Foreign-Owned Firms and Financial Constraints:
[Evidence from Ghana]

by

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Abstract

The ability of foreign firms to bring in additional capital to a host country together with technological and skill spillovers may relieve domestic firms of their financial constraints. Yet, some foreign firms borrow more from the local capital markets than the amount of capital they bring in, worsening the financial constraints of the domestic firms. We use a panel of 182 Ghanaian manufacturing firms over the period 1991-1997 to examine whether, local firms in Ghana face more financial constraints than foreign firms, and whether, foreign firms' borrowing on the local financial markets relieves or worsens domestic firms' financial constraints. We estimate an Euler equation augmented with a financial variable and interpret the degree of responsiveness of investment to the financial variable as the degree of financial constraints faced by firms. We find that small and domestic firms are more financially constrained than large and foreign firms and that; domestic firms' financial constraints are exacerbated by foreign firms' borrowing from the local capital markets.

Keywords: Foreign Direct Investment, Financial Constraints

Outline

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1. INTRODUCTION

Many contemporary studies on investment have largely concentrated on its relationship with financial variables, but the challenge still remains for researchers to reach a definite conclusion on the interpretation of the relationship between investment and financial constraints. For example, Fazzari et al. (1988) and Kaplan and Zingales (1997) debated on whether high investment cash flow sensitivities should be considered as evidence in favour or against financial constraints. A vast literature emerged afterwards with papers supporting either one of the above studies.

From one point of view, it may seem that the importance of this issue has been overemphasised. But it is important to understand issues related to investment because it is an important component of aggregate demand and this in turn determines the level of development of a country.

At the firm level, managers have to make decisions on investment and these decisions are dependent on certain factors. Extant literature contends that a major obstacle to firms' investment is financial constraint (for example, Aghion et al.2004). Irrespective of the ownership and size of a firm, no firm can boast of being self-sufficient in its finances, although the degree of financial constraints faced by firms may differ from one firm to another.

The ability of foreign firms to bring in scarce capital to a host country together with technological and skill spillovers may relieve local firms of financial constraints[1]. This may promote economic growth and development in the host country. We refer to this as the conventional wisdom behind attracting FDI.

Yet, despite their abundance in natural resources, most developing countries have been unable to attract significant Foreign Investment. Limiting the situation to Africa, most African developing countries have not been able to enjoy the benefits of having a stable investment inflow. Expectations that Foreign Investment could be a channel through which economic growth and development could take place have not been fully achieved; Ghana is no exception.

As a matter of fact, the effect of FDI on Ghana's economy has been experienced in only specific sectors. According to the Investment Policy Review (2003) on Ghana (p.12), in the mining sector for example, between 1994 and 2002,

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[1] See McMillan et al (2004) for details.

capital intensive methods of production created relatively few low- skilled jobs but in other sectors, estimates for registered projects suggest that $1.4 billion of FDI created jobs for 72,384 Ghanaians and 4652 non – Ghanaians. The effect of FDI on the whole economy has also been very trivial. For instance, FDI accounted for less than 1% of GDP in Ghana in the late 1980's (Investment Policy Review 2003).

In recent times, however, Ghana is beginning to attract significant levels of FDI as new policies are aiming at making foreign investment an integral part of the macro economy. But as to whether just attracting foreign investment into the country would generate a non- trivial impact on the whole economy is one argument on its own.

When foreign investors come in to compete with purely domestic firms for funds on the local capital market, FDI may not yield the necessary benefits expected from them. Typically, they may deprive local firms of their major source of financing, rendering them inactive. When this occurs, one could refute the validity of the conventional wisdom behind FDI. Foreign firms are generally larger, more productive, and less risky and have better access to collateral than their domestic counterparts. These positive attributes may make it easier for them to compete with wholly domestic firms and secure capital for their production on the local markets. We refer to this as the counterfactual effect of FDI. If this counterfactual effect of FDI outweighs the conventional wisdom behind attracting FDI, then the growth and development potential that FDI has to contribute to an economy may not be realised. The question now is whether Ghana's insignificant impact of FDI on growth and development of the economy over the years can be attributed partly to this.

In this study, we investigate this issue by examining whether Ghana's domestic firms' financial constraints are worsened by foreign firms' borrowing from the domestic capital markets. We first examine whether domestic firms face more financial constraints than foreign firms, and then move on to examine foreign firms' impact on domestic firms' financial constraints.

In our data, foreign- owned is not directly equivalent to FDI as traditionally understood. Foreign-owned in our dataset refers mostly to ownership by individual foreigners that are not originally from Ghana. Essentially, because of their networking these firms may have access to various forms of financing, making them relatively less credit constrained than domestic firms.

We will therefore assume that ownership by individual foreigners serves as a representative for FDI and can capture important features of the differences in the financial constraints behaviour of foreign and local firms.

As far as we are concerned, there are only few empirical studies that have tackled this issue. Alexander Rutkowski (2005) for instance, investigated the impact of foreign firms' borrowing from the local capital markets on domestic firms' financial constraints by focusing on Central and Eastern European Countries (CEEC). Harrison and McMillan (2003), also, investigated this issue by concentrating on Ivory Coast. Harrison and McMillan (2003)'s study, may however not provide a full picture about what happens in Africa. We therefore examine this same issue in another African country: Ghana. By doing this, we will contribute to existing literature in two ways. First, we will be able to make generalisations about the impact of foreign firms' borrowing on the financial constraints of domestic firms in Africa. Second, we will also be able to make a direct comparison between these two economies as similar techniques, variables and methodologies will be applied.

The remainder of this chapter is organised as follows: Section 2.1 relates the macroeconomic environment to FDI trends in Ghana. In section 2.2, we describe Ghana's business environment. Section 3 reviews the literature linked to this study. In section 4, we describe the dataset used in the study. In section 5.1, we evaluate the various approaches in testing for financial constraints. Section 5.2 illustrates how we group our firms. In section 5.3, we present our variables and define them. Section 5.4 deals with the methodology, model specification and estimation technique. We provide descriptive statistics of the dataset in section 6. In section 7, we discuss our results. Section 8 concludes the paper and makes recommendations for policy-makers.

2.

2.1 GHANA'S FINANCIAL SECTOR

2.1.1 Pre- Financial Sector Reforms Era

Prior to Ghana's independence, its colonial masters imposed its power on the financial sector. In 1875, the British government successfully monetized Ghana (then known as Gold Coast). During this period, they tried to restrict the use of currency in Ghana to just the British currency. For example, in 1880, a demonetization exercise was carried out to allow the lawful withdrawal of all other currencies in use in order

to limit the currency to just gold and British sterling. This led to the establishment of the Government Savings Bank in 1888. The British Bank of West Africa with its headquarters in Nigeria extended its territories to Ghana in 1896. In 1917, the Barclays Bank (formerly known as the Colonial Bank) was established to encourage competition in the banking industry.

Problems which the native people faced in accessing credit as a result of the so called "discriminatory practices" exercised by the foreign commercial banks as well as the high collateral demands, together with the fact that certain sectors in the economy regarded as important needed specific financial institutions to take care of their needs motivated the government to set up its own commercial and development banks. The Bank of the Gold Coast (now Ghana Commercial Bank) was then set up in May 1953 as a native bank to further boost the activities of the two commercial banks already in operation. Massive pressure mounted on the colonial government by the native people led to the establishment of the Bank of Ghana on March 1 1957, a few days before Ghana gained independence. To Ghana, the establishment of the Central Bank meant that it had gained financial independence. Upon the request of the local people the Bank of Ghana was given the total mandate to implement policies which were deemed fit to promote growth in the economy.

Later, three commercial banks, The National Investment Bank, Agricultural Development Bank and the Bank for Housing and Construction were set up to support the activities of the Ghana Commercial Bank.
In 1975, the National Savings and Credit Bank, known previously as the Post Office Savings Bank and the Cooperative Bank were established to provide credit to small-scale borrowers. To provide administrative and corporate financial services, three Bank was established jointly by the government, Grindlays Bank of the UK, the State Insurance Corporation (SIC) and the National Investment Bank (NIB) of which the government and Grindlay Bank owned majority of the shares. With the two foreign banks that were in existence during the colonial period, the Barclays Bank and Standard Chartered Bank, the government acquired some shares in them.

Ghana's desire to develop rapidly after independence led to the implementation of certain policies in the economy that resulted in financial repression later on. The government owned all the banks which were established and even possessed about 40% equity in the two expatriate banks which were already in existence. The Bank of Ghana controlled extensively interest rates, and credits were

allocated to specific sectors in the economy. These policies were designed to achieve some desired level of investment, ensure proper allocation of credits among various sectors of the economy, and to keep interest rates generally low. Unfortunately, the policies implemented could not achieve the targets set. Rather, the economy faced financial repression with interest rate hitting negative levels.

Worse of all, to reduce the amount of money in circulation, in 1979, the government imposed a 30% tax on all cash holdings outside the banking system below five thousand cedis and a 50% tax on the cash holdings above five thousand cedis. In addition, in the early 1980s, the Central Bank, withdrew all fifty cedi notes from the system and replaced them with smaller denominations. Those from whom the fifty cedi notes were withdrawn did not receive any compensation immediately. When compensation was due, most of them had misplaced their receipts.

In short, this period witnessed severe financial repression and people lost confidence in the banking system. Most of the policies implemented could not achieve the targets set. The supply of credits including those to the priority sector was reduced and all the banks but the ones with foreign shares went bankrupt.

The severe financial repression together with the loss of confidence that had subjugated the financial system in the Ghanaian economy led to the implementation of reforms in the latter parts of the 1980's. It was not until the initiation of the Financial Sector Adjustment Program (FINSAP) that it was realized that the financial sector was extremely distressed.

2.1.2 Financial Sector Reforms
The financial reforms which took place in Ghana constituted institutional restructuring, improvement in the legal and regulatory framework for banking operations, and interest rate liberalization.

Public sector banks restructuring
The reforms of the financial system started with restructuring of the public sector banks in 1989. Their focus was on the balance sheet as most banks before the reform took place had gone bankrupt.

Financial and managerial restructuring

Major restructuring took place during the reforms. The organizational structure that took place consisted of both management and financial restructuring of the banks. With regards to management, there was reshuffling in most of the banks especially at the management level. Financial restructuring according to Sowa (2003) involved mainly recapitalization of the banks with equity injection where liquidity was low. Banks' balance sheets of non-performing assets were also cleaned up.

Institutional restructuring

The structure of the financial system was changed. New institutions were set up to shake-up the financial system. Some banks were merged and some sold out. Actually, five banks and twenty non- bank institutions were set up under FINSAP. For example, in 1991, the Security Discount Company (SDC) was established mainly to eradicate the monopolistic power of the Consolidated Discount House which was established in 1987. Many more rural banks were created.

It was speculated that the commercial banks had been unable to extend its activities to the rural area. The main aim of creating the rural banks was to fill the gaps created by the commercial banks.

Capital market

FINSAP brought to fore the Ghana Stock Exchange. The Ghana Stock Exchange listed 12 companies and one Government Bond when it started its operations in November 1990. The value of listed shares amounted to 43 billion cedis in 1992 as compared to 30 billion cedis in 1991. According to Sowa (2003) ever since the inception of the Ghana Stock Exchange, the market has mobilized about 140 billion cedis and US 4.8 million dollars through equities and bonds and the number of listed companies has risen to 21.

Interest rate liberalization

Under the Structural Adjustment Program, market forces were allowed to determine interest rates freely. Government involvement in interest rate determination was cut off. The deregulation of interest rates began with the eradication of the maximum and minimum deposit policy in September, 1987. Subsequently, the commercial banks were given the mandate to set up their own rates in March, 1989 following the

eradication of minimum lending rate in February, 1988. By 1990, the policy that allowed the agric sector to have access to a compulsory lending of about 20% was also abolished.

Contrary to the pre-reform era, the reform was able to move both Treasury bill rate and real lending rate from negative to positive.

2.1.3 Structure and Operations of Ghana's Financial Sector

Ghana's financial sector is characterised by both formal and semi formal financial institutions. The formal financial institutions include banks and co-operative societies, and the semi-formal financial institutions include susu groups, susu collectors and money lenders.

Currently, the banking sector in Ghana is made up of the Bank of Ghana, eight Commercial Banks, three Development Banks, three Merchant Banks and one hundred and thirty-three rural banks. Apart from the rural banks, the distribution of the other banks is skewed towards the urban areas, which are mainly found in the southern part of the country. For instance, out of the thirteen districts in the Northern Region, seven of them have no banks. This gives the available banks a large client base. The banks are characterised by relatively high value and longer duration loans, which call for a lot of bureaucratic processes and collateral. As a result, the majority of the people in the rural areas and the northern part of the country engage in semi-formal financial practices.

Susu groups are mainly savings groups. A modified form of the susu group is the Rotating Savings and Credit Association (ROSCA). The ROSCA is made up of a group of individuals who come together and make regular contributions to a common fund, which is then given as a lump sum to one of the members in each cycle. This means that a member will lend money to other members of the group through his regular contributions to the fund. The total amount collected in each cycle is given to each member in turn. The person who gets the lump sum in each cycle is determined either by common consensus, lottery, or bid. By consensus, the members normally decide to give the total amount to the one who needs the money most. Where they ballot, members who have already received the lump sum contribute, but do not participate in the lottery till the cycle ends. With bidding, the highest bidder takes the

lump sum minus the bid. ROSCA's are flexible and can easily be used in both the rural and urban areas.

The Susu collectors agree on how much savers would want to save with the savers themselves, and visit them at regular intervals for collection. They deposit the money at a bank, invest the money in their businesses or lend it to others for a period of time. At the end of the period, the susu collectors return the savers' deposit less a small commission. The Ghana Co-operative Susu Collectors Association oversees the activities of susu collectors.

The moneylenders are usually the rich farmers or traders who lend out their own funds or have access to credits from the banks. They usually have good knowledge of their borrowers and so discourage fraud. Their focus is not mainly on how borrowers use the money they borrow but on their ability to repay the loans.

As opposed to the formal financial services, the semi- formal financial services have low transaction cost, door-to-door services, and the ability to adjust to changing circumstances.

In Ghana, people may also borrow from informal sources such as friends and relatives. These often accrue no transaction costs and do not take any formal contractual form.

2.2 FDI TRENDS AND THE MACROECONOMIC ENVIRONMENT IN GHANA

Ghana, a country endowed with natural resources looked very promising and bright when it gained independence. Disappointingly, it has been unable to attract significant FDI flows.

When Ghana gained independence in 1957, a socialist policy was adopted with the intention of narrowing the gap between the rich and the poor in the country. This initially put the economy at the fore- front of Sub- Saharan African countries in terms of economic growth. Unfortunately, this policy was misconceived and its positive impacts remained unsustainable.

By 1960, the economy had already started experiencing some downturns in its macroeconomic indicators. From 1966-1969, Ghana's economy was revitalised when policy-makers at the time solicited the assistance of the IMF. Among the policies

implemented were divestiture, devaluation and trade liberalisation. Macroeconomic mismanagement coupled with political instability which characterised the country in the 1970s and early 80s pushed the economy into severe crisis. In fact, for the short period between 1972 and 1981, four different military governments took over the country.

Turning to the macroeconomic environment, the highest GDP growth rate was registered in 1973 (15.25%) and this trickled all the way to negative (-12.85%) rate in 1975, recording the lowest GDP growth rate in that period (Aryeetey et al., 2004). Annual inflation hovered around double-digit figures and, by February 1984, it had reached 126% (Bank of Ghana Statistical Bulletins, various issues). During this same period, the country was heavily indebted and financed its indebtedness through banks and seignorage leading at negative interest rates (Aryeetey et al., 2004). This discouraged savings and consequently reduced investment. These problems faced by the economy arose from high crude oil prices, over protection of local industries and low incentives given to agricultural producers. To worsen the already existing predicament, Ghana found itself in a prolonged drought in 1983 and because the economy is primarily agricultural and agriculture is mainly rain fed, the economy was pushed into total economic decay.

Obviously, it is expected that the state of the Ghanaian economy during this period would have serious repercussions for foreign investment. Generally speaking, Ghana's historical record of Foreign Direct Investment has not had a positive steady pattern, possibly due to poor economic management. In 1970, Ghana's annual FDI inflow was just about $68 million, which dwindled slowly over the subsequent years, and eventually fell drastically to about $-25 million in 1976, recording the worst performance ever from 1970 till date. Perhaps, the low FDI value in 1976 followed from the low GDP growth rate recorded in 1975 (Investment Policy Review, 2003). By the early 80s, policy makers had undoubtedly lost grips of the economy so to speak.

Admitting the situation the nation found itself in, policy makers once again sought the help of multilateral agencies for a revival in the economy. As a result, in 1983, the Economic Recovery Program (ERP) was initiated under the auspices of the World Bank and the International Monetary Fund (IMF). The reform was targeted mainly at making the economy a market-oriented one and the private sector, the main driver of the economy.

Expectedly, from the time the ERP was launched, things started working well for the economy. Policies implemented during this period put the economy on a somewhat sound footing. Recorded values for real GDP have remained positive after the ERP. Even though inflation did not depart from its double-digit value immediately after the launch of the ERP, records show that it remained low relative to the pre-ERP periods. For example, the highest average annual inflation recorded after the ERP and before the 1990s was 48.75% and this was in 1984 (Bank of Ghana Statistical Bulletin, 1994 annual report).

However, the impact of the ERP on FDI was not immediate, as the economy did not experience any upsurge in foreign infl ows during the early part of the ERP. This was because foreign investors had totally lost confidence in the economy and were unsure about how committed the government was going to be to the reform. One main objective of the ERP was divestiture. When privatisation of State- Owned Enterprises (SOEs) began in 1988, 55 SOEs were initially privatised, with the liquidation of 31 firms following thereafter (Investment Policy Review, 2003). The privatisation program which took off in the 1990s resulted in the sale of more than 300 of about 350 SOEs. Foreign investors were actively involved in the program as few domestic investors had adequate capital to participate in the program except as partners with foreign investors.

The year 1994 recorded the highest amount of foreign direct investment setting an unprecedented record of $233 million (Investment Policy Review, 2003). This was mainly due to the partial sale of the Ashanti Goldfields Corporation (A.G.C) to a South African Company, Lomin. This brought Ghana to the fore front of FDI recipients in Africa. In addition, the government, upon embarking on the Structural Adjustment Program in 1988, recognised that attracting foreign investors required an enabling environment and therefore passed a new investment law in 1994. This law was primarily aimed at relaxing previous stringent investment policies, which had stifled and thwarted investment in Ghana.

One cannot also rule out the importance of the impact of political stability on foreign investment. After, twenty years of military rule, Ghana moved into democracy in 1992. But of course foreign investors would not immediately respond by trooping into the country, unless they were certain that the sound political conditions are sustainable. Perhaps, this partly explains the FDI rocketing in 1994.

In 1996, the government offloaded its 30% share in Ghana Telecom to Telekom Malaysia. Ghana however could not sustain its position after 1996 and early part of 2000 as the government had by then sold off all its shares in the largest firms and had difficulty in relinquishing its stakes in the remaining firms. As a result, the country struggled to fall within the first twenty FDI recipients in Africa. It seems like everything was going wrong for the country during this period. The state of the Ghanaian economy was in total lapses during this period, in particular in the late 1990s. [2]Interest rates were generally too high (annual average real interest rate in 1997 was 20.15%), with the currency depreciating at a faster rate ($1 U.S – 2250 cedis in 1997 and $1 U.S – 7312.23 cedis by 2001). Average annual inflation in the late 90's and early 2000's compared to the early 90's was high (average annual inflation from 1990 -1994 was 23.1%, whiles that of 1995- 2002 was over 30%).

Following the severe drought that occurred in 1998, Ghana, because of its reliance on the Akosombo Dam as its main source of energy for both industrial and domestic purposes faced power dearth leading to power rationing in the country. At some point, it had to import energy from Ivory Coast. This had a serious impact on industrial production and on the growth of the economy as a whole. In short, the macroeconomic environment was unstable, and hence, Ghana became an unattractive location for new foreign investors as it experienced its economic crises.

The macroeconomic performance of the country has seen significant improvements in recent times. A growth rate of about 5.8% was recorded in 2004, with inflation declining to about 11.8%, from about 23.6% at the end of 2003, and the cedi depreciating modestly at just about 2.2%. In accordance with this, the level of FDI in the country is picking up gradually as FDI increased by about 14% from 2003 to 2005 indicating the importance of macroeconomic stability for such inflows.

2.2 GHANA'S BUSINESS ENVIRONMENT[3]

Upon embarking on the Structural Adjustment Program (SAP), Ghana deemed it necessary to create a conducive atmosphere for investment to take place. This led to

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[2]Figures on this page are derived from the Bank of Ghana Statistical Bulletin (Annual Report, 1997-2004)

[3] This section draws from various issues (1996-2003) of Quarterly Investment Report of the Ghana Investment Promotion Centre.

the establishment of the Ghana Investment Promotion Centre Act, 1994, replacing the Investment Code 1985 (PNDC 116) and the Free Zone Act, 1995 (Act 504).

The Ghana Investment Promotion Centre (GIPC) is the main government agency that oversees foreign direct investment in Ghana.

The Ghana Investment Promotion Centre law governs investment in all sectors except minerals and mining, oil and gas, which are governed by Minerals and Mining Act, 1986, Petroleum and Production law of 1984 respectively, and the free trade zones set up in 1996. The law eliminates discrimination against foreign investors in relation to taxes, prices, access to foreign exchange, imports and assures them of capital repatriation. However, the right to engage in petty trading, taxi services with less than 10 cars, gambling and lotteries, beauty salons and barber shops is reserved to Ghanaians.

Setting up a business in Ghana requires one not just to abide by the rules and procedures of GIPC ,but also, by those set by at least four more agencies, which include the Registrar General Department, Internal Revenue Service, Ghana Immigration Service and Social Security and National Insurance Trust. The amount of bureaucracy involved together with having to fulfil the requirements of these entire agencies make the process of establishing a business in Ghana cumbersome. Besides, although the length of time taken to set up a business in Ghana has improved, it still takes longer compared to the world average. An average of about 85 days is required to set up a business in Ghana, exceeding the world's average (48 days) more than one and a half times[4]. This lengthy time period may deter potential investors from operating in the country.

The first condition that foreign investors are required to satisfy regards financing. A minimum of $10, 0000 is required to set up a joint venture with a Ghanaian, and a minimum of $50, 000 to set up a purely foreign-owned company, which should at least employ 10 Ghanaians. These minimum amounts can include cash, goods or equipment.

Ghana, because of its richness in natural resources attracts countries that have the desire to benefit from its national resources. More than half (about 70%) of the foreign investments that take place in Ghana are involved in natural resources (gold, aluminium, bauxite, timber diamond, manganese, oil and natural gas exploration).

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[4] Source: Index of Economic Freedom.

This is followed by the manufacturing sector. Particularly, this is in food, aluminium and plastic products, (e.g. Cadbury's Ghana Limited, a U.K company and Nestle Ghana Limited, a Swiss Company). The U.K and the U.S.A were the traditional sources of FDI flows in Ghana. Although the U.K ranks high in terms of the number of projects in Ghana, in terms of investment value, it only comes after Malaysia, the U.S and Switzerland (Ghana's Investment Policy Review, 2003).

Other foreign investors also engage in the service sector, particularly banking (Fidelity Bank, Standard Chartered Bank, Barclays Bank etc.) and communication. According to the Investment Policy Review (2003), there are now about 17 foreign banks and a number of leasing and loan companies. Lebanese and Asian communities play a very significant role in business in Ghana. Many of them have become third and fourth generation Ghanaian citizens and own most of the big supermarkets in Ghana. Majority of the hotels, restaurants and fast food companies are owned and run as joint ventures between Ghanaians and Lebanese and Ghanaians and some Asian communities, especially China and India.

3. LITERATURE REVIEW ON LOCAL FIRMS, MULTINATIONALS AND FINANCIAL CONSTRAINTS.

The impact of financial constraints on investment decisions has been of much interest to economic researchers over the past decade. Empirical work on the relationship between financial constraints and investment has given controversial results, which have consequently led to a never- ending debate on the relationship.

Fundamental to this line of thought is that capital market imperfections in credit and equity markets create a wedge between external and internal financing. If financial constraints do not exist, changes in internal financing should not have any influence on investment. In that respect, internal financing can be easily substituted with external financing which is more costly in the presence of informational asymmetries.

Fazzari, Hubbard and Peterson (FHP, 1988) were the first to provide a seminal paper on the monotonic relationship between investment-cash flow sensitivities and financial constraints. They split U.S manufacturing firms into three groups based on

an a priori measure of financial constraints (dividend payout ratio), and compare the three different categories' responsiveness of investment to cash flow. They find that the firms with low dividend payout policy (that is, firms which are a priori likely to be financially constrained), have their investment exhibiting higher sensitivities to cash flow than firms that pay out higher dividends, meaning that low dividend payout firms are actually more financially constrained.

Kaplan and Zingales (KZ, 1997) criticize the work of FHP(1988) by reclassifying the 49 low dividend firms (Class 1firms) that FHP(1988) classify as financially constrained into 5 groups. According to them, although firms facing financial constraints should respond more to internal financing than unconstrained firms, it is not automatically true that a monotonic relationship would exist between financial constraints and investment-cash flow sensitivities. They classify the 49 low dividend payout firms based on the qualitative information in annual reports, quantitative information in the companies' financial statements and notes that describe the firms' financial status with where they plan to source funds from for future investment. Based on this information, the firms' degrees of financial constraints are determined. Their results show that the firms that are a priori likely to be financially constrained have their investment being less sensitive to cash flow than those that are a priori less likely to be financially constrained; these results contradict FHP(1988)'s study.

In a response to KZ (1997), FHP (1998) argue that the classification scheme employed by KZ (1997) is not credible: it is complicated and relies on managers statements which may not necessarily be true. FHP (1998) also argue that KZ (1996)'s may reflect econometric problems[5].

A vast literature emerged afterwards with papers supporting either one of the above studies. An almost unexplored dimension of this research area is the impact of foreign ownership on the firm's financial constraints, and also, the effects that foreign firms' borrowing from the local markets may have on domestic firms' financial constraints. Despite the importance of this issue, only few empirical studies have addressed it.

Harrison and McMillan (2003), for instance, examine the differential effect of financial constraints on purely domestic firms and firms with foreign ownership.

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[5] 'Q' = the ratio of capital to the replacement of capital but KZ(1997) use the ratio of market value of assets to book value of assets.

Although classifying firms into size, age, dividend payout ratios etc. have been the focus of most studies in this field, Harrison and McMillan (2003) introduce a new criterion for firm classification: foreign ownership. By employing data from Ivory Coast for 399 firms over the period 1974-1987 and augmenting the standard Euler investment model with financial variables, they specifically test whether both domestic and foreign firms face the same level of credit constraints and whether foreign borrowing crowds out domestic firms out of the local financial market. Following Whited (1992) the financial variables they use are coverage ratio, measured by *interest/interest +profit and the ratio of debt to asset.* These measures indicate the indebtedness of firms, and the firms' lack of collateral respectively. A high coverage ratio (or debt/asset ratio) implies the firm is highly indebted and therefore financially constrained. They also control for the lag of the dependent variable and its square and lagged sales over fixed assets. Their results indicate that financial constraints are more binding for domestic firms than for foreign firms. They then interact the financial variables with a measure of foreign firms' borrowing on the local capital market and interact the same financial variables with foreign sales. They nest both interaction terms into the same investment equation to properly investigate whether (1) foreign firms' borrowing on the local market exacerbates local firms' financial constraints, and (2) if they do, what may be the driving force.

  Their results indicate a positive and significant relationship between investment and the interaction term that contains the financial variables and foreign borrowing. Meanwhile, the interaction term with foreign sales and the financial variables remain insignificant, implying that foreign borrowing increases the sensitivity of the financial variables to investment.

        In a related paper, Rutkowski (2005), first investigates whether domestically-owned firms in Central and Eastern Europe face higher credit constraints than foreign-owned enterprises, and second, if domestic enterprises' financial constraints are caused by incoming FDI. Using data from the second edition of the 'Business Environment and the Enterprise Performance Survey (BEEPS II), this study provides evidence that domestic firms face higher credit constraints when applying for short-term loan than foreign-owned firms. The study also finds that FDI reduces foreign firms' financial constraints without increasing the constraint faced by domestic enterprises.

Harrison, Love and McMillan (2004) also examine the issue of whether capital transaction restrictions, in particular, Direct Foreign (DFI) impact negatively or positively on firms' financial constraints. By using a panel of 40 countries covering about 7000 firms from 1988-1998, they also use the Euler investment equation augmented by a financial variable. Rather than using coverage ratio and debt/asset, they choose to use cash stock to proxy for financial constraints. They interact the DFI variable with cash stock and control for a number of factors like the lag of the dependent variable, the ratio of sales to capital and fixed effects. Their results show that DFI reduces firms' financing constraints, a result which contradicts the earlier findings of Harrison and McMillan (2001) which show that foreign ownership worsens the financial constraints of domestic firms. In order to introduce heterogeneity into their sample, they split the sample into G7 and non G7 countries. Their results show that DFI eases the financing constraints of the non-G7 countries, while the G7 countries are not financially constrained at all. Splitting the sample into firms with foreign assets and those without foreign assets suggests that firms without foreign assets face more financial constraints than multinationals, as the coefficient on DFI interacted with cash is only significant and negative for firms without foreign affiliation.

In a panel study of manufacturing firms in Estonia over the period 1985-1995, Mickiewicz, Bishop and Varblane (2004) examine the link between financial constraints and investment. They test the hypothesis that the impact of financial constraints on firm investment does not differ across firms with different ownership status and size. One unique thing about this study is how financial constraints are interpreted. Rather than looking at the statistical significance of the financial variable in an investment equation, their main way of interpreting financial constraint is through the signs of the proxy for the degree of financial constraint; a positive sign on the proxy for financial constraint implies that the firm is financially constrained and vice versa. Although they use the investment Euler equation as used by previous studies, they do not introduce any borrowing constraint into the Euler equation. They first estimate a basic investment model using the Euler equation with cash flow (measured by net sales/ previous year's capital), some dummies and previous year's investment/capital and its square (i.e. $inv\_capital_t = constant + inv\_capital_{t-1} + inv\_capit\_sq_{t-1} + netsal\_cap_{t-1} + year\_dummies + sectoral\_ contrasts + E_{it}$). Their results indicate a negative relationship between cash flow and investment implying

that financial constraints are absent. This result is however not robust to the introduction of heterogeneity across different categories of firms into the equation in terms of ownership structure and firm size as the earlier results are altered. By splitting the sample into foreign and domestic firms and small and large firms respectively and interacting the cash flow variable with them, the results indicate a positive relationship between domestic firms and cash flow, and between the reciprocal of employment (small firms) and cash flow (small firms) ,which implies that a smaller percentage of foreign ownership (or firms of small size) makes a firm prey to financial constraints. According to their results, the absence of financial constraint initially found was based on the assumption of firm homogeneity in their estimation. They also find great evidence for financial constraints of firms which possess both characteristics of low foreign participation and small size.

Guariglia and Mateut (2005) look at the same issue of financial constraint and investment from a different perspective; digress from the use of fixed investment models augmented by financial variables by earlier studies and use inventory investment regressions to find evidence of financial constraints. Using a total of 9381 U.K. firms, their sample was taken from1993-2003. Their contribution to literature in this field is in two folds. a)To investigate whether firms which are globally engaged (measured by exporting firms and firms with a high share of foreign ownership) exhibit lower/no sensitivity of inventory investment to financial constraint indicators compared to their counterpart firms which do not export or are domestically owned and b) classify firms using two different criteria based on traditional firm characteristics which divide firms into healthy and financially constrained firms and on global engagement status. Firms which fall below 75% of the distribution of sales, risk and age are classified as financially constrained whiles those with their distribution above are healthy. For global engagement the classification is based on firms' ability to export and ownership status.

By modifying Kashyap et al's (1993) Mix Variable (bank loans/bank loans +commercial paper), the financial variables they employ in the inventory equation is the ratio of short term debt to the sum of short term debt and trade credit (MIX1) and the ratio of the firm's short term debt to its current liabilities (MIX2), which is broader and takes into account other alternative sources of finance such as loans from insurance and financial companies, corporate bonds and commercial paper. This also differentiates this study from other studies in this field which have mainly relied on

coverage ratio, cash flow and cash stock as proxies for financial variables. A positive and significant level of the mix variable implies financial constraint whiles a negative and insignificant mix variable implies firms are less financially constrained.

Using an error correction model, Guariglia and Mateut (2005) find that inventory investment of firms which are financially healthy based on the traditional criteria exhibit lower sensitivity of inventory investment to the mix variables whiles financially constrained firms exhibit higher sensitivities. In particular, they find that the coefficients of the mix variables of the financially healthy firms are insignificant statistically and negative whiles those of the constrained group are significant and positive. Inventory investments of firms with global engagement (that is, those who export or have some foreign ownership) are less responsive to the mix variable than the inventory investment of those without global status implying that these firms are more financially constrained. In order to investigate whether global engagement mitigates financial constraints, constrained firms are split into those with global engagement and those without. Results reveal statistically significant coefficients for the mix variables for firms without global involvement but lower sensitivity of inventory to the mix variable for firms with global engagement. Consequently, participating in global activities attenuate financial constraints. Their work therefore supports McMillan and Harrison (2003). Also, their results show that inventory investment is more responsive to firms which are relatively small, younger and more risky.

In Guariglia and Bridges (2008)'s study, they examine whether global engagement may protect firms from financial constraint based on the failure probability of a firm, using a panel of 9420 newly established U.K firms from 1997-2002 with a probit model. They diversify the model by splitting firms based on their global status. Like Guariglia and Mateut, this classification of global engagement is based on two dimensions, exports and ownership so that firms who export and those with foreigners having a greater share are considered globally engaged and the opposite is true for domestic firms. They augment the probit model for survival probabilities with financial variables. The financial variables they use in this study are collateral; measured as the ratio of tangible assets to total assets, and leverage; measured by short term debt/total assets. The probability of a firm to fail is measured by a company whose position in a given year is in receivership, liquidation or dissolved.

According to them, if global engagement protects firms from financial constraints, then the probability of firms to fail should be less responsive to the financial variables for globally engaged firms. On the other hand, firms without global status would have their probability of failure responding sharply to financial variables. In order to capture the effect that financial variables have on the survival probability of a firm, they interact the financial variables with globally engaged firms and purely domestic firms. In their first estimation, they consider globally engaged firms (that is, firms that export and/or are foreign owned) jointly without splitting the firms into those that export and those that are foreign owned.

Their results show that financial variables'(leverage and collateral) have greater effects on firm's probability to fail for purely domestic firms than firms with some global status meaning that global engagement alleviates firms from financial constraint and consequently 'death '.The signs of the coefficients of the financial variables also support theory. A higher collateral and lower leverage are associated with low failure probabilities of firms. Using the Cox proportional hazard model and the random effect logit model does not change the results. In order to investigate whether the initial findings would hold for the individual dimensions of global engagement they consider in their studies, they estimate another logit equation with each of the two dimensions in the same equation interacted with each of the financial variables but the results does not change. In addition, introducing old firms into the sample (that is firms before 1996) does not change their results.

Desai, Foley and Forbes (2004) investigate the link between financial constraints and investment in a unique way, by looking at how firms with multinational affiliates and local firms respond differently to large depreciation of a currency. Using a sample of 25 emerging markets from 1991-1999, their results indicate that in the years of and after depreciation, firms with foreign affiliates increase sales, assets and investment more than local firms. In their view, currency crises can either make firms very competitive on the international market by promoting exports, or increase firm's indebtedness due to large borrowing from foreign sources without corresponding adjustment of capital structure. Hence, the effect of financial constraint on firm investment in periods characterising depreciation can be seen through these two ways. In order to examine why differences exist in the response of multinationals and local firms to currency crises, they examine the impact of depreciation on relative changes in operating profitability which measures

competitive benefits, and leverage (current liabilities/ long term assets), measuring financial constraints. Their results indicate that the operating profitability of both domestic and foreign-owned firms respond in the same way to currency crises, but the leverage of local firms responds more to currency crises than multinationals', suggesting that local firms' inability to increase investment in times of currency crises is due to financial constraints.

4.

DATA

This study elicits data from surveys conducted by the Centre for the Study of African Economies (CSAE) as part of the Regional Program on Enterprise Development (RPED) organized by the World Bank. The dataset is a firm level panel, which includes observations on 288 manufacturing firms in Ghana from diverse sectors located in some of the main cities (Accra, Kumasi, Takoradi and Cape Coast). These sectors include food, bakery, textile, wood, garment, furniture, metal and machines. The data covers the period 1991-1997 and this period is categorized into 5 waves depending on the period of survey. With the exception of waves 4 and 5 which cover two years each (1994 – 1995 and 1996 – 1997 respectively), all the other waves each cover one year.

It is worth-noting that some of the firms exited from the sample before the end of the Survey and these firms were replaced by firms with the same characteristics in terms of size, location and sector. As a result this sample has a weakly balanced structure with the number of waves associated with each firm ranging from 1 to 5.

We apply outlier rules by excluding all observations that fall within the 1% tails of all the variables used in the estimation. Firms with no identification numbers were also dropped from the sample. Firms with 0 debt and formal borrowing were also excluded from the sample. All these adjustments left the study with a sample of 182 firms.

5.

5.1 AN EVALUATION OF THE DIFFERENT APPROACHES TO TESTING FOR THE EXISTENCE OF FINANCIAL CONSTRAINTS

Empirical studies on investment and financial constraint utilized neoclassical methods, (that is, the Q and Accelerator Models) to isolate the effect of financial constraints on investment for different groups of firms (See for example Fazzari et al, 1998). The accelerator model explains investment using current and lagged changes in sales growth. Although the accelerator model did not perform badly, it lacked a convincing theoretical background.

Tobin's Q is a ratio of the market value of a firm to its replacement cost of capital that measures a firm's incentive to invest in capital. It is often called Average Q and can be shown to be a "sufficient statistic" for investment[6]. But of much importance to a firm's investment decision which is based on convex adjustment cost is Marginal Q (ratio of the marginal revenue product of capital to its marginal cost). Because marginal Q is unobservable, it is normally proxied by average Q. However, these two measures would only be equivalent under extreme conditions. Hayashi (1982) highlights the conditions (perfect competition in the product market, linear homogeneity etc) under which these two measures would be equivalent.

Even if these conditions are met, capital market imperfection would create a wedge between the market valuation and insider's valuation of the marginal return on capital. Therefore, any attempt to use one as a proxy for another may result in measurement errors. Because empirical studies make use of average Q instead of marginal Q, the Q model has been criticized first, for its error in measurement (See Carpenter and Guariglia (2008)[7] and Cummins et.al.(2006)[8]).

Secondly, the theoretical definition of marginal Q implies that it should summarize the effects of all factors that affect investment. However, variables like sales, output and measures of internal funds still have explanatory power when they are used as

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[6] See Chirinko(1995) for more details.
[7] Carpenter and Guariglia(2008, pges 2-3) argue that the use of the Q approach is based on the idea that investment opportunities, which are forward looking, can be captured by equity market participants who are also forward looking. They argue that in the presence of asymmetric information, a gap may exist between firm's outsiders' and insiders' information. Hence, Q will capture outsiders' evaluation of opportunities. They therefore develop another measure of Q that reflects both the outsiders and insiders information.
[8] Cummins et. al.(2006) also argued that information asymmetries drive a wedge between market-based and true Q. They develop another proxy for a firm's intrinsic value based on analysts' earnings expectations.

additional regressors (Erickson and Whited (2000)). Particularly, estimates of the coefficient of cash flow (a very common measure of internal funds) are larger and significant in investment equations for firms that are a priori classified as financially constrained. This problem, therefore, has several implications for the *Q* model. According to Erickson and Whited (1992) p.1029, if measured Tobin's q is a perfect proxy for marginal *Q* and the econometric assumptions are right, then *Q* theory is "wrong". Another possibility is that, if the *Q* theory is "right" and measured Tobin's *Q* is a perfect proxy, then some of the econometric assumptions are wrong. Alternatively, if both the *Q* theory and the econometric assumptions are right, then, measured Tobin's *Q* is a poor indicator for marginal *Q*. Several papers have also pointed out other problems associated with the *Q* theory approach (see Gomes (2001) for example).

The Euler Equation for investment serves as an alternative for the neoclassical formulations as it allows a by-pass of the empirical shortfalls associated with the neoclassical approaches. But like the neoclassical approaches, it allows an incorporation of financial variables directly into the model. It is therefore possible to point out the specific impact of foreign borrowing on the intertemporal allocation of domestic firms' investment (Whited 1992).

5.2 CATEGORIZATION METHOD

All firms generally face some form of financial constraints but the degree to which firms face financial constraints is what this study is concerned with. While some studies have found that financial variables are significant in investment equations for constrained firms, others have found the opposite but the bottom line of all these empirical studies is that the investments of different groups of firms respond differently to financial variables.

In order to address the issue of firm heterogeneity, it is important to find variables that are observable to split the sample into sub-samples of financially constrained and unconstrained firm-years. Investment and financial constraint studies have seen a number of classifications. Fazzari et al. (1988) group firms according to their ability to pay out dividends. The notion behind this classification is that if a firm is relatively financially sound, it should be able to issue new shares or secure external

financing to pay out dividends. Whited (1992) for instance, also groups firms according to bond rating. While some studies split their sample according to interest coverage ratio, other studies also classify firms based on size, age and risk[9].

The type of classification employed in this study takes into consideration the variables available in the dataset. Thus, firms are classified, first, according to ownership structure, and second, as a robustness test for financial constraints, according to firm size.

Under ownership structure, firms are classified into the broad sub groups, foreign-owned and purely domestic. One shortfall of this dataset is that it does not provide the share of foreign ownership in the firms. Therefore, we classify firms with any positive degree of foreign ownership as foreign- owned, and those without any foreign ownership as purely domestic.

The level of employment is used as a proxy for firm size in this study. We compare firms that fall within a particular wave and a particular industry. Thus, we classify all firms that fall within the bottom 75% of the distribution of size of firms operating in the same industry as firm 'i' in a particular wave as *small.* We represent *small* by a dummy = 1 if a firm falls within that category and 0 otherwise. Those that fall above 75% of the distribution of the size of firms operating in the same industry as firm 'i' in a particular year are considered *large*. *Large* is represented by a dummy equal to 1 if a firm falls within this category and 0 otherwise. Hence, small firms are considered a priori more financially constrained while large firms are considered a priori less financially constrained. As a robustness check against this classification criterion, the sample considers a different cut-off point for small and large firms. All firms that fall within the bottom 90% of the distribution of size are considered small and those that fall above the 90% of the distribution of size are considered large.

The reason behind this classification is that foreign and large firms are more established, are likely to have sufficient collateral and a long historical record which eases credit checks. These firms also might have built a good relationship with lending institutions over time. As a result they are generally more likely to access the external capital market easily relative to small and domestic firms.

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[9] For example Whited (1992)

Therefore, in the presence of asymmetric information, foreign and large firms would face a relatively lesser degree of external financial constraints than small and domestic firms.

5.3. VARIABLE MEASUREMENT

The study uses total investment, debt, and output, borrowing by foreign firms on the local capital market and ownership dummies. In the dataset, these variables are measured as follows: Apart from wave 1 in which investment in plant and equipment is used as a proxy for Total Investment, in all the other waves total investment is the sum of three categories of investment; investment in plant and equipment, investment in land and investment in buildings.

As measured in the dataset, the firm's aggregate debt equals the sum of the firms' total borrowing from formal and semi formal financial institutions and total borrowing from informal sources, over the previous 12 months less, informal lending by firm to different categories of recipients over the previous 12 months. Informal lending here consists of the aggregate of any loans made by enterprises in the last year to suppliers, clients, employees, other enterprises, relatives and friends and others. Capital Stock is measured as the replacement value of a firm's total capital. Output measures the value of firm's total production during the previous year. All variables are deflated using the GDP deflator, and 1998, is used as the base year to convert them to constant values[10].

A major shortfall of the dataset is that it does not contain the variable share of foreign borrowing. Since most of the foreign-owned firms in Ghana at the moment are being managed by second or third generation of foreigners, they have eventually become local firms.

We therefore assume that both foreign and domestic firms borrow from just the local capital market, and follow Harrison and McMillan (2003) to construct a measure of foreign borrowing which is defined as:

$$\text{Share of foreign Borrowing }_{idt} = \frac{\sum_i Debt_{idt} * ForeignOwnership_{idt}}{\sum_i Debt_{idt}}$$

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[10] The GDP deflators are from the World Bank Database.

Where '*i*' represents firm,'*d*', industry and '*t*', time.

5.4 METHODOLOGY, MODEL SPECIFICATION AND ESTIMATION TECHNIQUE

Methodology and Model Specification

From the analysis in section 4.1, this study chooses to utilize an augmented Euler Equation in the context of a dynamic investment model. The version of the Euler equation model employed here combines ideas from the studies developed by Whited (1992), Bond and Meghir (1994), Gilchrist and Himmelberg (1998), Love (2000) and Harrison and McMillan (2003) and it is as follows: A firm 'i' is assumed to maximize the present value of its future profits subject to capital accumulation and external financing constraints. According to this model, the firm borrows an amount B_{it}, at time t , and pays an interest i_{it} on its debt . Inflation is given by, π_{it} . The credit constraint is introduced either as a non negative dividend constraint or as a ceiling on borrowing, B_{it}^{*}. R_{it} represents net revenue, L_{it} refers to the variable factor inputs, P_{it}^{I}, the price of investment good, p_{it}, the price of output, B_{t+j}^{t}, the nominal discount factor between periods *t* and *t+j*, δ, the rate of depreciation, $F(K_{it}, L_{it})$, the production function gross of adjustment costs, $G(I_{it,}K_{it})$, the adjustment cost function and E_{t} (.) the expectations operator conditional on information available in period t.

The firm therefore maximizes:

$$\text{E}_t \left[\sum_{j=0}^{\infty} B_{t+j}^{t} R(K_{i,t+j}, L_{i,t+j}, I_{i,t+j})\right]$$

subject to the following constraints:

i. $K_{it} = (1-\delta) K_{i,t-1} + I_{it}$

ii. $B_{it} \le B_{it}^{*}$

iii. $B_{it} \ge 0$

iv. $\quad R_{it} = p_{it}F(K_{it},L_{it}) - p_{it}G(K_{it},L_{it}) - w_{it}L_{it} - p^{I}_{pit}I_{it} - i_{t-i}B_{it-1} + B_{it} - (1-\pi_{\pi-1})B_{i,t-1}$ -

$\quad (1-\pi_{t-1})B_{i,t-1}$

and

v. $\quad R_{it} \geq 0$.

The first constraint represents the capital stock constraint; the second, implies that a firm's borrowing should not exceed some maximum amount; the third, restricts debt to be at least 0; the fourth, defines net cash flows; and the fifth, imposes a non-negativity restriction on dividends. By solving the first order condition for this optimization problem, McMillan et al. (2003) arrive at an Euler equation that characterises the optimal investment path and relates marginal costs in adjacent period. This Euler equation which also shows that liquidity constrained firms will reserve investment today for investment tomorrow is given by:

$$(1-\delta)\beta^{c}_{t+1} + \left[\bar{F}_{t} (1-\Omega) \left(\frac{\partial R}{\partial I}\right)_{i,t+1} \right] = \left(\frac{\partial R}{\partial I}\right)_{it} + \left(\frac{\partial R}{\partial K}\right)_{it} \qquad (1)$$

How then do we find empirical proxies for $\Omega_{i,t}$ (the shadow value of financial constraints) and also the derivative of net revenue with respect to *I* and *K?* We follow Bond and Meghir (1994) who assume an adjustment cost function that is linearly homogeneous in investment and capital. Based on this assumption they show that the derivatives of net revenue with respect to *I* and *K* can be written as:

$$\left(\frac{\partial R}{\partial I}\right)_{t} = -b\alpha c_{t}\left(\frac{I}{K}\right)_{t} + bc\alpha_{t} - p^{I}_{t} \qquad (2)$$

$$\left(\frac{\partial R}{\partial K}\right)_{t} = \alpha p_{t}\left(\frac{Y}{K}\right)_{t} - \alpha p_{t}\left(\frac{\partial F}{\partial L}\frac{L}{K}\right)_{t} + bap_{t}\left(\frac{I}{K}\right)^{2}_{t} - bc\alpha_{t}\left(\frac{I}{K}\right)_{t} \qquad (3)$$

In a perfect capital market where there are no credit constraints (i.e , where $\Omega=0$), combining equations (2) and (3) gives:

$$\left(\frac{I}{K}\right)_{ij,t+1} = \beta_{1}\left(\frac{I}{K}\right)_{ijt} - \beta_{2}\left(\frac{I}{K}\right)^{2}_{ijt} - \beta_{3}\left(\frac{c}{K}\right)_{ijt} + \beta_{4}\left(\frac{r}{K_{ijt}}\right) + s_{j} + y_{t} + e_{it} \qquad (4)$$

where I is the firm's total investment, K_{it}, capital stock of firm i at time t, Y, the firm's previous year's output, B, the firm's previous year's debt, C, cash flow and e_{it}, the idiosyncratic component. The study incorporates fixed effects, (s_i), and year dummies, (y_t) into the model. The individual fixed effects capture all the firm specific effects that are time invariant such as differences in managerial ability, product demand etc., while the year dummies control for business cycle fluctuations.

"All things being equal", an increase in a firm's previous year's output (Y) increases its investment tomorrow. Accordingly, we expect output to have a positive coefficient in the specifications above. Similarly, an increase in previous year's investment (I/K_{it-1}) should increase current investment. As a result, we expect a positive relationship between previous year's investment and current investment.

To test for the presence of credit constraint, equation (4) will have to be modified to include a proxy for Ω. We will proxy for Ω using debt.

After manipulations, the basic equation we arrive at is:

$$(I/K)_{it} = \alpha_o + \alpha_1(I/K)_{it-1} + \alpha_2(Y/K)_{it-1} + \alpha_3(C/K) + \alpha_4(B/K)_{it-1} + s_i + y_t + e_{it} \qquad (1)$$

This empirical study uses debt (B) as a proxy for financial constraints. In a world where firms are free from financial constraints, debt should have no significant impact on future investment. A statistically significant debt variable implies that firms are financially constrained. In a world of imperfect information, debt should impact significantly on future investment if firms face financial constraints and the relationship should be positive, meaning that financially constrained firms will postpone investment today for investment tomorrow.

To explore how financial constraints affect different groups of firms, we allow the effect of the coefficient of B/K_{it-1} in (1) to vary between domestic and foreign firms. A firm is considered to be foreign if it has some degree of foreign ownership and it is represented by a dummy equals to 1 and 0 otherwise. A firm is classified domestic if it is purely domestic. This is represented by a dummy equals to 1 if a firm falls within this category or 0, otherwise.
This leads us to estimating a second equation given by:

$$(I/K)_{it} = \alpha_o + \alpha_1(I/K)_{it-1} + \alpha_2 (Y/K)_{it-1} + \alpha_3(CF/K)_{it-1} + \alpha_4 \text{ Foreign* } (B/K)_{it-1} +$$
$$\textbf{\textit{Domestic* }} (B/K)_{it-1} + s_i + y_t + e_{it}$$

(2)

We focus on the coefficients associated with the interaction terms, *foreign*debt* and *domestic*debt*.

Like Fazzari et al. (1998), we interpret the coefficients associated with each type of firm as their degree of sensitivity of investment to financial constraints. If the coefficients on the interaction terms are statistically significant then the firms are considered more financially constrained firm-years. We therefore expect the coefficient associated with the interaction term *domestic*debt* to be statistically significant. As a robustness check, debt is interacted with small and large firm-years and once more, the relationship is expected to be stronger for small firm-years. We expect the coefficients of the variables in the basic specification to maintain their positive signs.

To investigate how foreign firms' borrowing from the domestic capital markets affects domestic firms' financial constraints, we single out domestic firms' investment from the dataset and examine the impact of the share of foreign borrowing interacted with $(B/K)_{it-1}$ on them. We estimate a third equation, which is as follows:

$$(I/K)_{it} = \alpha_o + \alpha_1(I/K)_{it-1} + \alpha_2 (Y/K)_{it-1} + \alpha_3 (B/K)_{it-1} + \alpha_4 \textbf{\textit{Share of Foreign}}$$
$$\textbf{\textit{Borrowing}}) + \alpha_5 \textbf{\textit{Share of Foreign borrowing *}}(B/K)_{it-1} + \alpha_6 (CF/K)_{it-1} + y_t + s_i + e_{it}$$

(3)

Thus, in this equation, $(I/K)_{it}$ represent domestic firms' investment. The parameter of interest here is α_5. If the share of borrowing by foreign firms worsens the financial constraints of domestic firms, then, we expect α_5 to be positive and significant. On the other hand, if foreign firms' borrowing from the local financial market relieves domestic firms of financial constraints, then, α_5 should be negative and statistically significant. If α_5 is insignificant, then the share of foreign borrowing has no impact on domestic firms' investment. We expect all the other variables in the specifications in (1) and (2) to maintain their respective signs stated above.

Estimation Technique

In a dynamic investment model, investment depends on its own past realisation. The past realisation of investment is likely to be correlated with the fixed effects present in the error term. This violates one important assumption (exogeneity of regressors) necessary for consistency of Ordinary Least Squares (OLS) estimators. Particularly, it increases the coefficient estimate of the lagged investment variable and attributes explanatory power which belongs to the firm's fixed effects to it. This makes OLS an inappropriate method for dynamic models.

An alternate estimator is the Within Group estimator. This method applies a mean-deviations transformation to each variable, and the mean is calculated at the firm level. OLS is then applied on the transformed data. Even though this approach will eliminate the fixed effects, the dynamic panel bias will not be eliminated. The lagged dependent variable will still correlate with the error term in the transformed model.

To expunge fixed effects and at the same time avoid dynamic panel bias, two transformations are often used. These are (1) The First Difference Generalised Method of Moments (GMM) Approach, proposed by Arellano-Bond (1991) and (2) The Forward Orthogonal Deviation GMM approaches, proposed by Arellano- Bover (1995)/ Blundell-Bond (1998). Both methods are defined for panel analysis. According to Roodman (2006), the methods are used in the following cases: When, (1) there are few time periods but many observations; (2) the dependent variable depends on its own past realisations; (3) there are fixed individual effects; (4) there are independent variables that are not strictly exogenous; (5) the functional relationship is linear and (6) there are serial correlation and heteroskedasticity within individuals, but not across them. We are at least sure that assumptions 1 to 5 apply to our model above. These two approaches could serve the purposes of our model if the assumptions underlying them were the only basis for selecting our technique.
To select the most appropriate technique, the dataset being utilised and how each method is used must be considered.

The difference GMM approach subtracts previous observations from contemporaneous ones. This approach, however, magnifies gaps in unbalanced panels (Roodman 2006, p.19). If for example an observation is missing at time t then changes in that observation at both times *t* and *t+1* will be missing. It is therefore possible for one to construct a dataset that would completely disappear in first

differences (Roodman 2006). Given the study's already limited sample size, this technique may not be feasible as the sample size is supposed to be maximised as much as possible.

The forward orthogonal deviation method, on the other hand, subtracts the mean of all future available observations of a variable from the contemporaneous observations. No matter how many gaps the dataset has, it is computable for all observations except the last for each individual. This minimises data loss (Roodman 2006, pg 19).

Thus, our preferred econometric technique is the forward orthogonal deviation GMM approach.

A necessary assumption for the validity of instruments in GMM estimation is that the instruments should not be endogenous. Since our independent variables are previous year's variables, we use the 2 and 3 lags of each of our explanatory variables as instruments. GMM also allows external instruments into the model. Hence, to improve our results, we use the 2 and 3 lags of value added as our additional instruments. The inclusion of the 2 and 3 lags of value added also improves the Sargan test results.

To check whether our model is correctly specified, the Hansen test and the second order autocorrelation test *(m2)* are used. The Hansen test is a test for over identifying restrictions, which, under the null of instrument validity, is asymptotically distributed as a chi- square with degrees of freedom equals to the number of instruments less the number of parameters. The *m2* test checks whether the lagged variables used as instruments in the differenced equations are valid for the specification. It is asymptotically distributed as a standard normal under the null of no second order autocorrelation.

6. DESCRIPTIVE STATISTICS

Tables 1 and 2 below report the summary statistics of the variables for the full sample as well as the different sub samples. As indicated in the categorization section above, the sample split is along the lines of ownership structure and firm size (proxied by employment level). Different classes of firms face different degrees of financial constraints in the presence of asymmetric information. Smaller firms are likely to face

more financial constraint than larger firms. This is because smaller firms are more prone to risks, have lower collateral values compared to their liabilities as well as shorter track records. As discussed in McMillan (2003) and Colombo (2001), because foreign firms have a lower risk of going bankrupt, it is easier for them to access domestic banks. In addition, Desai et al. 2004b also highlights that foreign firms because of their affiliation abroad may not be limited to just the domestic banks for external finance. They can have access to credit through their parent companies as well as international banks.

All variables are scaled by capital stock to account for the cross-sectional differences across the different groups of firms.

Table1. Mean of Foreign and Domestic firm years expressed in percentages

Variable	*Domestic firms*		*Foreign Firms*	
	No of observations	**Mean**	**No of Observations**	**Mean**
Investment	641	10%	119	8.9%
Debt	622	11.3%	108	9.2%

Notes: All variables are divided by capital stock

Table2. Mean of Small and Large firm years expressed in percentages.

Variable	*Small firms* No of observations	Mean	*Large Firms* No of Observations	Mean
Investment	568	10.4%	192	8.5%
Debt	549	10.9%	191	11.4%

Notes: All variables are scaled by capital stock

Tables 1 and 2 above show the mean investment and debt of foreign and domestic firm-years and small and large firm-years. From Tables 1 and 2, it is evident that small firm- years have a mean investment to capital ratio higher than large firm-years and domestic firm-years also have a mean investment to capital ratio higher than foreign firm-years. The percentage mean investment to capital ratio for large and foreign firm-years are 8.5% and 8.9% respectively, while that of domestic and small firm-years are 10% and 10.4% respectively. This implies that domestic and small firms (i.e. firms that are a priori conjectured to be financially constrained) are growing and so invest more than foreign and large firms. Table 1 also shows that domestic firms are more indebted than foreign firms. The percentage mean debt to capital ratio of foreign firm-years is about 9.2%, while that of domestic firm-years is 11.3%. Using the 't test' to examine whether these means are significantly different across size classes and across ownership classes, tables A3 and A4 show that the differences in means are highly significant. In table A3, we can reject the null hypothesis that the mean values are the same for foreign and domestic firm years. The same can be said about small and large firm years.

Based on the classification criteria used in this study, the sample includes more small and domestic firm-years than large and foreign firm-years. From Table A1, just about 17.86% of the observations in this sample are foreign firm-years while 82.14% of the firms are domestic; 73.5% of the sampled firm-years are small, while 26.49% of them are large. Small and domestic firm-years are hypothesized to be more financially constrained. The distribution of the sample of firms across industries is not widely dispersed. About 22.14% of the sampled firms are found in the food and bakery industry, 26.79% in the garment and textile industry, 23.53% in the chemical, machine and metal industry, and 27.53% in the furniture and wood industry. Table A2 also shows that a greater percentage (26.69%) of foreign firms can be found in the wood and furniture industry.

7. DISCUSSION OF RESULTS

Table 3 below reports the GMM estimates of Equation (1) for all the firms. As expected, the coefficient on *lagged investment* is positive and significant. The coefficient of **Debt** is significant and positively related to future investment which means that all firm-years in the sample face some degree of financial constraints. As expected, lag investment is positive. The Hansen tests support the choice of instruments as well as the validity of the model. The second order autocorrelation test *(m2)* is also satisfied with the model.

Table 3: Investment and Financial Variables: All firm-years

Investment	*Coef.*	*Corrected Std. Err.*	*t*	*P>t*
Lag Investment	.2249913	.0702042	3.20	0.002
Output	-.0002588	.0006368	-0.41	0.685
Debt	.0697628	.0387268	1.80	0.074
Cashflow	.0005727	.0035547	0.16	0.872

Diagnostic Tests
(p-values)

No of Observations   436

Hansen Test	0.749			
First Order Serial Correlation Test	0.039			
Second Order Serial Correlation Test	0.618			

Notes: Estimation was done using GMM forward orthogonal deviation method. The first and second order serial correlation tests are asymptotically distributed as N(0,1) under the null of no serial correlation. The Hansen Test is a test of over identifying restrictions, distributed as a chi – square under the null of instrument validity. Time Dummies were included in the estimation as both regressors and instruments. We also used the third lag of all variables in the regression as well as that of the variable, value-added as instruments.

As indicated above, in equation 2, we allow the coefficient of ***Debt*** to vary between foreign and domestic firms. We focus on these two coefficients. Our results reported in Table 4, indicate that domestic firm years are more financially constrained than foreign firm years.

Table 4: Test of Investment and Financial Constraints: Classifying firms on the basis of whether they are foreign-owned or purely domestic.

Investment	*Coef.*	*Corrected Std. Err.*	*t*	*P>t*
Lag Investment	.2266162	.0872718	2.60	0.010
Output	-.0003133	.0007531	-0.42	0.678
Domestic*Debt	.0716746	.0431084	1.66	0.098
	.0197281	.0438869	0.45	0.654

Foreign*Debt				
Cash flow	.0018277	.003951	0.46	0.644

<div align="center">Diagnostic Tests (p values)</div>

No. of Observations	508
Hansen Test	0.884
First Order Serial Correlation Test	0.035
Second Order Serial Correlation Test	0.460

Notes: Estimation was done using GMM forward orthogonal deviation method. Foreign, is a dummy that takes the value 1 for firm i in wave t if the firm has some form of foreign ownership. Domestic, is a dummy which takes the value 1 for firm i in wave t if the firm is purely domestic. The first and second order serial correlation tests are asymptotically distributed as N (0, 1) under the null of no serial correlation. The Hansen Test is a test of over identifying restrictions, distributed as a chi – square under the null of instrument validity. Time Dummies were included in the estimation as both regressors and instruments. We also used the third lag of all variables in the regression as well as that of the variable, value-added as instruments.

Table 5: Test for Investment and Financial Constraints: Classifying firms according to whether they are small or large.

Investment	*Coef.*	*Corrected Std. Err.*	*t*	*P>t*
Lag Investment	.2299523	.085277	2.70	0.008

Output	.0001123	.0003919	0.29	0.775
Small *Debt	.0883003	.0403777	2.19	0.030
Large *Debt	.0618432	.147264	0.42	0.675

	Diagnostic Tests(p-values)
No. of Observations	509
Hansen Test	0.957
First Order Serial Correlation Test	0.037
Second Order Serial Correlation Test	0.455

Notes: Estimation was done using GMM forward orthogonal deviation method. Small, is a dummy that takes the value 1 for firms i in wave t if the firm falls within the bottom 75% of the distribution of employment and 0, otherwise. Large, is a dummy which takes the value 1 for firm i in wave t if the firm falls within the highest 75% of the distribution of employment and 0, otherwise. The first and second order serial correlation tests are asymptotically distributed as N(0,1) under the null of no serial correlation. The Hansen Test is a test of over identifying restrictions, distributed as a chi – square under the null of instrument validity. Time Dummies were included in the estimation as both regressors and instruments. We also used the third lag of all variables in the regression as well as that of the variable, value-added as instruments.

Specifically, the coefficient of ***Domestic* (B/K)$_{it-1}$*** is in fact positive and statistically significant while that of ***Foreign* (B/K)$_{it-1}$*** is not. This means that domestic firms in Ghana are financially constrained and will therefore postpone investment today and invest tomorrow. Lagged investment still remains positive and statistically significant. Again, the Hansen test and the second order autocorrelation tests are satisfied with the model. These results which are in line with Harrison and McMillan (2003) and

Mickiewicz et al. (2004), suggest that foreign ownership plays a significant role in relieving firms of their financial constraints. We repeat the process for small and large firms in Table 5 above. Our results suggest that small firms are more financially constrained than large ones.

Table 6 reports the estimates of equation 3, which tests for the presence of a crowding out effect in the financial market. We single out domestic firms from the sample in order to identify the impact of the *share of foreign borrowing* on domestic firms' investment.

Table A6: **Testing for the presence of crowding out.**

Investment	Coef.	Corrected Std. Err.	t	P>t
Lag Investment	.1157855	.0798077	1.45	0.149
Output	-.0005335	.0009735	-0.55	0.584
Debt	-.0041742	.0273846	-0.15	0.879
Share of foreign borrowing	-.0311582	.1154431	-0.27	0.788
Share of foreign borrowing*Debt	.4855073	.2599157	1.87	0.064

Diagnostic   Tests(p-values)

No. of Observation	436
Hansen Test	0.264
First Order Serial Correlation Test	0.045
Second Order Correlation Test	0.781

Notes: Estimation was done using GMM forward orthogonal deviation method. Foreign, is a dummy that takes the value 1 for firm i in wave t if the firm has some form of foreign ownership. Domestic, is a dummy which takes the value 1 for firm i in wave t if the firm is purely domestic. Foreign borrowing here refers to the amount of money foreign firms borrow from the local capital markets. The first and second order serial correlation tests are asymptotically distributed as N (0, 1) under the null of no serial correlation. The Hansen Test is a test of over identifying restrictions, distributed as a chi – square under the null of instrument validity. Time Dummies were included in the estimation as both regressors and instruments. We also used the third lag of all variables in the regression as well as that of the variable, value-added as instruments.

From the table, although the coefficient on the variable, *Share of Foreign Borrowing,* is not significant, it is negative. This gives an indication that as the share of foreign borrowing on the local capital market increases, domestic firms' investments are reduced.

At this point, our main focus is on the coefficient associated with the variable *Share of Foreign Borrowing*Debt*. The results indicate that borrowing by foreign firms from the domestic capital market worsens the financial constraints of local firms. Investment displays a positive sensitivity to the interaction term, *Share of Foreign Borrowing *Debt*, implying that as the share of foreign borrowing increases, domestic firms' financial constraints are worsened. We also find that the coefficient for *Debt* alone in this table has reduced by more than half of the magnitude of that in Table 4. This shows that the financial constraints faced by domestic firms in Ghana are largely a result of foreign borrowing. Our results are in line with Harrison and McMillan (2003) who focus on Cote d'Ivoire.

ROBUSTNESS CHECK

For small and large firms, we next investigate whether our results are robust to changing the cut off points. We therefore classify all firms that fall below the 90th percentile of the distribution of size as small and those that fall above the 90th percentile of the distribution as large. Our results in Table A7, however, do not change- we find that the coefficient of debt interacted with the *'small dummy'* is significant, while the coefficient interacted with the *'large' dummy* is not. This means

that our results are not sensitive to changing the cut-off points for small and large firms: small firms are more financially constrained than large firms.

We also carry out OLS and fixed effects estimations to justify our use of the GMM technique. From Tables A5 and A6, we can see that both the OLS and fixed effects estimations show that the variable of interest, share of foreign borrowing, is not significant. While in the GMM estimation the lagged dependent variable is not significant, OLS and fixed effects estimations attribute some explanatory power to this variable. This clearly indicates that using OLS and fixed effects estimations create some bias in dynamic panel estimation.

8. CONCLUSION AND POLICY RECOMMENDATION

In this paper, we have investigated whether the financial constraints of local firms in Ghana are exacerbated by foreign firms that invest in the country. Using a panel of 182 firms and, an Augmented Euler Equation framework, we have found that (1) domestic firms are more financially constrained than firms with some percentage of foreign ownership, and, (2) foreign firms' borrowing from the local capital markets worsen the financial constraints of domestic firms.

This means that the counterfactual effect of attracting FDI into Ghana outweighs the conventional wisdom behind attracting them. Policy makers should therefore consider the negative effects of foreign direct investment before putting in place policies to attract foreign investment. If possible, a limit could be placed on the maximum amount of money that foreign firms can borrow from local banks, so that domestic firms can be protected.

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APPENDIX

Definition of Variables Used:

*Total Investment***:** Sum of investment in plants and equipment, investment in land and investment in buildings.

Debt: Sum of the firms' total borrowing from informal sources over the previous 12 months less informal lending by firms to different categories of recipients over the previous 12 months.

Informal Lending: Consists of aggregate of any loans made by enterprises in the last year to suppliers, clients, employees, other enterprises, relatives and friends.

Capital Stock: Measured as the replacement value of a firm's total capital.

*Output***:** Measures the value of a firm's total production during the previous year.

*Foreign***:** Dummy equal to 1 if a firm has any degree of foreign ownership and 0, otherwise.

Table A1: Percentage and Frequency of Domestic, Foreign, Small and Large firm years.

Type of Firm	Frequency	Percentage
Purely Domestic	883	82.14
Foreign	192	17.86
Small	627	73.51
Large	226	26.49

Table A2: Percentage of Foreign and Domestic firm years found in each industry

Industry	Foreign Firms	Domestic Firms
Food and Bakery	17.65%	82.35%
Garment and Textiles	14.93%	85.07%
Machines, Metals, Chemicals and SSRI	11.07%	88.93%
Furniture and Wood	26.69%	73.31%

Table A3.   Two-sample t test with equal variance for foreign and domestic firms

Variable	Obs	Mean	Std. Err.
Foreign firms	1075	.1786047	.0116875
Domestic firms	1075	.8213953	.0116875
Combined	2150	.5	.0107858
Diff	-.6427907	.0165286	-.6752044

diff = mean(Foreign) - mean(Domestic)   **t = -38.8897**

Ho: diff = 0   **degrees of freedom =   2148**

Ha: diff < 0	**Ha: diff != 0**	**Ha: diff > 0**
Pr(T < t) = 0.0000	**Pr(|T| > |t|) = 0.0000**	**Pr(T > t) = 1.0000**

Table A4.   Two-sample t test with equal variances for small and large firms

Variable	Obs	Mean	Std. Err.
Small firms	853	.7350528	.0151189
Large firms	853	.2649472	.0151189
combined	1706	.5	.012109
diff	.4701055	.0213813	.4281691

diff = mean(small firms) - mean(large firms)   **t = 21.9868**

Ho: diff = 0   **degrees of freedom =   1704**

Ha: diff < 0	**Ha: diff != 0**	**Ha: diff > 0**
Pr(T < t) = 1.0000	**Pr(|T| > |t|) = 0.0000**	**Pr(T > t) = 0.0000**

Table A5: Ordinary Least Squares Estimation

Investment	Coef.	Std. Err.	t	P>t
Lag Investment	.2823388	.0384618	7.34	0.000
Output	.0009151	.0005111	1.79	0.074
Debt	-.0961421	.0387739	-2.48	0.014
Share of Foreign Borrowing	.0339526	.1247262	0.27	0.786
Share of Foreign Borrowing*Debt	-.3039783	.3286436	-0.92	0.356
No. of Observations	437			

Note: Estimation was done using Ordinary Least Squares method.

Table A6: Fixed Effects Regression

Investment	Coef.	Std. Err.	t	P>t
Lag Investment	.2454935	.049397	4.97	0.000
Output	.001982	.0008157	2.43	0.016
Debt	-.1569069	.0546329	-2.87	0.004
Share of Foreign Borrowing	-.0102759	.1816254	-0.06	0.955
Share of Foreign Borrowing*Debt	-.3836053	.4459798	-0.86	0.390

No. of Observations	437			

Note: Estimation was done using Fixed Effects Estimation method.

Table A7: Test for Investment and Financial Constraints: Classifying firms according to whether they are small or large. (Cut-Off Point for small firms- lowest 90th percentile of the distribution)

Investment	Coef.	Corrected Std. Err.	t	P>t
Lag Investment	.1593511	.0837596	1.90	0.059
Output	.0000293	.0005386	0.05	0.967
Small *Debt	.0734815	.0333728	2.20	0.029
Large *Debt	.13561	.2227056	0.61	0.543

	Diagnostic Tests(p-values)			
No. of Observations	509			
Hansen Test	0.785			
First Order Serial Correlation Test	0.043			
Second Order Serial Correlation Test	0.574			

Notes: Estimation was done using GMM forward orthogonal deviation method. Small, is a dummy that takes the value 1 for firms i in wave t if the firm falls within the bottom 90% of the distribution of employment and 0, otherwise. Large, is a dummy which takes the value 1 for firm i in wave t if the firm falls within the highest 90% of the distribution of employment and 0, otherwise. The first and second order serial correlation tests are asymptotically distributed as N(0,1) under the null of no serial correlation. The Hansen Test is a test of over identifying restrictions, distributed as a chi – square under the null of instrument validity. Time Dummies were included in the estimation as both regressors and instruments. We also used the third lag of all variables in the regression as well as that of the variable, value-added as instruments

Figure1.

CLASSIFICATION BY WAVE AND SECTOR

Before capital stock between the 93rd and 94th percentiles were deleted from the datasets.
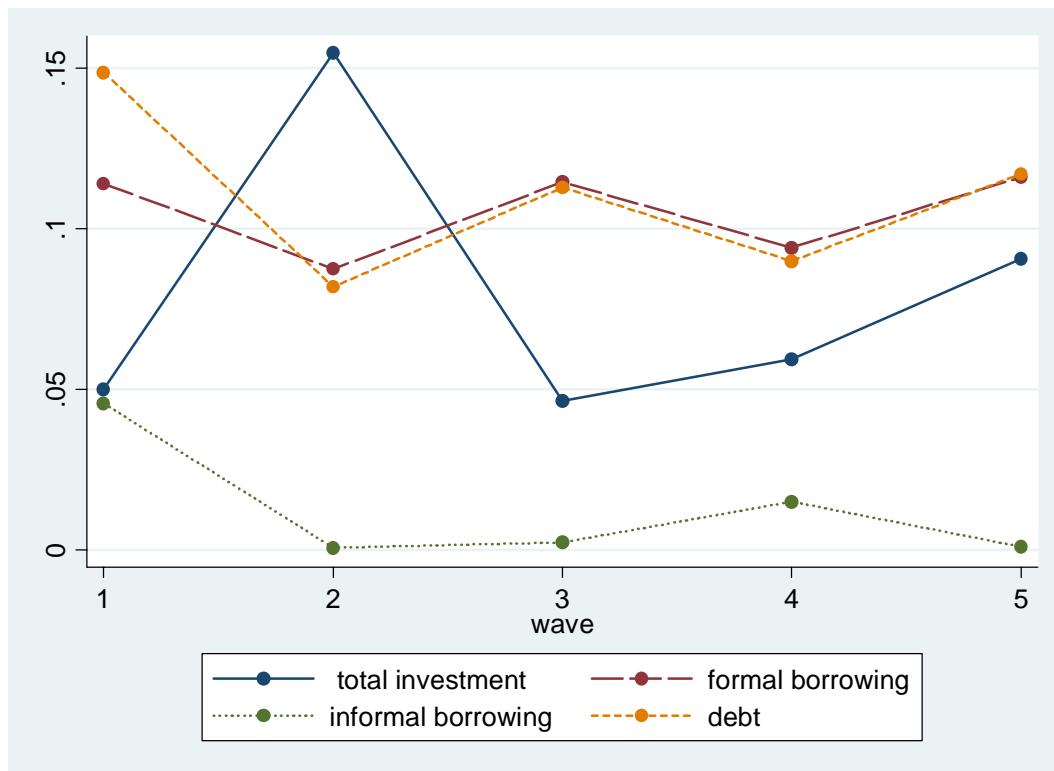
Large firms

Figure2.

CLASSIFICATION BY SECTOR
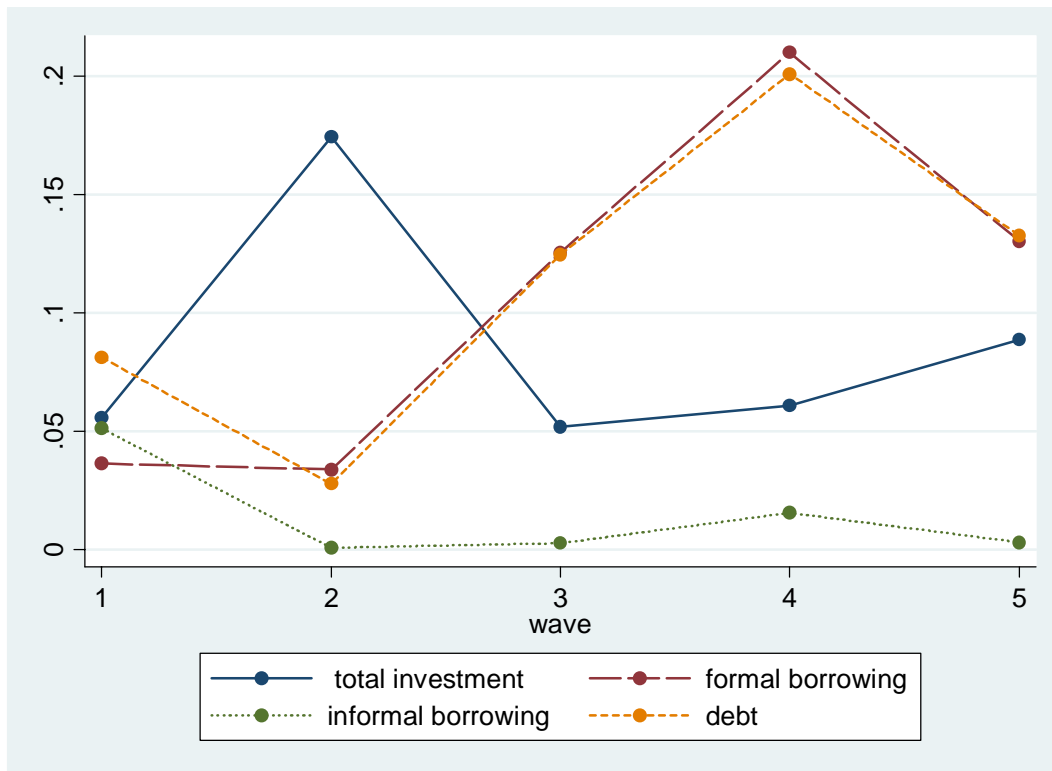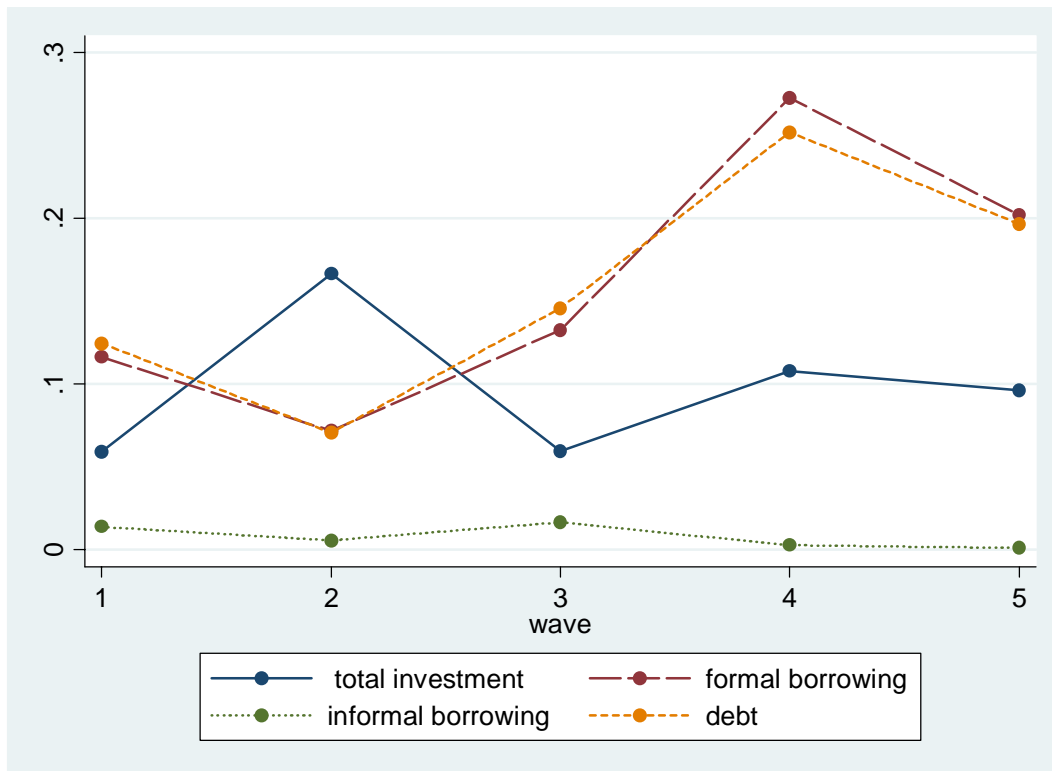
Large firms

Figure3.

CLASSIFICATION BY WAVE

Large firms

CLASSIFICATION BY WAVE AND SECTOR

Figure 4

After capital stock between the 93rd and 94th percentiles were deleted from the dataset.

Large firms