0.26 (0.53)	-1.82** (0.74)	-	-	0.44 (0.34)	2.48* (1.46)	-2.64 (3.28)	1.26* (0.64)
Constant	-2.50*** (0.83)	-2.13*** (0.74)	2.27*** (0.76)	-2.78*** (0.73)	-2.56*** (0.96)	0.92 (0.97)	-1.26 (0.78)	-4.05** (1.70)	-1.36* (0.82)	3.87 (2.42)	-4.04* (2.18)	0.42 (1.14)
No. of obs	710	710	710	454	123	67	442	268	349	125	49	144
Pseudo R ²	0.18	0.18	0.18	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26

^a Robust standard errors are reported in parentheses.

^b The telecommunications constraint is dropped from the firm size, industry and region regressions due to an insufficient number of observations.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table 5 Constraints to doing business by ownership and industry using objective data^a

	Baseline			Ownership (%)			Industry		Endogeneity	
	Financial	Physical	Institutional	100	50-99	10-49	Manuf	Services	IV 2SLS	IV Probit
<i>Constraints to Doing Business</i>										
Credit or loan	0.65** (0.30)	0.99** (0.40)	0.64 (0.45)	0.29 (0.44)	0.68 (0.47)	-0.68 (0.47)	0.07 (0.52)	3.94*** (0.93)	0.10* (0.06)	0.49** (0.21)
Audit	-1.53*** (0.32)	-1.44*** (0.37)	-1.50*** (0.43)	-1.79*** (0.54)	-1.64*** (0.48)	1.64*** (0.48)	-1.78*** (0.54)	-0.62 (0.79)	-0.45** (0.21)	-2.07*** (0.31)
Number of power outages	-	-0.03** (0.02)	-0.05** (0.062)	-0.04 (0.03)	-0.04* (0.02)	0.04* (0.02)	-0.04* (0.02)	-0.09** (0.04)	-0.30×10 ⁻² ** (0.00)	-0.02** (0.01)
Losses due to power outages	-	-0.03*** (0.01)	-0.05*** (0.02)	-0.03* (0.02)	-0.04** (0.01)	0.04** (0.01)	-0.06*** (0.03)	-0.04 (0.03)	-0.40×10 ⁻² *** (0.00)	-0.02** (0.01)
Tax inspections	-	-	0.09** (0.04)	0.04 (0.05)	0.12*** (0.04)	-0.12*** (0.06)	0.13** (0.06)	-0.58** (0.29)	0.01 (0.01)	0.03 (0.02)
Courts	-	-	-0.12*** (0.03)	-0.16*** (0.04)	-0.13*** (0.03)	0.13*** (0.03)	-0.15*** (0.04)	-0.10 (0.07)	-0.01*** (0.00)	-0.04* (0.02)
<i>Firm characteristics</i>										
Skilled workforce	0.23** (0.11)	0.45*** (0.15)	0.44** (0.18)	0.43** (0.18)	0.41** (0.17)	-0.41** (0.17)	0.28 (0.22)	0.97** (0.49)	0.01 (0.02)	0.08 (0.10)
Age	-0.01 (0.01)	0.02 (0.02)	0.02 (0.02)	-0.02 (0.02)	-0.01 (0.02)	0.01 (0.02)	0.02 (0.02)	0.03 (0.04)	0.10×10 ⁻² (0.00)	0.01 (0.01)
Firm size: Small	0.16 (0.51)	0.24 (0.71)	0.79 (1.22)	-1.81*** (0.46)	0.42 (1.23)	-0.42 (1.23)	0.58 (1.31)	-4.59*** (1.08)	0.03 (0.08)	0.46 (0.44)
Firm size: Medium	1.27** (0.53)	1.47** (0.74)	2.00 (1.25)	-1.07* (0.59)	1.80 (1.25)	-1.80 (1.25)	1.87 (1.35)	-3.69*** (0.86)	0.11 (0.09)	0.68 (0.51)
Firm size: Large	2.21*** (0.54)	2.09*** (0.75)	2.79** (1.24)	- (1.24)	2.47** (1.24)	-2.47** (1.24)	1.57 (1.36)	- (1.36)	0.26** (0.11)	0.76 (0.60)
Industry: Manuf	0.30** (0.24)	0.22 (0.30)	0.27 (0.35)	0.50 (0.41)	0.42 (0.37)	-0.42 (0.37)	- (0.37)	- (0.37)	0.03 (0.04)	0.14 (0.17)
Constant	-1.92** (0.90)	-2.45** (1.08)	-2.48* (1.38)	1.05 (1.19)	-2.28* (1.36)	2.28* (1.36)	-0.38 (1.47)	-3.82 (2.51)	0.60** (0.30)	0.85 (0.95)
No. of obs	690	425	384	357	384	384	246	131	384	384
Pseudo R ²	0.31	0.31	0.31	0.31	0.31	0.31	0.48	0.48	-	-

^a Robust standard errors are reported in parentheses.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

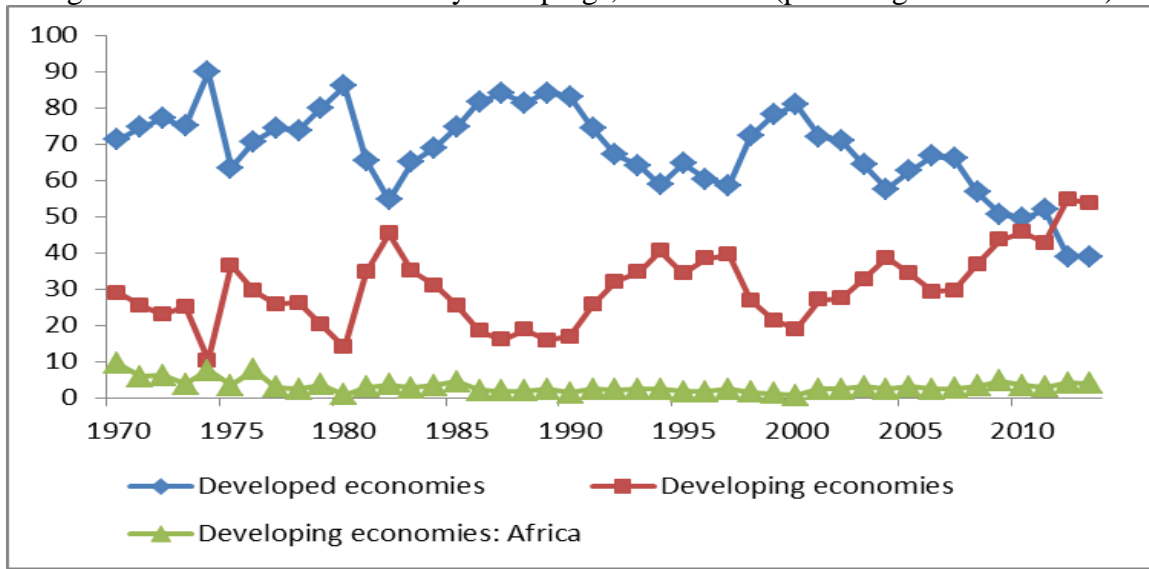
Table 6 Constraints to doing business with additional firm characteristics

<i>Regressors</i>	<i>Financial</i>	<i>Physical</i>	<i>Institutional</i>
Credit or loan	0.604 (0.550)	-0.239 (0.602)	-0.439 (0.572)
Audit	-1.791*** (0.574)	-2.076*** (0.716)	-1.772** (0.794)
Losses due to power outages		-0.050** (0.025)	-0.078** (0.038)
Number of Power outages		-0.050* (0.030)	-0.076** (0.034)
Formal training	1.381** (0.614)	0.959 (0.733)	0.983 (0.644)
Education	0.199** (0.084)	0.332*** (0.114)	0.291** (0.123)
export	1.191** (0.507)	0.822 (0.555)	1.108 (0.702)
Capacity utilization	0.601 (0.504)	0.902 (0.580)	0.490 (0.628)
Competition	-0.004 (0.007)	-0.011 (0.009)	-0.005 (0.013)
skilled work force	0.237 (0.190)	0.520* (0.296)	0.611 (0.389)
Tax Inspection			0.261** (0.119)
Courts			-0.142* (0.078)
Constant	-7.037*** (2.158)	-5.732* (3.058)	-6.157* (3.549)
Controls	Size, Industry, age		
Observations	254	173	159
Pseudo R-squared	0.446	0.446	0.446

Robust standard errors are reported in parentheses.

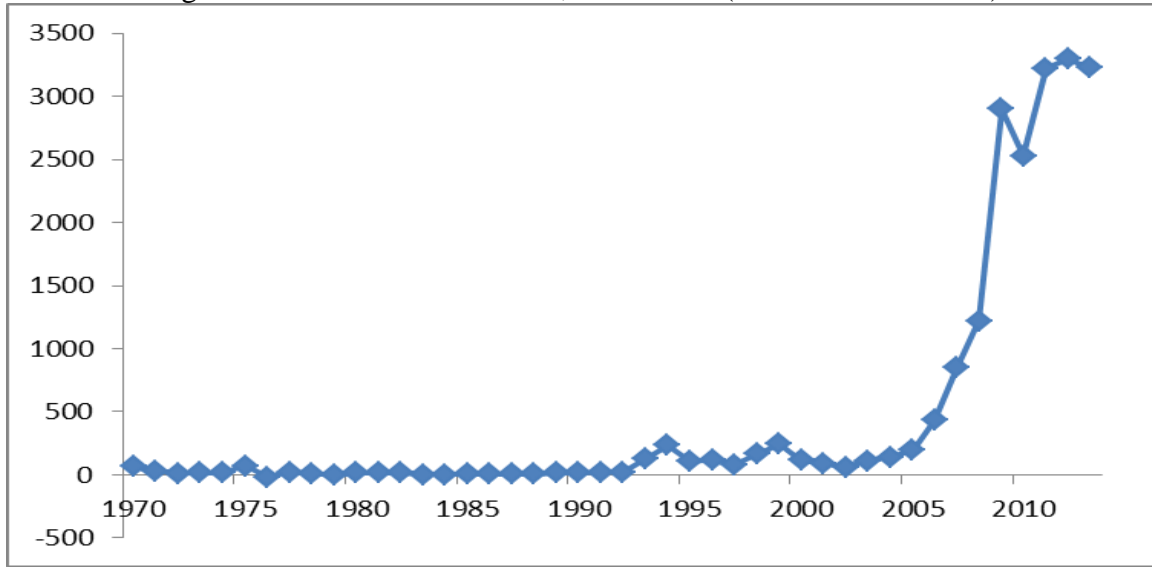
*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Figure 1 FDI Inflows to Country Groupings, 1970-2013 (percentage of world total)



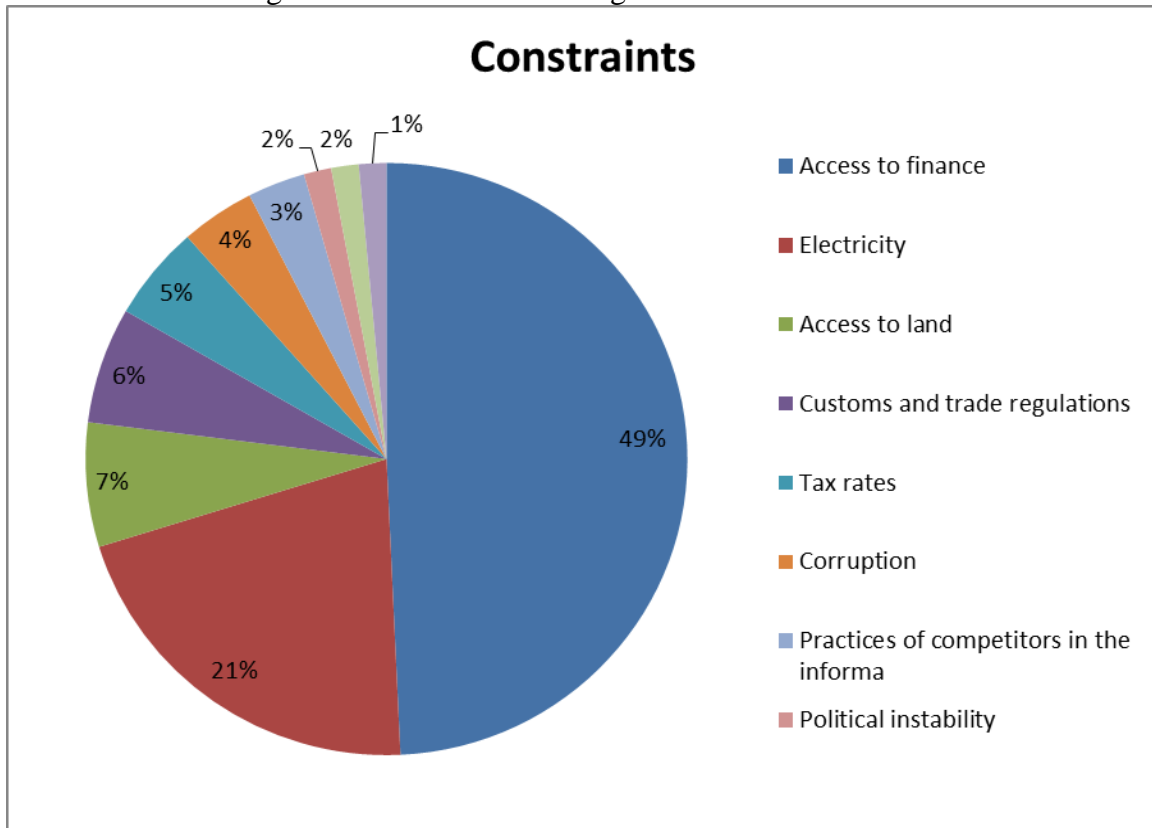
Source: UNCTAD (2015).

Figure 2 FDI Inflows to Ghana, 1970-2013 (current US\$ million)



Source: UNCTAD (2015).

Figure 3 Constraints to foreign investment in Ghana



Source: Enterprise Survey, World Bank.

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