

UNIVERSITY OF KWAZULU-NATAL

**THE ECONOMIC IMPACT OF TRADE OPENNESS ON
FOREIGN DIRECT INVESTMENT INTO EMERGING
MARKET COUNTRIES.**

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of

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Abstract

This paper addresses a central research question that will enable us to understand the economic impact trade openness has on FDI. Does a government's effort to liberalise trade, lead to an increase of FDI into the host country? Using a comprehensive sample of emerging market countries over the period 1990 to 2010, together with panel data techniques, the paper disaggregates total FDI inflows to empirically investigate, at a sectoral level of the economy, the effect trade openness has on primary, secondary and tertiary FDI inflows. The main findings are that liberalising trade openness in the emerging market countries leads to an increase in total FDI inflows, and in the secondary sector-wise FDI inflows. A 10% increase in the trade openness of an EMC member (i.e. lower trade barriers), resulted in an 8.43% increase in the total sector FDI, and a 4.01% increase in the secondary sector FDI, *ceteris paribus*. Trade liberalisation is therefore an important motive for FDI in the manufacturing sector of EMCs. This follows the efficiency seeking (vertical FDI) theories the export-orientated market seeking (horizontal FDI) theories.

This liberalisation effort has the opposite effect in the Asia Pacific Trade Agreement region, where increased openness results in a strong decrease in the manufacturing sector FDI inflows. This suggests tariff jumping motives for FDI into this region.

Keywords: foreign direct investment, trade openness, emerging market countries, panel data, generalized least squares, fixed effects.

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1. INTRODUCTION

Some authors¹ are of the opinion that more open markets are likely to create significant economic welfare gains through more efficient use of resources (static gains). This efficient allocation of resources is thought to enhance long term productivity, investment and growth (dynamic gains). This positive environment is likely to entice foreign businesses, leading to increased foreign direct investment (FDI) inflows². This study aim's to test the premise in the case of emerging market countries (EMCs), and whether being a member of a regional trade agreement (RTA) acts as a catalyst in this regard.

1.1 Motivation for the research

The motivation of this paper is to examine the economic impact of trade openness on the flow of FDI, with the focus on emerging market countries. Specifically, in addition to total FDI inflows, the paper will analyse the impact trade openness has on primary FDI, secondary FDI, and tertiary FDI. It is suspected that regression analysis using total FDI flows could fail to significantly account for the sector specific motives for FDI by multinationals³. The author adheres to the opinion – as proposed by Kumar (2002) - that freeing the markets up to foreign competition and trade is likely to foster significant economic welfare gains through a more efficient allocation of resources (static gains). If resources are used more efficiently, an economy can expect to achieve dynamic gains, as increases in investment and productivity lead to long term growth. It is likely that foreign firms will be attracted by this favourable economic environment, thus also raising inflows of FDI. Could this premise hold in the sample of emerging markets, and does it differ when each of the three sectoral FDI inflows are examined in turn?

1.2 Value of the research

The emerging markets of this world have come under close inspection of late since vast amounts of wealth have been moving to & from these regions and from the more developed first world economies. Volatility is high and there will always be an added element of risk when trading economically with an emerging market.

¹ Kandiero & Chitiga (2003); Kumar (2002); Asiedu (2002)

² Kumar (2002)

³ Massoud (2008);

This study aims to shed light on a scarcely covered area of research. More specifically, with regards to a sector-wise breakdown of FDI, It aims to show whether the host company's decisions to invest abroad differ depending on whether the investment is in either: primary, secondary or tertiary FDI.

The research findings of this paper will hopefully equip governments with the necessary knowledge to make informed decisions regarding the direction of their foreign trade, policy & investment stance. Multinational firms could use the research to select countries that best fit their strategies for international expansion.

1.3 Research Question

This paper addresses a central research question that will enable us to understand the economic impact trade openness has on FDI. Does a government's effort to liberalise trade, by reducing barriers lead to an increase in FDI flows into the host EMC?

1.4 Objectives of the paper

The central objective of this paper is to examine the economic link between trade openness and FDI.

Following from this, the secondary aims are to:

- Establish the optimal measure of economic trade openness in the context of this study
- Separately analyse the impact of trade openness on FDI in primary commodities, manufactured goods, and tertiary services
- Ascertain whether factors affecting FDI in developing countries affect emerging market countries differently
- Examine the extent to which, being a member of an RTA influences FDI into the respective countries.

1.5 Data Analysis

Secondary data was used from the World Bank Development Indicators and IMF statistical database. The data collected will be evaluated and analysed through the use of an empirical regression analysis. Regressions will be run on several trade openness variables to establish which is the most relevant in this situation.

Multiple regressions will then be run, separating the 36 emerging market countries from the 7 member countries of the Asia-Pacific Trade Agreement (APTA), and then the FDI in primary sectors, manufactured goods, and finally services.

1.6 Limitations of the Research

Data availability proved to be a limiting factor. While extensive data is available for total FDI, FDI at the disaggregated level is scant and is in need of improved collection efforts.

When a model is constructed which incorrectly omits one or more important causal factor/s, an omitted variable bias may occur. It is difficult to include all the necessary variables. Sometimes this is due to the data availability limitations previously mentioned. Thus proxies are needed in an attempt to account for the unavailable data. A bias may result when the model compensate for the omitted factor by over- or underestimating the effect of one of the other factors.

This study makes use of a partial equilibrium, as opposed to the broader general equilibrium analysis. A partial equilibrium analysis looks at one market in isolation, while a general equilibrium analysis takes into account all markets simultaneously. This study is therefore limited in that the analysis would not consider any feedback between linked markets or inter-industry interactions.

1.7 Structure of the Paper

The paper is composed of five specified chapters. It is classified in such a way that it provides a clear picture of understanding the research topic, theoretical aspects, empirical methodology and analysis of data.

A review of existing literature will be looked at in chapter 2. It describes what others have done and hence sets a benchmark for the current analysis. It also serves to justify the use of specific economic modelling techniques as can be seen in Chapter 3 and 4 of the paper. The review will be broken down into four sections exploring previous views on each of the key elements the paper seeks to tackle, namely: FDI (What it is, and how it is classified); Openness to trade (measuring openness); emerging markets (what characteristics these countries exhibit); and finally, PTA's (their aim and significance – with a focus on APTA).

Chapter 3 concerns specification of the model and data definition. It is separated into three sections: Firstly the model used will be specified and reasons why the particular model was

chosen will be provided. This section will also name the countries to be included in the study and the time frame to be used. The second section of the chapter aims to define each of the variables to be used in the model, both dependant variables (very briefly) and independent (at length). Thirdly, the most appropriate trade openness variable for this study will be chosen using a generalised least squared (GLS) method.

Lastly, the EMC and APTA samples will be introduced. Based on post regression tests, the most appropriate regression model will be selected in each case, to evaluate the results that follow in chapter 4.

Chapter 4 attempts to answer the remaining research objectives with an empirical approach. Explanations and accounts of the empirical findings will be done using the models selected in the previous chapter. Firstly the full EMC sample will be run, using the GLS model presented in the previous chapter. Secondly, the APTA sample is run using fixed effects (FE) method. Finally, the results from the EMC and APTA regressions will be compared against each other, to distinguish any differences or similarities.

Conclusions made in the 5th chapter will be drawn from the empirical findings. Policy recommendations on amendments to government's trade policy in these respective countries will thus be presented. Suggestions for future research are also made.

This introductory chapter highlighted the whole picture of what the paper is going to look like. It indicated the questions to be answered as well as the specific aims of the study. This paper's motive is to study the effect of openness to trade on FDI inflows, and how this differs from being an APTA member country, or merely one of 36 emerging market Countries outside of this agreement.

The chapter that follows will unpack each of the keywords in turn, and examine the previous literature, setting up a platform from which to evaluate the empirical analysis.

2. Literature Review

2.1 FDI explained

There has been much debate surrounding the measurement of FDI, and what it comprises. The concern stems from the relative subjectivity of the FDI measurement, even though it is quantitatively derived. It is thus necessary to try and define the concept. Current consensus defines FDI as an increase in the equity position of a non-resident owner (the direct investor in the home country), who holds greater than 10 percent of the shares of the target company (OECD, 2008). It can also include any loans from the home country company made to the local affiliate. Any outflow of capital causing an equity position less than this 10 percent figure would constitute a portfolio flow. Put differently, the outflow is considered FDI, when a resident in one economy (the direct investor) acquires a lasting interest through a cross-border investment in a company in another economy (the foreign company). The 'lasting interest', implies a long term (tangible) relationship between the direct investor and the host country foreign target, typically involving the establishment of manufacturing facilities, bank premises, warehouses, and other permanent or long-term organisations abroad.

When a firm wishes to expand its production in a foreign economy, it has a number of options available to it. It may create a new establishment or investment (known as a greenfield investment); it could sign a joint venture; or via an acquisition of an existing company abroad (cross-border mergers and acquisitions). It is suggested by Siem (2009) that FDI from multinational corporations (MNCs) in developed countries, to developing countries is more commonly of the greenfield investment type. Since these advanced MNCs typically have the technological knowledge and know-how, they can create new companies in the less developed economies where this kind of technology may be scarce or lacking. When FDI is from a developed country to another developed country, quite often the FDI is into an already established company via either a joint venture, or M&A.

The FDI relationship does not necessarily end once the initial direct investment transaction has taken place by the multinational investor, to the host country recipient of the investment. It includes all future transactions between them and among their affiliated companies. There appears to be an FDI relationship that extends beyond the original direct investor and includes all foreign subsidiaries and affiliates of the direct investor that are part of the "parent group". Once the initial FDI is established, there are a handful of avenues whereby subsequent increases in FDI can occur. The three most notable instances are: *firstly*, any injections of

additional equity capital; *secondly*, any reinvested earnings or profits not distributed as dividends by subsidiaries or repatriated to the parent group; and *thirdly*, various inter-firm claims, such as the allowance of supplier's credit or loans, all of which constitute an FDI (International Monetary Fund, 2003).

Now that the concept of FDI has been clarified, it is necessary to bring to attention some popular misconceptions regarding the subject. FDI does not imply control of the affiliate, as only a 10 percent "ownership" is needed to constitute an FDI transaction. This would be the true, only if 51 percent or greater established FDI, which is not the case. The figure of 10 percent is more for statistical convenience. What it does imply for the direct investor, is an effective voice, or the potential for an effective voice, in the strategic executive decisions of the direct investment enterprise.

FDI does not consist of a "10 percent ownership" (or more) by a group of unrelated investors residing in the same foreign country. It must be one investor or a related group of investors. Nor is FDI based on the nationality or citizenship of the direct investor; it is based on residency. Borrowings from unrelated parties abroad that are guaranteed by direct investors also do not constitute FDI.

With regards to FDI positions, FDI does not cover all of the assets of the direct investment enterprise. It only covers that portion financed by the investor directly - or foreign subsidiaries and affiliates of the direct investor - that are part of the parent group.

A firm is a set of assets that are "owned" (i.e. financed) by creditors and shareholders, where the former have a primary claim over the assets and income of the enterprise and the equity owners hold the remaining claims and have greater influence over management. FDI is not the enterprise and its assets. Instead, it is just one of the avenues of financing available to that enterprise. Hausmann (2000) believes that this distinction is important because many of the positives commonly associated with FDI are actually generated by the enterprise, not by the way it finances itself. Take for example, the UK firm Virgin Mobile's entry into the South African telecoms market in 2006. If a foreign-owned company such as Virgin Mobile brings in new technology, a better management system or access to new export markets, it is Virgin Mobile that is bringing it, not FDI. FDI is just one of the ways in which an enterprise - such as Virgin Mobile - can provide finance for its expansions.

The focus of FDI literature has shifted through a number of phases over the decades.

Phase one

In the years following World War II, considerable growth took place in the total value of FDI, predominantly into the manufacturing sector and largely by U.S. and British enterprises. This signalled a structural shift from pre-World War 2 FDI flows, which were on a much smaller scale, of the extractive type, and mostly into primary commodities - raw materials resources. This shift brought about a change in thinking, since FDI could no longer be attributed to the need to secure primary resources, which were scarce or unattainable in developed countries. As it so happened, the majority of this FDI post-World War 2, was being directed towards developed countries (Letto-Gillies, 2005).

Phase two

During this time, theory formulated around FDI was in its infancy. According to the conventional neoclassical explanation at the time, it was commonplace to lump FDI and all the types of foreign investment together as one capital flow, irrespective of its type or origin. The existence of FDI was motivated by the belief that capital flowed from one country to another in response to differences in interest rates⁴.

These norms were put to an end in 1960 by Stephen Hymer, and his PhD thesis on FDI & MNEs. Hymer (1960) revolutionised economic theory, by linking FDI to industrial organization (the study of market imperfections). There were two main tenets to his theory in the thesis which are pivotal to his analysis of why companies seek foreign investment locations: *Firstly*, the concept of control, which is crucial in distinguishing between portfolio and direct investment, as well as to the motivational rationale behind the firm's direct investment versus exporting or other internationalisation modes such as licensing. *Secondly*, the notion of structural market imperfections and the resulting market power of firms operating in oligopolistic markets.

Since this departure, the literature on the subject increased substantially and took different directions, placing the multinational firm at the crossroads of many disciplines and of many debates as well.

Kindleberger (1969) provided the first comprehensive review of the various theories of FDI along the lines expressed by Hymer. He approached the question of FDI from the standpoint of the perfectly competitive model of neoclassical economics by asserting that in a world of pure competition, FDI would not occur. When a market is operating efficiently, when no

⁴ Calvet (1981, p. 48) provides an explanation for the inappropriateness of international capital theory in explaining FDI. He highlights its ignorance of the complexities of the international transfer of resources and the channels through which it takes place.

external economies of scale or marketing exist, when information is freely transferable, and there are no trade barriers or anti-competitive practices, then international trade is the only possible mode of foreign participation. This assertion stems from the Heckscher-Ohlin theory of international trade (Ohlin, 1933). Trade of goods will equalize factor prices in a world of factor immobility. This theory is supported by Dunning (1977). Logically, it follows that it is the departure from the model of perfect competition that must provide the rationale for FDI.

It was thus a natural step for Kindleberger to later suggest that imperfect markets were the catalyst for the presence of FDI. He proposed the following classification: Imperfections in goods markets, imperfections in factor markets, economies of scale and disruptions authorized by government (Kindleberger, 1969). He named this the Market Imperfections Paradigm, in an attempt to encompass new developments in the field of FDI determinants.

Phase three

From the early 1970's, the way FDI was studied changed once again⁵. In this third phase, it became recognised that the institution carrying out the foreign direct investment, is the core of theoretical explanation rather than the investment itself. A more recent paper by Buckley (1993) reiterates this ideology: "Explanations of international direct investment which ignore the role of the multinational firm are, at best, partial and, at worst, incorrect." This phase became known as the *theory of the firm*. Other authors prior to this had put forward theories about the firm⁶, but little, if any mention was made of international production.

One opinion brought about by this shift in thinking was the Internalisation theory first proposed by McManus (1972) and later confirmed by Buckley and Casson (1976). The basis of the approach is the acceptance of market imperfections as transactional in nature, as opposed to structural, as in Hymer's thesis. These imperfections are costly and disruptive to the firm, thus should be circumvented by internalising the transactions. The Internalisation process takes place where a firm attempts to keep the results of research technology advancement (ownership-specific) to itself, while expanding the market reach and production platforms (location-specific) abroad.

The terms ownership-specific endowments and location-specific endowments were introduced to the world of economic theory by Dunning (1977) in his book entitled: "*Trade, Location of Economic Activity and the MNE: A Search for an Eclectic Approach*". An enterprise may possess or create its own technology and organizational skills (it may also purchase this

⁵ See: McManus (McManus, 1972); Magee (1977); Buckley & Casson (1976); Agmon & Lessard (1977)

⁶ See: Coase (1937)

from another institution, but in doing so, secures some exclusive rights of use). These skills would be described as *ownership-specific endowments*, taking the form of a legally protected right (a patent, brand name, or trademarks); a commercial monopoly (securing control of inputs necessary in the production process); or they may arise due to the technical characteristics or size of firms (an innovative and entrepreneurial workforce, or economies of scale).

With regards to *location-specific endowments*, every country has a unique set of prices; quality; and productivity of labour, energy, materials, components, and semi-finished goods. Dunning (1977) theorised that the cheaper the location factors are, the more profitable is FDI, provided a constant quality and productivity of each input exists. Location theory is especially significant for the purpose of this paper because it is under this theory that the concept of trade openness falls. We shall therefore return to it later in the chapter when we address what previous authors have said about openness to trade.

Keeping our attention on the MNC in explaining FDI, one remarkably adaptive and increasingly popular view is the 'Eclectic Theory of International Production', again, put forward by Dunning (1981). According to this theory, he implies that ownership-specific endowments, location-specific endowments, internalisation theory, and industrial organisation theory all have something to contribute to an explanation of why firms decide to transact with foreign countries. The more R&D or advertising expenditures, the stronger the patent protection or the monopolistic returns of firms; The higher the cost differentials between countries; the greater the benefits of internalising the firm specific advantages rather than selling them; and the higher the advantages to be gained from multiple locations in different countries, the more significant the degree of international involvement would be. If tariffs are high in a host country, perhaps the country is following import substitution policies (and thus low trade openness). An MNC seeking to operate in this location, may circumvent the barriers through FDI in this host country.

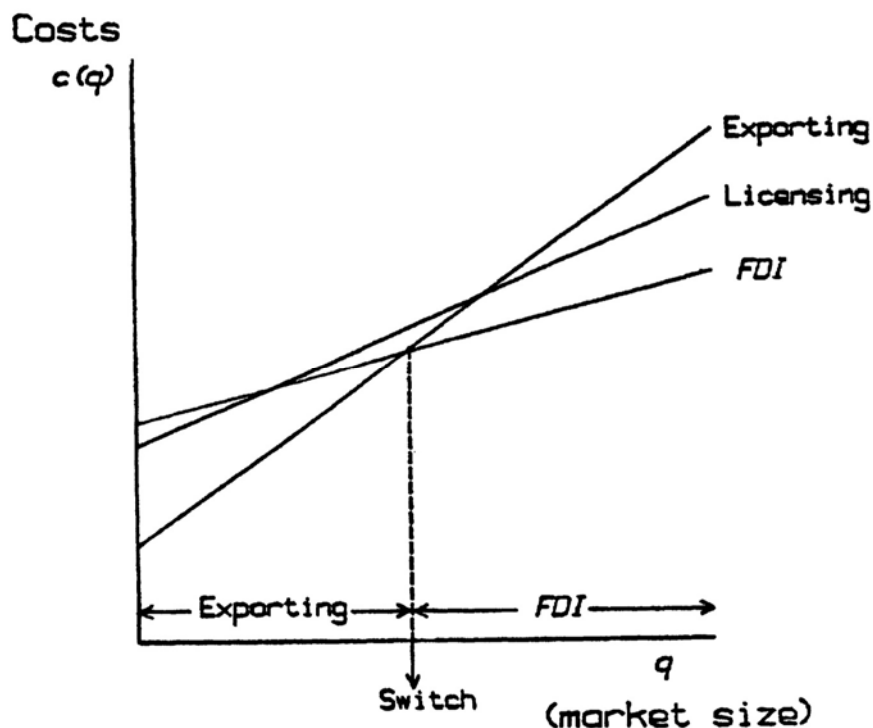
Dunning's (1981) eclectic theory is, subject to much criticism in a paper by Itaki (1991). He argues, firstly, the conceptual futility of the 'ownership advantage'; secondly, the inability to separate and distinguish between the 'ownership advantage' and the 'location advantage';⁷

⁷ Whilst Itaki (1991) does not dispute the possible existence and even measurability of the advantage that consists of both the 'ownership advantage' and the 'location advantage', he does however, totally deny the possibility of their separate existence and measurability

and lastly, the theoretical ambiguity of the 'location advantage' (Itaki, 1991). Nonetheless, Dunning's views remain the preeminent theoretical works by a majority of economists.⁸

Figure 2.1, shows that the timing of an FDI is dependent on the size of the market and the costs of operating in that region. In this instance, licensing is never the favored option. What can be taken from this somewhat simplistic figure is that a firm should begin by exporting the product from the home country and continue to do so until demand for the product (market size) reaches a certain threshold. From this point, the firm should switch to FDI in the host country.

Figure 2.1 The Timing of a Foreign Direct Investment



Adapted from: Buckley and Casson (1981)

Firms that can truly plan, organize and control across borders, can also develop strategies to take advantage of differences in regulatory regimes in these respective countries. Thus the existence of different trade, currencies and taxation laws may, for example, provide the opportunity to develop location and intra-firm transfer strategies that give them the ability to manipulate transfer prices and therefore accrue higher profits than they would have otherwise.

⁸ See: Cantwell (1988); Gastanaga (1998)

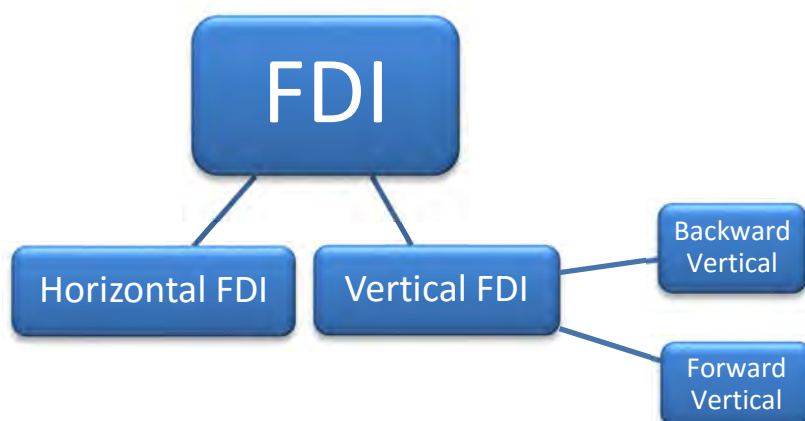
This opportunity to develop advantageous strategies is most prevalent with regards to labour, which, unlike the Multinational Corporation (MNC) that employs it, has been unable to organize itself across nations. This is in contrast to a large firm operating in a single country, where its sizeable labour force would make labour organisation and resistance much stronger. Thus, as Letto-Gilles (2005) suggests, "A strategy of international location may also be a strategy of labour fragmentation".

The case of Hyundai motor company in 2007 is a good example of the labour fragmentation that comes about when operating in a global environment. The company announced plans to shift part of its production load from its home in South Korea to neighbouring China, after employees in the existing plant voted against the addition of a second shift, necessary to meet production demands.

There are two main forms of FDI: Horizontal and Vertical (See Figure 2.2). Horizontal FDI occurs if the investment in a host country, by the parent firm, manufactures the same products or provides the same services as that parent firm does back in its home country. This Horizontal FDI can be export orientated or non-export orientated. It is considered export orientated, when the MNC is investing in the foreign affiliate, with the intention to use the host country as an export platform for its product. If the MNC is attempting to lower costs of selling its product in a particular country, it may employ a non-export orientated horizontal FDI strategy rather than exporting its product from its home country. Prohibitive transport costs or high trade barriers could warrant FDI in favour of exporting its product.

Vertical FDI occurs when an enterprise, through FDI, expands its operations upstream or downstream in different value chains, namely, when an MNC's subsidiaries perform value-adding activities phase by phase in a vertical fashion in a host country. In other words, vertical FDI arises when an MNC fragments the production process abroad, thereby locating each stage of production in the foreign location where it can be performed at a lower cost. FDI is said to be Backward Vertical, if the parent firm invests 'upstream', in a foreign affiliate, to secure raw materials or inputs for its activity back home. 'Backward' refers to the location of the industry in the production chain. It provides inputs to the parent firm. Historically most backward vertical FDI has been in the resource extraction industries such as oil extraction, bauxite mining, tin mining and copper mining (Hill, 2001).

Figure 2.2 Forms of FDI expansions



Adapted from: Hill (2001)

Forward Vertical FDI occurs if the affiliate in the host country sells the output of its parent firm. Forward vertical FDI is less prevalent than backward vertical FDI. An example of this 'downstream' investment would be a German Vehicle Manufacturer, acquiring a number of dealerships in Argentina, to sell its vehicles produced in Germany.

FDI by industry.

Massoud (2008) contends that FDI is not an aggregate occurrence. It should not be treated as a homogenous group, but rather heterogeneously. Since it has different, if not contradicting effects based on its sector-level distribution (whether it's channelled into agricultural, manufacturing or service sectors), it requires disaggregation to be correctly analysed.

We therefore follow UNCTAD's common practice of disaggregating FDI into primary, secondary and tertiary sectors. Each of these three sectors is explained by the business activity they are concerned with. (See Table 2.1)

Extractive Industries (Primary). Provide the ingredients or raw materials used further along the production chain. They remove or take out things which are already provided by nature. There is often a large labour requirement at this stage. For example lumberjacks, fisherman, or miners. Although there is still room for machinery and technology either to supplement the labour process, or to substitute it to some extent.

Manufacturing and Construction (Secondary), takes the raw materials or components and adds value to them through production or processes. They make, build and assemble

products. This can either be labour intensive, or use factory assembly lines and thus more technologically intensive. Most products involve several stages of production.

The Tertiary sector of the economy is the service industry. The service industry is less tradable than the previous two. Often they provide intangible 'goods' by people, to people, in an effort to add value or fill a gap in the market. It is more people orientated. As a country increases in development, more of its attention shifts to the service industry.

Table 2.1 FDI disaggregated at the industry level
<u>Primary Sector</u>
Agriculture
Hunting, Fishing and Forestry
Mining and Quarrying
<u>Secondary Sector</u>
Manufacturing
Production and Supply of Electricity, Gas and Water
Construction
<u>Tertiary Sector</u>
Transport, Storage and Post
Information Transmission, Computer Services and Software
Wholesale and Retail Trades
Hotels and Restaurants
Financial Intermediation and Services
Real Estate
Leasing and Business Services
Scientific Research, Technical Service and
Geologic Prospecting
Management of Water Conservancy, Environment and
Public Facilities
Services to Households and Other Services
Education
Health, Social Security and Social Welfare
Culture, Sports and Entertainment
Public Management and Social Organizations
International Organizations
<u>Others</u> (not elsewhere classified)

Adapted from: UNCTAD (2009)

While a wide array of variables have been proposed in the literature, this study focusses on trade openness as a significant factor affecting FDI inflows. More importantly, the study is only concerned with the economic (i.e. trade) aspect of openness, and not the social or socio-economic aspects.

2.2 Openness to Trade

There are a handful of tools at government policy-makers disposal which they can use to restrict trade. They fall into either tariff barriers, or non-tariff barriers. On the Import side, a tariff rate can be imposed on products coming into the country. This raises the effective price of that foreign product to the local buyer. The tariff is also a source of income to the Government that imposes it (an import tax). Some developing country governments generate a significant portion of their annual revenue from this source.

Non-tariff barriers (NTB) take many forms and disguises. The infant industry argument is often put forward by Governments to motivate for protecting of a particular industry. Import quotas are sometimes put in place to protect an industry. Import licensing requirements add a layer of red-tape, which aim to slow down and strictly control a particular industry's competitive imports. Another NTB are Local content requirements on exports. These try to ensure that value is added to products before they get shipped out of the country. Extraction of minerals is an example. A Local (or foreign) diamond mining company may extract the resource from the home country's ground and export it in its raw state to more advanced nations. These advanced nations would process the Diamonds, polishing and adding them to jewellery etc. After adding value to them, the product would be sold around the world for a much higher price than the original price in its raw unprocessed state. Often the home country (where the Diamonds were extracted from) imports these finished Jewellery products. Local content requirements are also a common restriction in the automotive manufacturing sector. A certain specified percentage of the parts required in the vehicle, must be manufactured in the home country. This is an attempt to maintain some of the value added in the production process.

Policies that restricted trade were popular in the 1970's (Pahariya, 2008). At the beginning of the 1980's - with rising debt levels - developing countries started to shift away from import substitution policies, in favour of export promotion. Trying to measure or quantify this openness is not a definitive task. A major challenge of empirically calculating the influence of trade liberalisations on FDI, is how best to quantify multi-dimensional trade restrictions.

Various measures have been proposed and used as a proxy for trade openness. These measures are often separated into two broad categories: incidence-based and outcome-based (Baldwin, 1989).

Incidence-based measures of trade openness include average tariff rates and non-tariff barrier indices⁹. These measures try to capture trade policy by examining policy instruments.

Outcome-based measures assess the deviation of the observed outcome, from an outcome without the trade barriers. It can be further broken down into two subcategories: Flow-based trade measures and Price-based trade measures. "Flow-based measures include trade intensity (the ratio of exports plus imports to GDP), structure-adjusted trade intensity (the ratio of trade to GDP adjusted for factors affecting trade, including location, external transport cost, country size, etc.), and import penetration ratio. Price-based measures include implicit tariff rates (the discrepancy between domestic prices and border prices on identical products), and the spread of the black market premium of exchange rates." (Pritchett, 1991) and (Andriamananjara & Nash, 1997)

Several alternative measures of Trade Openness have been listed which may be used as the main independent variable in the econometric analysis. In this paper's appendix, (Table A2.1), 12 of these different trade openness variables are regressed against each other to compare which is the most appropriate. The trade openness variable will be further discussed in the next chapter (3.2).

Consider the standard model of trade, as highlighted by Faini (2004). Raising tariff barriers will typically deter both exports and imports. In a country with poor capital endowment, it will also raise the returns to capital and hence attract foreign investment. Thus trade and factor mobility are substitutes. Conversely, the reduction of trade barriers should stimulate trade and stifle factor mobility.

An econometric study by Gastanaga (1998) examined the effects of a number of policies on FDI flows from the viewpoint of Dunning's "eclectic theory" of foreign investment, and therefore the advantages of foreign ownership, host country location, and internationalisation. Of particular interest were the estimates of tariff rates on FDI. Whereas the pure cross-section results indicate the effect of Tariffs on FDI to be positive (Low trade openness – high FDI), in a time-series context, the net effect of Tariffs on FDI/GDP ratios became negative (High openness – high FDI). Although cross-sectionally, and in the earlier part of the sample period,

⁹ Pritchett (1991) and Andriamananjara & Nash (1997)

tariff jumping seemed to be a determining factor for FDI, as time passed, in individual countries, trade liberalization became the more significant motive for FDI.

Kandiero & Chitiga (2003) looked at trade openness and FDI in an African country sample. Where their study differs from this one is that they disaggregated their trade openness variable at the sector-wise level, but kept FDI as the total economy FDI inflows. They focused on whether trade in the primary, secondary, or tertiary sector had quantifiable changes on the flow of FDI into those countries.

Now that the concepts of FDI and Trade Openness have been defined, as well as looking at how past authors view the link between the two, a third element of the paper can be introduced, concerning the sample of countries to be included in the dataset. It will be interesting to determine the net effect of Trade Openness on the FDI/GDP ratio, once the sample of EMCs is used.

2.3 Emerging markets

Emerging markets defined...

While there is no universally accepted definition of the group of EMCs, the International Monetary Fund (IMF) uses the broadest conceivable definition in its World Economic Outlook (WEO), representing all non-industrialised countries¹⁰. Others define EMCs as a group of more advanced developing economies. However, no consensus exists among authorities on which countries to be included. The term further indicates a market that is not limited to economic strength or geographical location. EMCs are considered to be in a transitional phase, falling anywhere between developing (China; South Africa) and developed (South Korea; Israel) status.

Spurred on by the success of firms from newly industrialized countries such as South Korea, Taiwan, and Singapore, EMCs are shifting away from inward-oriented import substitution policies, toward more outward-orientated export-led growth (Kotler, Jatusripitak, & Maesincee, 1997). Thus public policy instruments in emerging economies are increasingly geared to providing incentives for local firms to actively internationalise and be competitive in the global marketplace (Kotler, Jatusripitak, & Maesincee, 1997).

Legislation from the U.S. Government's Secretary of Agriculture defines an EMC as: Any country that: (a) Is taking steps toward developing a market oriented economy through the

¹⁰ See WEO of September 2002, Table 1, p 12.

food, agriculture, or rural business sectors of the country's economy; and (b) Can potentially provide a viable and significant market for U.S. agricultural commodities, or products of U.S. agricultural commodities. (Federal Register, 2009). They limit the classification of emerging markets to countries with per capita income of under \$12,276 (the upper threshold at this point in time, on "Upper middle income" countries as stipulated by the World Bank, according to 2010 GNI per capita, calculated using the World Bank Atlas method).¹¹

These EMC's are thought to provide greater potential for profit, but with greater rewards comes more exposed to risk and volatility from various factors. The term can be somewhat misleading, since it is not a mere formality that a country will emerge from "less developed" to "more developed"; although that is the general trend in the world. There is, however, the possibility of a country moving from "more developed" to "less developed".

Precisely at what point does a country become an 'emerging market'?

In 1981, World Bank economist Antoine W. van Agtmael coined the term emerging market country. The term was used to define a country with low-to-middle per capita income. Countries falling into this classification represent about 80% of the world's population, accounting for approximately 20% of the world's economies. Although quite a loose definition, countries whose economies fall into this category, ranging from very large (the likes of India) to small (island nations like the Dominican Republic), are usually considered emerging because they all share a common theme in their developments and reforms.

Even though China is deemed one of the world's economic superpowers, it is included in the category alongside much smaller nations who may be endowed with great deal less resources, like Bulgaria. Since China and Bulgaria have both embarked on economic development and reform programs, and have begun to open up their markets and "emerge" onto the global scene, it is deemed acceptable to include these two contrasting countries in this category.

EMCs are considered countries with high GDP growth rates. The Market must be located in a developing country. They are characterised as transitional, meaning there are processes in place that promote accountability, to ensure that the market is moving from a closed economy to an open market economy. Evidence of this could be seen in the former Soviet Union and Eastern bloc countries. The ultimate aim of EMCs is to introduce economic reform policies that promote sustainability, transparency and efficiency in the capital market system.

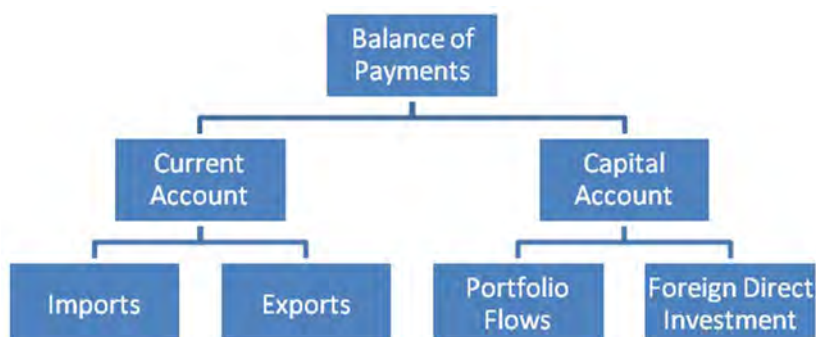
An EMC will also reform its exchange rate system because a stable local currency allows for greater transparency and builds confidence in an economy, particularly when foreigners are

¹¹ World Bank (2010)

considering investing. Exchange rate reforms also reduce the need for local investors to send their capital abroad (capital flight). The inflation targeting policy by South Africa's Reserve Bank is one such example of an EMC attempting to assure potential foreign investors that it is serious about creating a stable environment conducive to healthy returns on investment (South African Reserve Bank, 2012). Besides the implementation of reforms, it is also highly likely that an EMC is receiving some foreign aid and guidance from large donor countries and/or world organizations such as The World Bank and International Monetary Fund (IMF). EMCs differ from *less developed countries* (LDCs) due to their higher potential for growth. However, EMCs like LDCs, often contain weak or poor quality physical infrastructures for example telecommunications, transportation, electricity and ports, roadways, and rail networks.

Why are EMCs so eager to attract foreign investment, specifically FDI? In answering this, we turn to a country's financial statements and figure 2.3. The Balance of Payments is a record of all transactions made between one particular country and all other countries over a specified time period. It comprises two components: the Current Account and the Capital Account.

Figure 2.3 Balance of Payments breakdown



Source: Author's own classification.

As already mentioned, EMCs often have GDP growth rates well above the levels seen in least developing & developed countries. To maintain this growth, large amounts of resources and technology are required for prolonged periods.

Estimates show that 70% of world growth over the next few years will originate from EMCs, of which China and India should account for 40% of that growth. Adjusted for variations in purchasing power parity, this rise of EMCs is that much more remarkable: the IMF forecasts that the total GDP of EMCs could surpass that of the developed economies in 2014 (Martin,

2012). Economic demands of this magnitude require resources and inputs to be imported. This puts strain on the country's Current Account, usually resulting in a trade deficit with its trading partners. Governments in these circumstances need to keep money flowing into the country on the Capital Account side so as to offset the Current Account deficit and thus preventing the currency from depreciating in response to the high demand for foreign products & currency. The Capital Account comprises Portfolio income and Foreign Direct Investments. Portfolio income is known to be the more liquid and volatile of the two flows. FDI in contrast usually has a longer timeframe for return on investment. It is for this reason that Governments from all corners of the globe have been eager to capture a greater share of world FDI inflows. It would allow the high levels of imports relative to exports to continue and the economy to grow at full potential.

In addition to generating relatively large multiplier effects for the economy, FDI typically facilitates the transfer of technology and promotes sound employment and corporate governance practices (Capital Markets Consultative Group, The, 2003). For example, FDI in the financial sector is commonly credited with raised efficiency of financial intermediation and the quality of supervision through importing higher prudential standards. These benefits may accrue either through linkages directly with local firms or via positive spillovers—that is, outside contractual relationships, for instance, by demonstrating to local firms, ways of accessing international markets.

For foreign investors or developed country corporations, EMCs are an ideal investment or expansion path in respect of new resource outlets or extending business opportunities. In the host country, employment levels can be increased, labour and managerial skills become more refined, and technology accumulation, sharing and transfer can occur. In the long-run, Heakel (2003) believes EMC's can expect to realize increased overall production levels, raising their GDP and allowing the EMCs to catch up to the developed economies.

Faini (2004) finds evidence of a shift in the nature of FDI, particularly toward emerging markets. Historically, FDI was primarily focused on production facilities in host economies, to cater to these markets and, advantageously, bypass any barriers to trade. As a result, a rise in barriers to trade (less openness) would have resulted in a subsequent increase in FDI. This suggests substitutability was the norm between trade and FDI. Presently, MNCs are displaying different investment criterion. Improvements in telecommunication and transportation technology allow these companies to realise substantial reductions in production costs by dividing up the value added chain among its subsidiaries in different locations as a function of factor prices. Hence, trade costs now play a very different role in this new context. No longer

do they encourage MNCs to invest in foreign countries with the aim of circumventing the trade costs and gaining better access to foreign consumers. Quite the contrary, they inevitably increase the costs associated with the division of the value added chain and therefore discourage firms from investing abroad. In other words, trade and FDI have increasingly become complementary. As a result, any regression in either dimension would have an adverse reaction on the other. In particular, increasing trade restrictions would not only dampen trade, but also reduce the attractiveness of MNC's embarking on any FDI undertakings.

There are authors who are critical of FDI being the Holy Grail for development. Hausmann (2000) warns against governments pursuing policies that actively target FDI, possibly at the expense of local investment. He believes it is inefficiencies in the market place that determine the initiative to seek markets outside the common borders of the company. The belief is that the share of FDI needs to be greater in host countries with inadequate institutions because these MNCs will tend to substitute for missing markets (Hausmann, 2000). It is from this logic, one may assume that investments flowing from developed nations into less developed ones are more likely to be in the form of FDI and occur via Greenfield investments. Converse to this, most of the investment flowing between two developed countries would be through portfolio flows (shorter duration), while the smaller FDI share between these developed nations would be in the form of mergers & acquisitions or a joint venture.

Can increased economic trade openness in this selection of emerging market countries attract greater amounts of FDI? There are several studies in the literature, which have attempted to empirically test the relationship between Trade Openness and FDI flows into EMCs. Not all come to the same conclusions. Martens (2008), suggests these discrepancies can be attributed to the theoretical underpinnings, how the models' were specified, the degree of disaggregation of the Trade and FDI flows, and the selection and measurement of the control variables.

This brief review of the literature will separate the authors findings based on whether a positive or negative effect on trade openness was found. Firstly, a look at the literature with a positive effect: Asiedu (2002) regressed trade openness on net FDI inflow/GDP ratio. The sample used 39 non-sub-Saharan African emerging countries, and 32 SSA countries, over a period from 1988 to 1997. FDI and Trade were found to be compliments. The elasticity of FDI with

respect to Trade Openness was 0.033 for the 39 N SSA emerging countries, and 0.028 for the SSA sample.

Markusen & Maskus (2002) tested the vertical, horizontal and knowledge capital models. They concluded that in developing countries, trade restrictions may be less of an incentive for horizontal tariff jumping investments. This suggests increasing trade openness will have less of a positive impact on market-seeking investments in developing countries compared to developed countries. Their regressions were performed on US inward and outward FDI from 1986 to 1994, with a sample size of 36 economies (including the U.S.), resulting in 509 observations of local transactions.

Addison & Heshmati (2003) used a Fixed Effects approach to test trade openness on FDI. Their sample included 110 developed and emerging countries, over the period 1970 to 1999. They found trade openness had a positive effect on FDI, but the impact was relatively minor and varied by geographic location. The elasticity's of FDI with respect to trade openness are 0.0472 for Latin America, and 0.0333 for SSA.

Nonnemberg and Cardoso de Mendonca (2004) examined 38 EMCs between 1975 and 2000. They concluded that trade openness impacted positively on FDI. The elasticity's of FDI with respect to trade openness were 0.0113 (pooling OLS), 0.0143 (Random Effects) and 0.0160 (Fixed Effects) for the 1975-2000 period. When the period 1985 to 2000 was used, the corresponding elasticity's were 0.0115, 0.0127 and 0.0146.

Faini (2004) uses a fixed effect method to test the Log of external tariff rate on inward FDI stock. He uses a sample of 92 emerging countries, over a period from 1981 to 2000. The significant coefficients of the external tariff on FDI stock are -1.23 (Trade Barriers) and -1.03 (FDI potential). According to the author, the more prohibitive is the external tariff, the lower is FDI, which invalidates the tariff jumping motive and would suggest that trade and FDI are complementary (trade openness positively effects FDI stock). This would suggest that FDI in EMCs is predominantly backward vertical. In other words, after FDI is made and has increased the corresponding stock, foreign subsidiaries generate a sustained demand for imports of capital. The transportation of final or intermediate goods to the parent company (from the affiliate) will also increase exports. This suggests MNC's aim to reduce their production costs by streamlining the value added chain and relocating abroad the portions of production of those intermediate goods which are too costly to manufacture in their home country.

Panagiotis & Konstantinos (2011) studied 36 developing countries between 1990 and 2008, using 8 different measures of trade openness. In the long run, they found trade openness contributed positively to the inflow of FDI in these developing economies.

While there is numerous evidence in the literature documenting the positive impact of trade openness on FDI, cases where a negative influence is found are less prominent. One such case is in the previously mentioned 2010 paper by Walsh and Yu. Their results suggested a negative impact of trade openness on Primary FDI inflows. This is further evidence, that examining FDI at a disaggregated level matters.

Kandiero and Chitiga (2003) regressed 51 African countries over 4 periods between 1980 and 2001. Their study differs in approach from the rest in that while their dependent variables is total FDI, their openness variable was disaggregated into economy wide openness in the primary sector, openness in the secondary (manufacturing) sector, and openness in the tertiary (services) sector. Primary sector openness is statistically significant at the 1 percent level but has a negative coefficient. They suggest increasing trade openness in the primary sector by 10%, will decrease total FDI by 0.7 percent.

Another sign of increased openness is the signing of Free Trade Agreements by Governments, between countries. This concept is now discussed in the section that follows.

2.4 Preferential Trade Agreements

During the last two decades, the extraordinary surge in the number of PTA's signed has drawn much attention from researchers and literature. Some suggest being in a PTA has a positive effect on FDI inflows.¹² Medvedev (2006) highlights a number of ways in which preferential trade liberalisation might affect FDI flows. He confirms that both threshold effects (the actual signing of the agreement) and market size effects (joining a larger and faster-growing common market) are significant determinants of net FDI inflows, although the market size effects seem to be the dominant of the two.

Not all trade agreements are created equal. The type of trade agreement matters. Bilateral trade agreements are between two countries, and are the most popular type. Plurilateral Trade Agreements are all agreements that comprise more than two countries, but do not fall into the

¹² Globerman (2002); Lederman et al (2005); Medvedev (2006); Samuel (2009)

regional trade agreement (RTA) or inter-regional categories. Inter-regional agreements are those signed between two regional entities.

RTAs are proving increasingly popular amongst developing countries, and despite the costs, provide the benefit of free trade within the boundaries of that regional group. Jaumotte (2004) suggests some of the benefits, including the exploitation of comparative advantage with partner countries, increased competition leading to greater efficiency, and an expanded market allowing for scale economies to be achieved. Globerman (2002) argues that FDI is likely to respond positively to preferential trade liberalisation regardless of whether an MNC has invested vertically (taking advantage of production process economies of scale) or horizontally (benefiting from product economies of scale) in the host country. The lessening/elimination of trade barriers between PTA members, reduces the costs for affiliates to transport intermediate and final products between one another. Thus, due to the MNCs' highly integrated production structure, intra-PTA FDI is likely to respond favourably to preferential trade liberalisation

Trade creation occurs when trade is shifted into the country that is now offering more lucrative trading terms. Or, as a result of the PTA, an increase in trade occurs on a previous trade route due to the improved trade conditions.

Trade diversion occurs when the trade from one country gets shifted away from that country, and into a country with which the exporting country has a newly formed PTA with. In terms of RTAs, trade diversion results when trade previously imported from countries outside the region, is substituted for less efficient production from countries within the region. The domino theory proposed by Baldwin (1993) explains the proliferation of PTAs using a political economy model that focuses on the trade diversion costs of being excluded from a PTA.

In Samuel's (2009) empirical analysis, it was found that becoming a member of the WTO or maintaining membership in the organization in one year, compared to a country that is identical in all other aspects but is not a member of the WTO, resulted in an approximate 29% increase in FDI flows to that country, over an otherwise identical non-member country. He contends that the relationship associated with joining the WTO and a host country's FDI inflows is far greater in magnitude than the relationship associated with involvement in any type of trade agreement or association. Consequently, one important policy recommendation he proposes, would be for some countries to focus more efforts towards WTO negotiations and less on establishing other types of trade agreements. Jaumotte (2004) who tends to share this viewpoint suggests that RTAs should be considered of second-best nature compared to multilateral free trade because of the possible impact of trade diversion.

RTAs could even have a worse outcome compared to before the agreement, if trade diversion exceeded trade creation and other benefits of RTAs. However, this risk is reduced when the objective of the RTA is to promote exports and lay the groundwork for more effective competition outside the region instead of protecting an import-substitution policy. This argument by Samuel holds less significance in EMCs, since almost all of those countries in this sample are already members of the WTO. China joined in 2001, Russia in 2012. Only Venezuela is not a member.

More recent negotiations and their resulting PTA's are no longer being dominated by the subject of merchandise trade alone. Being dubbed as the 'third wave of regionalism' by Adams et al (2003), current PTA's have evolved, placing much more emphasis on other areas of integration such as investment, trade in services, setting and harmonisation of standards, competition disciplines, customs cooperation, intellectual property rights, and dispute settlement. Samuel (2009) attempts to test the hypothesis that the more economically integrated trade agreements are, the more investment that countries involved in those agreements are likely to receive. While his results are partially in line with this hypothesis, a more definitive answer cannot be reached, due to statistical insignificance of the variable's coefficients.

In a survey by the Capital Markets Consultative Group (2003)¹³, respondents underscored the importance of an established market in the host country. It was noted that FTA and RTI endeavours often increased demand and potential market size. Due to this, there is a need for greater trade integration, as evidenced in the case of EMC's in Africa and Asia that have historically been relatively too small to attract market seeking FDI. The respondents also cautioned that the preferential treatment of certain investors and the rules of origin requirements under RTAs could distort the FDI flows to various EMCs and possibly increase their susceptibility to shocks if the source of FDI becomes too focused.

To what extent, does being a member of the Asia-Pacific Trade Agreement influence FDI into these countries?

In this paper, The Asia-Pacific Trade Agreement (APTA) was selected as a sample of countries involved in a Trade agreement. This agreement, signed in 1975, is a PTA that aims

¹³ "The CMCG, established in July 2000 by the IMF's management, serves as a communications channel with participants in a multitude of international capital markets. While the sample of private sector participants is relatively limited, it is quite representative of large firms having significant exposure to EMCs across various economic sectors and regions." (International Monetary Fund, 2003)

at promoting intra-regional trade through exchange of mutually agreed concessions by the member countries. The participating countries include: Bangladesh, China, India, Republic of Korea (South), Lao People's Democratic Republic, and Sri Lanka. Mongolia is currently in the process of accession to APTA.¹⁴

This particular trade agreement was chosen because of its successful track record. In 2011, FDI into APTA countries amounted to \$162 billion (or 10.6% of world FDI in 2011). This is in stark contrast to the FDI inflows into APTA at the time it was signed in 1975. FDI inflows were only \$93 million (or 0.3% of world FDI during that year).

¹⁴ (United Nations: Economic and Social Commission for Asia and the Pacific, n.d.) See Appendix Table A2.2

3. Specification of the Model and Data Definition

3.1 Model Specification

Following the trend of previous authors, the dependent variable will be the ratio of net real FDI flows to real GDP.¹⁵ Since this paper's research is interested in looking at the effects on disaggregated FDI flows, there will be four dependent variables, each run in turn - net real Total FDI to real GDP; net real primary sector FDI to real GDP; net real secondary sector FDI to real GDP; and net real tertiary sector FDI to real GDP.

As indicated, the objective of this paper is not to find the factors that impact FDI flows into EMC's per se. Rather, the aim is to establish whether trade openness has a significant effect on the FDI sectors, having controlled for any other important determinants of FDI. The estimated equation in this paper most closely resembles the method found in Kandiero & Chitago (2003).

FDI = Trade openness, REER, GDP growth, P2, GDP per capita, E

The following equation is estimated:

$$F_{jit} = \alpha + \beta_1 + \beta_2\eta_{it} + \beta_3X_{it} + e_{it} \dots \dots \dots (1)$$

where,

- α = the constant
- F_j = FDI (Economy wide, Primary Sector, Secondary Sector, and Tertiary Sector FDI/GDP)
- i = the i^{th} country
- t = time period in years
- η_{it} = measures of openness
- e_{it} = error term
- X_{it} = a vector of other determinants of FDI (Real Effective Exchange Rate; GDP growth rate; Inflation; GDP per capita).

In the empirical analysis, for convenience, we log one or more of the variables to aid interpretation. By logging both the dependent (Y) and independent (X) variable(s), the regression coefficients (β) will be elasticities, and interpretation would go as follows: a 1% increase in X would lead to a ceteris paribus $\beta\%$ increase in Y (on average).

¹⁵ Asiedu (2002); Kandiero and Chitiga (2003); Addison and Heshmati (2003); Nonnemberg (2004); Aizenman and Noy (2005).

Logging only one side of the regression "equation" would lead to alternative interpretations as outlined below:

- Y and X -- a one unit increase in X would lead to a β increase/decrease in Y
- Log Y and Log X -- a 1% increase in X would lead to a β % increase/decrease in Y
- Log Y and X -- a one unit increase in X would lead to a $\beta \times 100$ % increase/decrease in Y
- Y and Log X -- a 1% increase in X would lead to a $\beta/100$ increase/decrease in Y

When including the control variables:

$$FDI_{jit} = \beta_1 + \beta_{2nit} + \beta_{3Xit} + Z_{it} + e_{it} \dots\dots\dots(2)$$

where,

Z_{it} = each of the control variables in turn (infrastructure matrix; secondary school enrolment; tertiary school enrolment; corruption; natural resources; oil reserves; railway infrastructure)

3.2 Data Definition

3.2.1 Macroeconomic Variables

- FDI

FDI inflow, as a proportion of GDP is used as the Dependent variable in this paper. This is indicated by the variable: Total FDI/GDP. The data for GDP spanned a 21 year period from 1990 to 2010, and was obtained from the World Bank 2012, WDI dataset. A constant currency denomination in US\$ millions was used, with the base year being 2000. Sources of sectoral FDI data: UNCTAD WID country profiles. National Bank databases, ASEAN FDI database 2006, OECD statistics website 2006-2010.

Real FDI inflow values are used at all stages of the regressions, rather than nominal FDI inflows. They are calculated as follows: Real value of FDI = (Nominal value of FDI x GDP deflator) x 100

Total FDI was calculated by adding the three industry sectors, plus any unspecified inflows. Recall in Chapter 2, Table 2.1.

Primary FDI comprised Agriculture; Hunting & Fishing; and Mining & Quarrying.

Secondary FDI comprised Manufacturing; Construction; and the production and supply of Electricity, Gas & Water.

Tertiary FDI was made up of Trade & Repairs; Hotels & Restaurants; Transports, Storage & Communication; Financial Intermediation; Real Estate, Renting & Business Activities; and Other Services.

At all stages in this paper's regressions, FDI flows are used rather than stocks, in order to improve the tracking of the variation in the data. Globerman and Shapiro (2002) suggest that "To the extent that inward and outward FDI have been going on for a long time, recent and relatively large changes in FDI behaviour may not be evident if FDI stock figures are used." Therefore, as long as FDI stocks are relatively large, annual increments to these stocks are expected to be minimal, causing an empirical model to have difficulty identifying the determinants of change in the dependent variable. Additionally, they felt the methods used to calculate FDI stocks in each country are often not homogeneous. (Globerman & Shapiro, 2002).

➤ Openness to Trade

It is argued by Alcalá & Ciccone (2003), that real openness is a more appropriate measure of openness compared to current openness in the presence of trade-driven productivity gains. As such, data at constant prices was used in this paper for the openness variables. The data was obtained from the World Bank 2012, WDI dataset.

In Chapter 2, Appendix Table A2.1 showed a range of trade openness variables proposed or suggested in previous literature to show trade openness' influence on FDI. Each of those suggested trade openness variables were run in turn on FDI in total, and broken down by industry. This is to determine the most appropriate trade openness variable to use in the proposed empirical analysis. The trade openness regressions can be found in the appendix (Table A3.4 to A3.7).

If the simple trade intensity variable is used $(X+M)/GDP$, one would expect a positive sign between trade openness and FDI/GDP. If $(X+M)/GDP$ increases, it is probably because of a liberalising trade regime, thus increased openness. This would suggest complementarity exists between trade openness and FDI inflows. However, if a tariffs variable is used in this instance, one would expect a negative sign between trade openness and FDI/GDP. As tariffs decrease, there would be an anticipated increase in FDI.

Which is the best Trade Openness variable to use as a proxy? The simple trade intensity variable "ln_TradeR4" (column 6) was chosen as the most appropriate of the alternate variables, to approximate trade openness. Representing $(X+M)/GDP$, It is one of the most

commonly used outcomes-based measures in the literature¹⁶. It allows for the highest number of observations available in the samples, and displays robust regression results in this sample.

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The expected sign of total sectoral FDI as a proportion of GDP could be either negative or positive. It would depend on which FDI sector has the biggest influence on total FDI inflows. Trade openness may not have too much influence on primary FDI. This type of FDI is of the extractive type, and investment in this sector tends to ignore macro-economic variables (Faini, 2004). There could be a positive sign, if the reason from this investment is to export the extracted resources to external markets. Resource seeking FDI supplements trade but is less sensitive to trade barriers in host countries.

Regarding secondary FDI, if the investment in the manufacturing and construction sector is of the efficiency seeking (Vertical type), one might expect a positive sign between trade openness and secondary FDI. The aim is simple, namely to cut production costs by dividing the value-added chain and relocating abroad the production of those intermediate goods which are too costly to produce domestically. The MNC's might try to take advantage of factor endowments in less developed countries. Labour costs are often lower relative to more advanced nations. Vertical FDI is also thought to be trade creating, but is highly responsive to trade barriers. Siem (2009) finds trade barriers discourage vertical FDI, and therefore a positive effect of trade openness on this type of FDI.

If the host country's secondary sector FDI is horizontal in nature (that is, the MNC's producing a product replicating its home country industry), the expected effect of trade openness and secondary FDI is more complicated. FDI of the horizontal type may be positively or negatively affected by trade openness. According to Siem (2009), the expected sign is dependent on whether the MNC is planning to export that product it produces in the host country to neighbouring countries, or whether it plans to only serve that host country's market. Theory suggests export-orientated FDI is positively influenced by how open that host country is, while non-export orientated investments are negatively affected by increased trade openness. Sometimes, an MNCs production is shifted to a foreign location, motivated by the desire to avoid trade barriers, reduce transport costs and gain access to foreign consumers. This is

¹⁶ Benassy-Quere, Fontagne, & Lareche-Revil (2001); Asiedu (2002); Kandiero & Chitiga (2003); Addison & Heshmati (2003); Nonnemberg & Cardoso de Mendonça (2004); Ghosh (2007)

¹⁷ Of the EMC's, data for Nigeria's real exports was unavailable. The observations for this country were obtained by deflating its Nominal Exports by the GDP deflator for the respective period.

known as the Tariff-jumping motive. Gastanaga et al (1998) suggests a negative sign is expected between trade openness and FDI in this instance.

Gelb (2005) argues that the resource seeking motive for FDI is not reserved for the primary sector, extractive industries such as mining or agriculture. It can also be said to incorporate secondary sector FDI in its quest for cheap labour as a resource. Resmini (2000), who studied manufacturing investment in Central and Eastern Europe, found predominantly vertical FDI inflows, which benefited from increased openness, as one might expect in a sector for which international trade flows in intermediate and capital goods are important. Singh and Jun (1996) also find that export orientation is very important in enticing FDI, suggesting the rising complementarity between trade and FDI flows as an explanation.

Regarding the Tertiary sector, most services FDI is likely to be of a horizontal nature (non-export), aimed at the host country market in which the investment is made, rather than vertical (intended for export back to the home market). It is often difficult to export a service. Sometimes the service rendered offers an intangible benefit. As a result, it has little to do with trade flows per se. In their paper, Walsh and Yu (2010) were surprised to find a strong positive coefficient of Trade Openness on Tertiary FDI inflows. In defence of their findings, they suggested trade liberalisation may be correlated with the type of economic liberalisation that also generates a sound economic environment, conducive to the service industry.

➤ REER (*ln_REER2*)

Real Effective Exchange Rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. The base year used was 2000 = 100. The data was obtained from Bruegel "A New Database" (2012), as well as own calculations.

It is generally accepted in the literature that the REER in the host country (The country receiving the FDI), is negatively associated with FDI flows into the economy.¹⁸ A weaker real exchange rate might be expected to increase vertical FDI as firms take advantage of the relatively lower prices in host markets to purchase facilities or, if production is re-exported, to increase home-country profits on goods sent to a third market. Froot and Stein (1991) find evidence of this relationship: a weaker host country currency tends to increase inward FDI within an imperfect capital market model as depreciation makes host country assets cheaper relative to assets in the home country. Blonigen (1997) makes a "firm specific asset" argument

¹⁸ Froot & Stein (1991); Blonigen (1997); Bende-Nabende (2002); Kandiero & Chitiga (2003); Cuyvers, Plasmans, Soeng, & Van den Bulcke (2008); Walsh & Yu (2010)

to show that depreciating exchange rates in host countries relative to the rest of the world tend to result in increased FDI inflows.

➤ GDP growth rate (*rGDPgrow*)

Using the GDP growth rate of a country controls for future market potential. MNC's look to invest in countries experiencing higher economic growth. During times of higher economic growth in an economy, local opposition to FDI in the host country may be less hostile to a proposed FDI inflow. Similar to Addison and Heshmati (2003), one would expect the growth rate of GDP variable to be positively related to FDI inflows. Many empirical studies use the rate of growth of GDP, as a proxy for the growth of market size.¹⁹ Data source: World Bank's WDI 2012. Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars.

➤ Inflation (*P2*)

An Inflation variable is said to be an adequate proxy for macro-economic stability in a country (Ghosh, 2007). We follow the World Bank's WDI 2012 definition of inflation, measured by the consumer price index (CPI). It measures the annual average percentage change in the price paid by an urban consumer for a fixed basket of goods and services. The Laspeyres formula was used.

➤ Log GDP per capita (*ln_rGDPpc*)

Kandiero (2003) uses GDP per capita, purchasing power parity (PPP) adjusted, as a proxy accounting for market size.

In this paper, the researcher uses the natural log of GDP per capita. GDP per capita is gross domestic product divided by midyear population. GDP is the total value of all final goods and services produced annually within the borders of a country, plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. The data was sourced from the World Bank's national accounts WDI.

3.2.2 Control Variables

In the second part of the regression analysis, after specifying the macroeconomic variables, we include institutional and qualitative variables, which we label as our control variables.

¹⁹ see Knickerbocker (1973); Root and Ahmed (1979); Lim (1983); Torrissi (1985); Singh and Jun (1996); Gastanaga, Nugent, and Pashamova (1998); and Ryckeghem (1998)

These include an infrastructure index, secondary school enrolment, tertiary school enrolment, corruption, a total natural resource index, an oil reserve dummy, and a telecommunication infrastructure variable. Due to the potential multicollinearity between these control variables, this method of separating the macroeconomic variables from the institutional/qualitative control variables, and adding each into the regression in turn, is deemed appropriate, and follows the method found in Walsh and Yu (2010).

➤ Infrastructure Index (Rail + Telephone) (*ln_InfraSum2Mis*)

An more extensive infrastructure increases the productivity of investments and therefore stimulates FDI flows. Asiedu (2002) believes a comprehensive measure of infrastructure development should account for both the availability and reliability of infrastructure. Though due to data constraints, she ignores the reliability of infrastructure.

This paper follows the method of Asiedu (2002), by only accounting for the availability aspect. An infrastructure index was attempted, to capture a more holistic view of the different infrastructural facilities. At first, four variables were tested in the index: Rail lines, road density, telephone lines, and internet subscribers. Eventually road density and internet subscribers were dropped from the index, due to insufficient observations and poor model specification. Rail lines is the length of total railway route in kilometers available for train services, irrespective of the number of parallel tracks. The data was obtained from the WDI 2012 database and the CIA World Factbook. The data for Telephone lines per 100 people was re-scaled from 100 to 10,000 people. This was to limit the negative observations that resulted when their log values were calculated.

➤ Human Capital (*Educ2nd; EducTer*)

Education raises the productivity of FDI, leading to higher growth in the host country. The higher the level of education, the greater the potential for an investment decision, and achievement of an expected outcome. However, skill-biased technological change indicates that a part of the production from industrialised economies is increasingly being shifted or outsourced to less developed countries. In the latter case, the expected positive association between human capital and FDI is reversed (Addison & Heshmati, 2003). Two variables were included in the paper to capture the human capital in the sample countries.

Secondary education enrollment ratio (*Educ2nd*), acts as a proxy for the level of human capital, specifically semi-skilled labour. Tertiary enrollment ratio, as measured by the *EducTer* variable, aims to capture the level of skilled labour in the country. The data was sourced from the WDI 2012 database.

In recent years, MNC's have been offshoring²⁰ professional services and technology-related facilities, for which a well-educated pool of workers is essential (Lluberas, 2007).

➤ Corruption/Political instability Index (*Corrupt*)

A corruption index is used as a proxy for how corrupt a country's public sector is perceived to be. The Corruption Perception Index produced by Transparency International is used. It is based on 13 independent surveys, giving countries a score from 10 (being highly clean) to 0 (highly corrupt). The study covers the period 2001-2010. In the most recent publication, amongst the EMC sample, Chile scored the highest, with a score of 7.2 out of 10. At the bottom end of the clean sheet, Venezuela only managed a score of 2.0, followed closely by Russia with 2.1 out of 10.

One would expect a positive relationship between the index and FDI. This implies that a country with a lower corruption index score (more corrupt public sector), would attract a lower share of FDI inflows.

➤ Natural Resources Index (*NatResTotExProt*)

The data was obtained from the World Bank's "Wealth of the Nations 2011" publication. They calculate a natural capital variable, which is the sum of pasture land, crops, timber, non-timber forest, oil, protected areas, coal, natural gas and minerals.

Protected areas were subtracted from the calculation. Since protected areas are owned by the governments of the respective countries, they won't be available for commercial use, and therefore not of value to MNC's looking to invest. A positive effect is expected from the presence of natural resources on the inflow of FDI (Addison & Heshmati, 2003).

➤ Oil Reserve dummy (*OilResDum*)

Oil-reserve dummy, OilRes = 1 if country has oil reserves greater than 400 million bbl.

OilRes = 0 if its oil reserves are less than or equal to 400 million bbl.²¹

Loots (2002) established that this variable is necessary to determine the appeal of oil endowed countries in attracting more FDI. Further, it served as a control for countries whose economies may be primarily based on this natural resource. The data was obtained from the CIA World Factbook (2012). This source lists the stock of proven reserves of crude oil in barrels (bbl).

²⁰ Offshoring is the relocation of a business process from a company in one country, to the same or another company in another, different country.

²¹ The "bbl" abbreviation is used to signify a petroleum barrel of 159 liters.

Proven reserves are those quantities of petroleum which, by analysis of geological and engineering data, can be estimated with a high degree of confidence to be commercially recoverable in the foreseeable future, from known reservoirs and under the prevailing economic climate. Theory suggests a positive effect of the oil reserve dummy on FDI inflows is expected (Loots, 2002).

➤ Infrastructure (Telephone lines) (*ln_InfraT*)

Similar to the Infrastructure index, except this variable is not an index, but comprises one variable. The natural log of telephone lines per 10,000 people. It should take into consideration the extent of telecommunications available in a country. The researcher can anticipate a positive relationship between *ln_InfraT* and FDI. Perhaps more significantly in the tertiary sector.

International cross-sectional studies account for the vast majority of available data studies on the effect of policy-related variables on FDI flows (Gastanaga, Nugent, & Pashamova, 1998). Yet, despite attempts to separate out other influences, as with all cross-section studies, the results may reflect other non-measurable influences which vary across countries but not over time. For this reason, the results of such studies may not apply to the more relevant trade policy reform context of changes over time. Dollar and Kraay (2001) contend that a large part of the cross-country difference in countries' trade/GDP share has little to do with policy, but rather reflects countries' characteristics specific to their location. It is difficult to attribute discrepancies in trade volumes amongst countries as a reflection of significant trade policy differences.

Therefore, it would seem important that the cross-sectional estimates be supplemented with time-series data. The main drawback to embarking on a time-series study is the absence of time-series of sufficient length and variation over time on the relevant policy variables to allow the effects of such changes on FDI to be accurately estimated. For example, in many countries corporate tax rates, tariff rates, regulations on capital flows, and various other institutional factors remain unchanged for many years for reasons of international treaty, political equilibrium, policy gridlock among other factors. Developed countries governments have been collecting statistics and economic data for decades, but often less developed countries and newly EMC's have less complete economic statistical records in place. Some strides toward improving this problem have been made by organisations such as the World Bank (WDI) and UNCTAD (UNCTAD STAT) databases. Another problem with pure time-series analysis of FDI is that the variations over time may be quite volatile, reflecting many idiosyncratic influences unique to an individual economy. For example, while one country might be experiencing civil

unrest and therefore foreign investment scared away, another nearby country might be booming, with high GDP annual growth rates and multinationals scrambling to set up shop within its borders.

In order to alleviate the drawbacks arising from either pure cross-section or pure time-series analyses, by using data over time, and across countries, this paper makes use of Panel Data estimation techniques to estimate the policy influences. The panel data approach allows for a more systematic distinction between the effects of policy changes, and other less variable elements of the investment climate on FDI.

When deciding on which countries to include in the sample of emerging markets, a number of well-regarded sources were utilised.

- IMF FDI emerging markets
- Countries with cities included in the EMI, compiled by Mastercard (2008)
- The Economist
- Emerging market Global Players (EMGP) project at Columbia University (2014)

The analysis began with a pool of 43 potential EMC's, but, Jamaica and Trinidad & Tobago were dropped due to the lack of data available for constant prices. They are also small island nations. "They are frequently used as off-shore banking centers and their level of de facto openness to financial flows is radically different from other countries with similar income level." (Aizenman & Noy, 2005). Panama was dropped as most of its FDI inflows were due to tax avoidance, going into pure holding companies to take advantage of the country's favourable taxes breaks. Uruguay, Philippines, Jordan and Israel were also dropped as no FDI data was available at the sector-wise level. (See Appendix A1, for a list of EMCs in the sample).

As mentioned previously (in chapter 2.3), as an upper threshold, EMC's are limited to Upper Middle Income countries and below this category. Countries such as South Korea and Israel had GNI per capita exceeding this 2010 threshold and were thus removed from the sample. They are examples of EMC's that have risen above this label and progressed sufficiently in economic terms to be considered Developed.

After dropping these countries, the data analysis was left with 35 EMC's in the sample over a 21 year period from 1990-2010.

Regarding the smaller subset for the Asia-Pacific trade agreement countries, the analysis will cover 5 of the 6 countries over the 21 year period. Sri Lanka was dropped due to the lack of FDI data at the sector-wise level. Each of the APTA member countries joined the trade agreement at its inception, in 1975 (with the exception of China, which was acceded in 2001).

Including a dummy for the date member countries joined APTA is unlikely to have a significant effect on the results. This is due to the members joining the PTA fifteen year prior to the sample period in this paper.

3.3 The Econometric models available for estimation:

OLS

In the application of regression analysis, the possible existence of heteroscedasticity is a major concern, including in the analysis of variance. The presence of heteroscedasticity can invalidate statistical tests of significance that assume that the modeling errors are uncorrelated, normally distributed, and that their variances do not vary with the effects being modelled. Gujarati and Porter (2009).

Heteroscedasticity can cause ordinary least squares estimates of the variance - and thus, standard errors - of the coefficients to be biased, possibly above or below the true population variance. Thus, regression analysis using heteroscedastic data will still provide an unbiased estimate for the relationship between the predictor variable and the outcome, but standard errors and therefore inferences obtained from data analysis are questionable. Biased standard errors lead to biased inference, so results of hypothesis tests are possibly wrong.

The presence of heteroscedasticity can be tested in the OLS model using the Breusch-Pagan / Cook-Weisberg test. It tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. A large Chi-squared test result would mean heteroscedasticity was a factor.

With a large number of parameters to estimate, multicollinearity can be an anticipated problem. A simple test of its degree can be obtained by regressing each of the independent variables on the remaining independent variables. The R^2 obtained can then be taken as a measure of the degree of multicollinearity.

Previous literary works on the subject - which use OLS estimation methods - include Asiedu (2002); Alfaro (2003); Jensen (2003); and Siem (2009) among others.

FE

The pooled OLS does not account for any unobservable country-specific effects and is therefore a less appropriate estimator of the parameters of the FDI model. Pooled OLS is used as a starting point. The model is next estimated by allowing country effects to control for

unobservable policy and technology effects. This method is known as the Fixed Effects method. There may be some unobserved within country effects that need to be accounted for. For example, the political system of a particular country in the sample could have some effect on trade flows. FE's remove the effect of those time-invariant characteristics from the predictor variables, so we can assess the predictors' net effect.

Previous literature on the subject, which make use of FE's include Gastanaga (1998), Asiedu & Lien (2004)²², and Asiedu (2005).

A problem with FE estimation is that it not only removes any within country effects, but also eliminates all time-indifferent variables. It is appropriate only when the research is interested in analysing the impact of variables that vary over time.

The usual Goodness-of-fit R^2 is valid for comparison of the pooled model estimated by OLS and the FE model. FE assumes that each country's error term and constant should not be correlated with the others. If the error terms are correlated, then FE is not suitable since inferences may not be correct. This is the main rationale for the Hausman test.

RE

The random effects estimator is a weighted average of the estimates produced by between and the within effects (FE). This is a form of Weighted Least Squares when correlation is uniform. An advantage of RE is that it allows for time invariant variables (e.g. Oil reserve dummy). In the FE model, these variables are absorbed by the intercept.

The Hausman test, shows whether country specific effects are correlated with the explanatory variables. Thus it is a test between RE and FE. The null hypothesis is that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator (Green, 2008).

If they are (insignificant Chi-squared, probability greater than Chi-squared larger than 0.5), then it is safe to use random effects over fixed effects. Otherwise, you should use FE, or one of the other solutions for unobserved heterogeneity (McMahon, 2012). We then run a Breusch and Pagan Lagrangian multiplier test to decide between a RE regression and a simple OLS regression. The command *xttest0* is used in Stata. The null hypothesis in the LM test is that variances across entities are zero, indicative that there is no significant difference across countries.

²² They use FE's to estimate how Capital Controls affect FDI inflows.

GLS

The Stata command *xtgls* allows a more flexible covariance structure for disturbances and random effects (Bjørn, 2010). *xtgls* is more commonly used for panel data. It fits these cross-sectional time-series linear models using feasible generalized least squares. This command allows estimation in the presence of AR(1) autocorrelation within panels and cross-sectional correlation and/or heteroskedasticity across panels. GLS minimizes a *weighted* sum of squared residuals. In the case of heteroscedasticity, observations expected to have error terms with higher variances are weighted less than observations suspected to have error terms with smaller variances. Previous literature on the subject (which also makes use of GLS), includes Karim et al (2003), and Medvedev (2006), among others.

GMM

GMM is designed for a dynamic persistent panel data with few time periods and many individuals, with endogenous regressors, with fixed effect, with heteroskedasticity and autocorrelation within cross-sections.

Having run the regression using the GMM model, the researcher believes it is an inappropriate method for this data set. Though recently, numerous studies in the literature have based their econometric findings on this method.²³

Roodman (2006) states: "If N is small, the cluster-robust standard errors and the Arellano-Bond autocorrelation test may be unreliable. The test depends on the assumption that N is large. Large has no precise definition, but applying it to panels with $N = 20$, for instance, seems worrisome."

While the 35 EMC's in this paper may just be a sufficient number for GMM estimation, the APTA countries number only six, which fails to uphold the requirement of 'many' individuals.

²³ Kandiero & Chitiga (2003); Stoianov (2007); Tondl & Fornero (2008); and Solomon (2011)

4. Empirical Results

4.1 Which econometric model to use for estimation of the regressions?

Prior to running the regressions, the most appropriate econometric model needs to be selected. The effects of macroeconomic variables on total sector FDI will now be considered (As shown in table 4.1.1). The dependent variable is total sector FDI. The independent variables are openness, log of REER, real GDP growth rate, Inflation, and log of GDP per capita.

Table 4.1.1 EMC Total Sector FDI model selection, Macroeconomic Variables. (OLS,FE,RE,GLS). Uncorrected					
Total Sector-wise FDI		1990-2010			
Model Selection		1	2	3	4
Independent Variables		OLS	FE	RE	GLS
openness	In_TradeR4	0.853*** (0.326)	0.805 (1.458)	0.874* (0.501)	0.853*** (0.323)
log REER2		0.485 (0.677)	0.293 (0.860)	0.347 (0.753)	0.485 (0.671)
real GDP growth		0.00793 (0.0390)	0.0467 (0.0367)	0.0364 (0.0355)	0.00793 (0.0386)
P2		-0.00377 (0.0110)	0.00516 (0.0135)	0.00186 (0.0121)	-0.00377 (0.0109)
Log GDP per capita		-0.0477 (0.182)	-0.0521 (1.700)	0.104 (0.322)	-0.0477 (0.181)
Constant		-2.069 (3.478)	-1.212 (10.42)	-2.901 (4.359)	-2.069 (3.445)
F		2.57	0.51	5.85	
Prob>F		0.0268	0.7657	0.3210	
Wald Chi2					11.31
Prob > Chi2					0.0455
R 2		0.0401	0.329	0.270	
N		314	314	314	314
i		35	35	35	35

Source: Author's own calculations

EMC

There are 314 observations over the 21 year period. The reason for the reduced number of observations than might be expected, is that the FDI data at sector wise level was missing values from a number of years and a number of countries. Capturing this data is a work in progress, upon which statistical databanks such as the World Bank are laying the foundations for countries to follow. The table (4.1.1) compares the regression results using the common regression models in the literature, where column 1 depicts the Ordinary Least Squares method (OLS), column 2 is Fixed Effects (FE), column 3 is Random Effects (RE), and column 4 is Generalised Least Squares (GLS).

➤ OLS

The Trade Openness variable is Significant and positive. None of the other Macroeconomic variables are significant when regressed on total FDI.

Using the Breusch-Pagan / Cook-Weisberg test for total FDI using OLS (1), the Chi-Squared value is 1.64 (Table 4.1.2). This low value suggests heteroscedasticity is not a problem in the aggregate FDI regression.²⁴

Table 4.1.2 Total FDI Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity (estat hettest)

estat hettest	Breusch-Pagan / Cook- Weisberg test for heteroskedasticity	chi2(1)	Prob > chi2	< 0.05% reject	Hetero- scedaticity
1	total FDI	1.64	0.2007	no	no
2	primary FDI	9.19	0.0024	yes	yes
3	secondary FDI	39.26	0.0000	yes	yes
4	tertiary FDI	26.81	0.0000	yes	yes

Source: Author's own calculations

➤ FE

None of the macroeconomic variables appear significant using FE. The F-stat is very low, and the probability of being greater than F is very high. The FE model appears to be a poor choice of model for the EMC sample.

To test for any heteroscedasticity in the FE model, a Modified Wald test is run on total FDI inflows. The results are displayed in Table 4.1.3. There is significant evidence to reject the null hypothesis of homoscedasticity. This shows evidence of heteroscedasticity using the FE model.

²⁴ When running the test on primary, secondary, and tertiary FDI sectors, heteroscedasticity was present in each regression.

Table 4.1.3 Total FDI, Modified Wald test for heteroscedasticity (xtttest3)

				< 0.05%	
xtttest3	modified Wald test	chi2(34)	Prob > chi2	reject	Heteroskedasticity
1	total FDI	1.70E+05	0.0000	yes	yes
2	primary FDI	3.80E+06	0.0000	yes	yes
3	secondary FDI	31758.25	0.0000	yes	yes
4	tertiary FDI	62982.45	0.0000	yes	yes

Source: Author's own calculations

➤ RE

Referring back to Table 4.1.1, Similarly to FE, the RE model does not provide a statistically significant result for the model (F-stat). While the trade openness variable has now become significant, the model as a whole fails the test of whether all the coefficients in the model are different from zero. Chi-squared of 0.32 is not less than the 0.05 required.

Table 4.1.4 Total FDI, Hausman Test for choosing FE or RE model (hausman); Total FDI, Breusch and Pagan Lagrangian multiplier test for choosing RE or OLS model (xtttest0)		
		Total FDI
hausman	Chi2	2.67
	prob>chi2	0.7511
		RE > FE
Breusch and Pagan Lagrangian multiplier test	Chibar2	81.98
	prob>chibar2	0.0000
		RE > OLS
xtttest0		
variance across panels		26.98%

Source: Author's own calculations

Running the Hausman test on the Total FDI regression, a low Chi-squared value is evident, and a Prob>Chi-squared being 0.7511. There is insufficient evidence to reject the null hypothesis at all levels of significance. It can thus be concluded that RE is preferred in this regression over FE.

The results are also displayed in Table 4.1.4, Chibar-squared equals 81.98, and a probability greater than Chibar-squared of 0.00. Therefore the null hypothesis is rejected in the LM test. Variance across entities is not zero. Thus, RE is preferred over simple OLS in the total FDI regression.

It is notable that OLS standard errors tend to be smaller than in the RE or FE cases. OLS standard errors underestimate the true standard errors (Refer back to Table 4.1.1 EMC trade openness total sector FDI xtgls). OLS coefficient estimates also suffer from the omitted variable problem encountered in panel estimation.

➤ **GLS**

Table 4.1.1, column 4, shows the Generalised Least Squares model of Total FDI inflows. The use of GLS (4) produces regression results which look reasonable. The model is statistically significant at the 95% level with a probability greater than chi-squared of 0.455. With regards to the independent variables, only trade openness is significant (and positive).

In summary, OLS was ruled out because it does not account for any unobservable country-specific effects. The Hausman test resulted in RE being preferred over FE. RE allows for time invariant variables (like oil reserves dummy), while FE does not allow for these kinds of time invariant variables. The Breusch and Pagan Lagrangian multiplier test suggested RE is preferable to OLS (since variance across entities is not zero). However, the RE model was not statistically significant. Too few observations were available for GMM to be appropriately used for the EMC and more specifically APTA samples. Therefore, GLS is deemed the most appropriate technique for this sample. The variables look to have the expected signs, and the model is significant overall, at the 95% level.

APTA

In the APTA sample subset. As in the EMC sample, the trade openness variable remains $\ln_TradeR4$.²⁵

➤ **OLS**

For Total FDI using OLS, see table 4.1.5, column 1. A Breusch-Pagan/Cook-Weisberg test for heteroscedasticity was run on the model. The result is displayed in Table 4.1.6. The Chi-Squared value is 32.15. This high value suggests heteroscedasticity is an issue in the aggregate FDI regression.²⁶

²⁵ To check whether the model looked decent, each of the 12 trade openness variables were regressed on the different FDI sectors. In each of the 4 FDI sector regressions, the model was correctly specified, with a statistically significant fit.

²⁶ When running the test on primary, secondary, and tertiary FDI sectors, heteroscedasticity was also found present in each OLS regression.

Table 4.1.5 APTA Total Sector FDI model selection, Macroeconomic Variables (OLS,FE,RE,GLS), uncorrected.

Total Sector-wise FDI	1990-2010			
	1	2	3	4
Model Selection	OLS	FE	RE	GLS
Independent Variables				
openness In_TradeR4	-0.309 (0.379)	-0.563 (0.680)	0.600* (0.353)	0.600* (0.339)
log REER2	-2.578*** (0.827)	0.367 (0.639)	0.397 (0.466)	0.397 (0.447)
real GDP growth	-0.0387 (0.0744)	0.216*** (0.0554)	0.251*** (0.0415)	0.251*** (0.0398)
P2	0.00700 (0.00640)	0.00531 (0.00809)	0.00833 (0.00791)	0.00833 (0.00758)
Log GDP per capita	-0.910** (0.347)	-0.104 (0.255)	-0.283 (0.220)	-0.283 (0.211)
Constant	20.92*** (6.115)	1.250 (4.824)	-2.826 (2.898)	-2.826 (2.780)
F	9.42	3.16	47.11	
Prob>F	0.0000	0.0131	0.0000	
Wald Chi2				51.20
Prob > Chi2				0.0000
R 2	0.4057	0.329	0	
Adj R2	0.3627			
N	75	75	75	75
i				6

Source: Author's own calculations

Besides the evidence of heteroscedasticity, the OLS model looks reasonably specified. It has a statistically significant F stat, and an Adjusted R-squared of 36.27%.

estat hetttest	Breusch-Pagan / Cook-Weisberg test	for heteroskedasticity	chi2(1)	Prob > chi2	< 0.05% reject	Heteroscedaticity
1	total FDI		32.15	0.0000	yes	yes

Source: Author's own calculations

➤ **FE**

The model is next estimated by allowing country effects to control for unobservable policy and technology effects. Using the FE method (2), we look for any unobserved within country effects that need to be accounted for (Refer back to Table 4.1.1, column 2).

It was next necessary to test whether the error variances vary with the effects being modeled. This is done by the Modified Wald test for heteroscedasticity (Table 4.1.7). The results are highly significant, suggesting heteroscedasticity is an issue in the total FDI regression using FE.²⁷

Table 4.1.7 Total FDI, Modified Wald test for heteroscedasticity (xttest3)					
	modified		Prob >	< 0.05%	
xttest3	Wald test	chi2	chi2	reject	Heteroskedaticity
1	total FDI	5.01E+02	0.0000	yes	yes

Source: Author's own calculations

Running *xttest2* for cross sectional dependence (Table 4.1.8), the Chi-squared is 34.941 and significant at the 1% level. This suggests cross sectional dependence is present in the Total FDI regression using FE.²⁸

Table 4.1.8 Total FDI, test for cross sectional dependence (xttest2)					
				<0.05%	cross-sectional
xttest2		chi2	Prob>chi2	reject	dependence
1	total FDI	34.941	0.0025	yes	yes

Source: Author's own calculations

➤ **RE**

(Refer back to Table 4.1.1, column 3).

The Hausman test (Table 4.1.9), found a Chi-squared of 11.48, with a probability greater than Chi-squared of 0.0426. The null hypothesis is rejected at the 95% level of significance, and FE preferred in this regression over RE.²⁹

²⁷ As was the case running *estat hettest* on the OLS models, heteroscedasticity is also present on the primary, secondary and tertiary sectors in the FE model.

²⁸ Issues were encountered with the sector wise FDI. Running *xttest2* on primary and secondary FDI resulted in errors (too few common observations across panels). Running it on tertiary FDI failed to produce a result (correlation matrix of residuals is singular). This could be due to the gaps in our sample data for sectoral FDI. This result was overcome later in the paper by running another test for serial correlation (*xtserial*).

²⁹ See Appendix Table A4.2.1 for a comparison between APTA (FE) and APTA (GLS) method.

Table 4.1.9 Total FDI, Hausman Test for choosing FE or RE model (Hausman)		
		Total FDI
hausman	Chi2	11.48
	prob>Chi2	0.0426
		FE>RE
Breusch and Pagan Lagrangian multiplier test	Chibar2	0.00
	prob>Chibar2	1.0000
		OLS>RE
xttest0		
variance across panels		0.00%

Source: Author's own calculations

Therefore in the APTA sample, the regressions will be run using a FE model. The results can be found in the following section (4.2)

4.2 EMC

Since the GLS method is chosen as the most appropriate model for the EMC sample subset, the GLS method is run on total FDI, and each of the three industry sectors. The appropriate post estimation tests were then run.

FDI = Trade Openness, REER, GDP growth, P2, GDP per capita, E

$$F_{jit} = \alpha + \beta_1 + \beta_{2jit} + \beta_{3xit} + e_{it} \dots \dots \dots (1)$$

Wooldridge (2002) derived a simple test for autocorrelation in panel data models. Drukker (2003) provides simulation results showing that the test has decent size and power properties in reasonably sized samples. Drukker (2003) wrote a program in Stata called *xtserial*, to perform this test. A significant test statistic indicates the presence of serial correlation.

We test the macroeconomic variable's models (using GLS) for any heteroscedasticity and/or serial correlation.³⁰ The results suggest that while heteroscedasticity is present in all the models 1-4, serial correlation is only evident in total FDI and primary FDI (1 & 2).

³⁰ See Appendix Table A4.2.2 and A4.2.3 for the post-estimation results

Table 4.2.1 shows the results of regressing each of the macroeconomic variables on the 4 FDI sectors, after accounting/correcting for heteroscedasticity and serial correlation, where present.

Table 4.2.1: EMC Total, Primary, Secondary, and Tertiary Sector FDI. Macroeconomic Variables (GLS). Corrected					
Corrected for Heteroskedasticity and serial correlation, where present					
GLS	EMC	1990-2010	xtgls, after corrections		
Sector-wise FDI and Macroeconomic variables					
		1	2	3	4
Dependent Variables		Total FDI	Primary FDI	Secondary FDI	Tertiary FDI
Independent Variables					
openness	ln_TradeR4	0.843*** (0.252)	0.0750 (0.0682)	0.401*** (0.0691)	0.110 (0.132)
log REER2		-0.210 (0.455)	-0.117 (0.119)	-0.776*** (0.138)	0.876*** (0.260)
real GDP growth		0.0148 (0.0183)	0.00282 (0.00326)	0.0231** (0.00954)	0.00227 (0.0158)
P2		0.00103 (0.00662)	0.000624 (0.00182)	-0.00833*** (0.00214)	-0.0159*** (0.00452)
Log GDP per capita		-0.0612 (0.142)	-0.159*** (0.0438)	-0.00639 (0.0481)	0.212*** (0.0754)
Constant		0.755 (2.544)	1.677*** (0.643)	2.837*** (0.823)	-4.685*** (1.389)
Wald chi2		13.62	15.04	99.36	37.20
prob > chi2		0.0180	0.0102	0.0000	0.0000
rho					
N		314	304	284	296
i		35	35	35	35
Source: Author's own calculations.					
*** p <= .01** p <= .05 * p <= .1					
Standard errors are shown below the coefficient in parenthesis					

[*xtgls, panels(hetero) corr(ar1) force*] is used to correct for the heteroscedasticity and serial correlation present in the total & primary FDI regressions (1 & 2). Since heteroscedasticity,

but no serial correlation was present in the remaining regressions (3 & 4), [*xtgls, panels(hetero)*] was used to correct for it.

Total

The trade openness variable has a positive and significant effect on total FDI inflows (Table 4.2.1, Column 1). A 10% increase in the trade openness of an EMC (i.e. lower trade barriers), results in an 8.43% increase in total FDI, *ceteris paribus*. Combining all three FDI sectors seems to ultimately lead to an increase in total FDI inflows when Those EMC's open their borders to trade. Asiedu (2002) also found a positive effect of trade openness on total FDI. When a dummy for African countries was included, this positive effect – while remaining positive – diminished in importance.

Other authors who find a similar positive effect include: Kandiero & Chitiga (2003), Edwards (1990), Benassy-Quere et al (2001), Jensen (2003), Siem (2009), and Walsh and Yu (2010). Although, Walsh & Yu's positive finding was insignificant. This evidence seems to validate the market seeking (export-orientated) and efficiency seeking (vertical) theories of FDI. It also suggests that tariff jumping is not the main purpose of FDI into these EMC's.

Benassy-Quere et al (2001) explain that EMC's seem to receive a large portion of FDI intended for setting up production platforms, with the aim to re-export at least part of this production. The regression results for the EMC sample seem to support this a priori theory. The question this paper attempts to answer next is whether disaggregating FDI into sectors, changes this outcome.

Primary

Only GDP per capita has a highly significant and negative coefficient (Table 4.2.1, Column 2). EMC's with higher incomes seems to attract less FDI in the extractive/agricultural sector. The remaining macroeconomic variables (Including openness) are not significant when regressed on total FDI. This result seems to confirm a view by Walsh & Yu (2010), who contend that investments in resource extraction usually have little connection to the broader macro economy. Faini (2004) shares this view that trade openness (trade barriers) is unlikely to matter much. The main motivation for resource seeking FDI is to produce for exports (often back to the home country), rather than for host country consumption.

Kandiero & Chitiga's results however, differ from this paper's finding regarding the insignificant trade openness effect on primary FDI. They found a negative and significant effect of primary openness on FDI. Bearing in mind their sample was only for African countries and they disaggregated trade openness (one of the independent variables), not FDI (the dependent variable). They proposed that efficiency gains and increased investments from increased openness in sectors such as services may enable a country to support some of the activities in the primary sectors, reducing some of the investments by MNCs.

Lee & van der Mensbrugghe (2001) describe the impact of trade liberalisation on Primary FDI as ambiguous. They suggest that the motivation for Primary FDI might include securing energy and/or natural resources for the home country. They expect this type of FDI to be less sensitive to changes in the trade protectionist regime in the host country.

The constant term of column (2) Indicates that even if the rate of change in all the macroeconomic variables were zero, the primary sector FDI/GDP ratio has generally increased during the period from 1990 to 2010 by about 1.68 times.

Secondary

Examining the regression results for the secondary or manufacturing sector (Table 4.2.1, column 3), they appear to be quite significant. There is a positive relationship between trade openness and secondary FDI. A 10% increase in the trade openness of an EMC member (i.e. lower trade barriers), resulted in a 4.01% increase in the secondary sector FDI, ceteris paribus. This finding seems to validate the efficiency-seeking (vertical FDI) theory. Vertical FDI firms engage in both FDI and exports. It is therefore trade creating. The vertical FDI framework is like a developed source country and a developing host country, with the home country usually thought of as being much larger market than the host country. For instance, an MNC from the U.S., investing in a smaller, lower cost EMC such as Tunisia or Argentina to supply some component of the value-chain.

Lee & van der Mensbrugghe (2001) find a similar result in the manufacturing sector. They found trade liberalisation lead to an increase in the inward FDI stocks of the manufacturing sector in the APEC region.

Studying manufacturing investment in Central and Eastern Europe, Resmini (2000), found vertical FDI flows prevailed, benefiting from increasing openness.

Tertiary

A positive but insignificant trade openness effect is found on Tertiary FDI (Table 4.2.1, Column 4). This finding is supported by Lee & van der Mensbrugghe (2001). In the services sector, they suggest a change in the level of trade openness is unlikely to affect the FDI inflows to the tertiary sector extensively, because FDI is often the only means to provide foreign services to the host country's consumers.

To summarise the findings thus far, when running the regressions using the EMC sample countries, trade openness had a positive and significant effect on total FDI inflows. The effect on Primary FDI inflows was slightly positive, but insignificant. Trade openness was positively related to FDI into the Secondary sector. Finally, the trade openness variable had a positive but insignificant effect on tertiary FDI inflows.

4.3 Control Variables

This section follows on from the previous macroeconomic independent variables, regressed on each of the four FDI sector dependant variables, using the GLS method. It now adds each of the control variables in turn to the regressions, to see how the model reacts to their subsequent inclusion.

When including the control variables:

$$FDI_{jit} = \beta_1 + \beta_{2nit} + \beta_{3xjit} + Z_{it} + e_{it} \dots\dots\dots(2)$$

where,

Z_{it} = each of the control variables in turn (infrastructure matrix; secondary school enrolment; tertiary school enrolment; corruption; natural resources; oil reserves; railway infrastructure)

EMC total sector FDI, showing each of the seven control variables - prior to running any of the post-regression tests - has been included in the Appendix (Table A4.3.1), to reduce clutter.

To test if heteroscedasticity exists in total sector FDI model, a Modified Wald test was run.³¹ All seven of the control variables tested had significant heteroscedasticity present in their respective regressions.

³¹ See Appendix Table A4.3.2

Next an *xtserial* test was performed, with each of the seven institutional variables in the model. This is to test for any serial correlation evident in the error structure.³²

The null hypothesis is no serial correlation. In this particular test, the data exhibited does not have first-order autocorrelation present in the first four variables, namely infrastructure index, secondary education, tertiary education, and corruption. There is serial correlation in the regressions that include Natural resources, Oil resources dummy, and telephone subscribers.

Correcting for the presence of Heteroscedasticity in the EMC panel error structure, where no serial correlation is evident. We use the panels (hetero) correction after xtgls.

When the panel exhibits a heteroscedastic and correlated error structure, we use the *panels (hetero) corr(ar1) force* correction after xtgls.

³² See Appendix Table A4.3.3

Table 4.3.1 EMC Total Sector FDI, corrected Control Variables [xtgls panels (hetero)]							
Generalised Least Squares 1990-2010 xtgls, after corrections			Corrected for Heteroscedasticity and Serial Correlation, where present				
Sectoral FDI and Institutional Variables							
Dependent Variables	Total FDI as a share of GDP						
	1	2	3	4	5	6	7
Control Variables	Ln_InfracSum2Mis	Educ2nd	EducTer	Corrup	NatResTotExProt	OilResDum	Ln_InfracT
openness (ln_TradeR4)	1.208*** (0.183)	0.727*** (0.184)	0.869*** (0.194)	1.098*** (0.325)	0.463* (0.278)	0.865*** (0.259)	0.765*** (0.273)
log REER2	-0.488 (0.429)	0.248 (0.431)	-0.227 (0.373)	1.942 (1.821)	-0.299 (0.482)	-0.196 (0.458)	-0.116 (0.468)
real GDP growth	0.00522 (0.0302)	0.0193 (0.0182)	-0.00855 (0.0156)	-0.0782* (0.0412)	0.0170 (0.0183)	0.0147 (0.0183)	0.0167 (0.0186)
P2	0.00258 (0.00581)	-0.00253 (0.00856)	-0.0201** (0.00833)	-0.0218 (0.0158)	0.00167 (0.00591)	0.00109 (0.00664)	0.00182 (0.00681)
Log GDP per capita	-0.0527 (0.125)	-0.187 (0.136)	0.0376 (0.125)	-0.0475 (0.214)	-0.201 (0.145)	-0.0478 (0.149)	-0.150 (0.230)
Qualitative Var.	-0.292*** (0.0979)	0.0262*** (0.00578)	0.00118 (0.00740)	0.234 (0.171)	-0.623*** (0.199)	0.0877 (0.296)	0.178 (0.241)
Constant	3.336 (2.861)	-1.483 (2.240)	0.408 (1.881)	-10.42 (8.652)	5.194* (2.867)	0.436 (2.742)	0.0693 (2.625)
Wald Chi2	57.95	49.32	37.19	23.35	21.37	13.79	12.12
prob > chi2	0.0000	0.0000	0.0000	0.0007	0.0016	0.0320	0.0593
Observations	213	265	233	72	302	314	313
i	33	35	34	15	34	35	35

Source: Author's own calculations.
*** p <= .01** p <= .05 * p <= .1
Standard errors are shown below the coefficient in parenthesis

Table 4.3.1 shows the EMC total sector FDI, after adding the control variables, and correcting for heteroscedasticity and serial correlation. The results seem to hold up reasonably well. Each of the seven regressions still reflect a positive and significant effect of trade openness on total FDI. The positive variable of 0.843 is strengthened to 1.208, when the infrastructure index variable (Ln_InfracSum2Mis) is included in the regression. However, the positive effect of trade openness on FDI is weakened somewhat by the inclusion of the natural resource endowment variable (NatResTotExProt).

Besides trade openness, there are very few significant variables.

Turning to primary sector FDI, we jump straight to the post estimation tests, prior to correcting for any irregularities in the error structure.³³ All seven of the control variables lead to Heteroscedasticity in the respective models.

When testing for serial correlation, evidence is found in all but one regression (EducTer).³⁴

Table 4.3.2 shows the primary sector FDI, using the GLS model, having corrected for heteroscedasticity and serial correlation (where present).

Primary sector FDI =

Table 4.3.2: EMC Primary Sector FDI, corrected Control Variables [xtgls panels (hetero)]							
Generalised Least Squares 1990-2010 xtgls, after corrections			Corrected for Heteroscedasticity and Serial Correlation, where present				
Sectoral FDI and Institutional Variables							
Dependent Variables	Primary FDI as a share of GDP						
	1	2	3	4	5	6	7
Control Variables	In_InfraSum2 Mis	Educ2nd	EducTer	Corrup	NatResTotExProt	OilResDum	In_InfraT
openness (ln_TradeR4)	0.0449 (0.0717)	0.0634 (0.0844)	0.0436 (0.0437)	-0.269 (0.291)	0.0490 (0.0826)	0.0922 (0.0623)	0.156** (0.0612)
log REER2	-0.210 (0.145)	-0.0632 (0.142)	-0.507*** (0.113)	1.417 (0.936)	-0.109 (0.115)	-0.0969 (0.102)	-0.209* (0.114)
real GDP growth	0.00365 (0.00420)	-0.000620 (0.00406)	0.000249 (0.00548)	-0.0471** (0.0225)	0.00306 (0.00301)	0.00190 (0.00256)	0.00312 (0.00299)
P2	0.00108 (0.00197)	0.000744 (0.00225)	-0.00615** (0.00244)	0.0193** (0.00913)	-0.000282 (0.00163)	0.000243 (0.00145)	-0.000393 (0.00159)
Log GDP per capita	-0.224*** (0.0345)	-0.140** (0.0623)	-0.363*** (0.0333)	-0.682*** (0.163)	-0.156*** (0.0480)	-0.111** (0.0442)	-0.100* (0.0556)
Qualitative Var.	-0.223*** (0.0419)	-0.00291 -0.00333	0.00346*** (0.00134)	0.157** (0.0614)	-0.0625 (0.0604)	0.158 (0.109)	-0.136* (0.0693)
Constant	4.891*** (0.892)	1.592** (0.725)	5.306*** (0.535)	-0.390 (4.301)	1.857** -0.749	1.053* (0.583)	2.337*** (0.624)
Wald Chi2	58.55	15.87	189.06	22.92	12.33	14.22	36.96
prob > chi2	0.0000	0.0145	0.0000	0.0008	0.0550	0.0273	0.0000
Observations	205	255	223	66	292	304	303
i	33	34	34	12	34	35	35

Source: Author's own calculations.
*** p <= .01 ** p <= .05 * p <= .1
Standard errors are shown below the coefficient in parenthesis

³³ See Appendix Table A4.3.2

³⁴ See Appendix Table A4.3.3

In the primary FDI regression without the control variables (Table 4.2.1), the trade openness variable was 0.0750. i.e. positive but insignificant. When the control variables are added, the trade openness variable ranges from -0.269 to +0.156. When including the telecommunication Infrastructure variable *ln_infraT* (column 7), the positive trade openness variable remains positive, but now becomes statistically significant (+0.156).

Turning to FDI into the secondary sector, when running the post-estimation tests, as was the case in both total and primary sectoral models, heteroscedasticity is again present in all seven of the secondary sector regressions.³⁵

Table 4.3.3 EMC Secondary Sector FDI, corrected Control variables, [xtgls panels (hetero)]							
Generalised Least Squares		1990-2010	xtgls, after corrections		Corrected for Heteroscedasticity and Serial Correlation, where present		
Sectoral FDI and Institutional Variables							
Dependent Variables	Secondary FDI as a share of GDP						
	1	2	3	4	5	6	7
Control Variables	<i>ln_InfraSum2</i> Mis	<i>Educ2nd</i>	<i>EducTer</i>	<i>Corrup</i>	<i>NatResTotExProt</i>	<i>OilResDum</i>	<i>ln_InfraT</i>
openness (<i>ln_TradeR4</i>)	0.442*** (0.128)	0.441*** (0.0724)	0.480*** (0.0787)	0.649*** (0.146)	0.446*** (0.0757)	0.429*** (0.0687)	0.324*** (0.0659)
log REER2	-1.171*** (0.243)	-0.771*** (0.158)	-0.880*** (0.171)	-1.870*** (0.310)	-0.811*** (0.139)	-0.718*** (0.139)	-0.718*** (0.138)
real GDP growth	0.0130 (0.0122)	0.0266** (0.0104)	0.0179* (0.0104)	0.0225 (0.0189)	0.0161 (0.0101)	0.0247*** (0.00941)	0.0255*** (0.00951)
p2	-0.00590* (0.00332)	-0.00631*** (0.00228)	-0.00481 (0.00295)	-0.0149*** (0.00256)	-0.00705*** (0.00228)	-0.00798*** (0.00220)	-0.00797*** (0.00229)
Log GDP per capita	-0.231*** (0.0726)	-0.106* (0.0623)	0.0746 (0.0689)	-0.00862 (0.0979)	-0.0316 (0.0495)	0.0316 (0.0470)	-0.159** (0.0783)
Qualitative Var.	0.0908* (0.0552)	0.00868*** (0.00226)	-0.00982*** (0.00282)	0.0260 (0.0537)	-0.0804* (0.0432)	0.174*** (0.0652)	0.214*** (0.0682)
Constant	5.436*** (1.361)	2.735*** (0.882)	2.694*** (0.966)	7.028*** (1.607)	3.207*** (0.821)	2.038** (0.839)	2.537*** (0.838)
Wald Chi2	41.71	101.85	79.35	129.05	100.66	101.73	92.64
prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	194	247	221	69	272	284	283
l	31	34	33	14	34	35	35

Source: Author's own calculations.
*** p <= .01 ** p <= .05 * p <= .1
Standard errors are shown below the coefficient in parenthesis

³⁵ See Appendix Table A4.3.4

Conversely to the primary sector, serial correlation does not appear to be an issue in the secondary sector regressions, in all but one instance. Only the infrastructure index variable appears to cause serial correlation in this model.³⁶

Having corrected for the problem of heteroscedasticity, the results of the secondary sector FDI with the control variables are shown in Table 4.3.3.

Including each of the control variables in turn, seems to increase the magnitude of the trade openness variable's effect on secondary FDI, but only marginally. The sign remains positive in each of the seven regressions. The positive coefficient ranges from +0.324 to +0.649.

Generalised Least Squares 1990-2010		xtgls, after corrections		Corrected for Heteroscedasticity and Serial Correlation, where present			
Sectoral FDI and Institutional Variables							
Dependent Variables	Tertiary FDI as a share of GDP						
	1	2	3	4	5	6	7
Control Variables	In_InfraSum2 Mis	Educ2nd	EducTer	Corrup	NatResTotExProt	OilResDum	In_InfraT
openness (ln_TradeR4)	0.434*** (0.143)	0.0551 (0.126)	0.0551 (0.155)	-0.0342 (0.195)	-0.115 (0.145)	0.00306 (0.130)	-0.0567 (0.131)
log REER2	0.407 (0.304)	1.054*** (0.294)	1.452*** (0.339)	-0.163 (0.748)	0.757*** (0.264)	0.723*** (0.251)	1.068*** (0.205)
real GDP growth	-0.0220 (0.0222)	0.00313 (0.0149)	-0.00295 (0.0187)	-0.0365** (0.0144)	-0.00146 (0.0165)	0.00423 (0.0152)	-0.00243 (0.0163)
P2	-0.0105** (0.00529)	-0.0133*** (0.00173)	-0.0127* (0.00698)	-0.0152** (0.00673)	-0.0126*** (0.00442)	-0.0145*** (0.00424)	-0.0161*** (0.00478)
Log GDP per capita	0.0805 (0.0897)	-0.0621 (0.0848)	0.154 (0.105)	0.238* (0.142)	0.193** (0.0760)	0.155** (0.0746)	-0.132 (0.104)
Qualitative Var.	0.0252 (0.0727)	0.0226*** (0.00333)	0.00685 (0.00511)	0.211*** (0.0724)	-0.379*** (0.101)	-0.512*** (0.162)	0.508*** (0.107)
Constant	-2.953 (2.051)	-4.706*** (1.546)	-6.666*** (1.652)	-0.404 (3.660)	-2.203 (1.484)	-2.779* (1.452)	-5.695*** (1.294)
Wald Chi2	25.33	111.72	38.16	18.24	42.20	48.02	57.36
prob > chi2	0.0003	0.0000	0.0000	0.0057	0.0000	0.0000	0.0000
Observations	201	256	228	72	284	296	295
i	32	34	33	15	34	35	35

Source: Author's own calculations.
*** p <= .01 ** p <= .05 * p <= .1
Standard errors are shown below the coefficient in parenthesis

³⁶ See Appendix Table A4.3.5

Finally, the control variables were introduced to the tertiary sector FDI. Testing for any heteroscedasticity in the tertiary FDI model, it was again found to be a factor in each of the seven control variables. Running the *xtserial* test for serial correlation, there is no significant evidence of serial correlation present in the error structure.³⁷

Having corrected for the problem of heteroscedasticity, the results of the tertiary sector FDI with the control variables are shown in Table 4.3.4. When we looked at the macroeconomic variable models, trade openness – while positive - did not appear to be significant on tertiary FDI inflows. Adding the control variables to the tertiary FDI model did not seem to change too much regarding significance of the trade openness variable, except for Infrastructure Index (1). Adding the Infrastructure Index variable to the model, results in the trade openness variable now having a statistically significant positive effect on tertiary FDI. It remained insignificant when variables 2-7 are added.

The REER seems to have a positive effect on tertiary FDI. This would suggest tertiary sector FDI is attracted to countries with more depreciated real exchange rates.

With reference to the added control variables, education enrolment ratios (2 & 3), both show a positive effect on tertiary FDI, but only secondary education enrolment is significant. This suggests that in the service industry of EMC's, those with more semi-skilled workers (as opposed to highly skilled) tend to have a higher share of FDI inflows.

The corruption perception Index has a statistically significant positive effect. It is important to reiterate that the corruption variable used in this study is inversely related to the amount of corruption experienced in a country. So an improvement in the index by 1 point (a reduction in corruption) leads to an increase in the tertiary sector FDI/GDP ratio of 0.211. For countries in the sample such as Ecuador, which have a poor corruption perception score of 2.2 out of 10 and tertiary FDI/GDP of less than 1.0, an increase in the ratio of 0.211 would be a significant improvement on FDI Inflows.

Lowering corruption in a country such as Chile, would have less of an impact on its FDI inflows. It is already at a high 7.2 on the corruption perception index, so increasing it (reducing perceived corruption) may take a significant amount of effort, with relatively little relative gains. Even if they do succeed in moving up 1 more level to 8.2 on the index, Chile has a relatively

³⁷ See Appendix Tables A4.3.6 and A4.3.7

high tertiary FDI/GDP ratio of about 3.261. So that reduction in corruption would only increase the ratio by 6.4% (0.211).

Telecommunications is an important industry in the services sector. This is no more evident by the positive and statistically significant effect of telephone subscribers on tertiary FDI inflows (7). The number of companies outsourcing the call centre function of their business has been on the increase. Emerging markets such as India have been reaping the benefits of outsourcing -from companies in developed countries - to lower cost locations (McIntyre, 2009).

4.4 APTA

It was determined earlier in the chapter from the tests that the FE method is the most appropriate model for the APTA sample subset. The FE method is therefore run on each of the four sectors.³⁸ The appropriate post estimation tests were then run. We already know that heteroscedasticity is present in each of the four regressions (Table 4.1.6). Next, the test for serial correlation was run using *xtserial*³⁹. Serial correlation was found in the Total and Tertiary regressions (1 & 4).

To account for the within-panel correlation in the regressions (1 & 4), the two regressions were adjusted to allow for clustering at the panel level. Since *cluster(i)* implies robust, this command is also robust to heteroscedasticity. For the remaining two regressions, free of serial correlation (2 & 3), the *robust* command was added, to correct for the presence of heteroscedasticity. The final results of the APTA sectoral FDI regressions using a FE model, after corrections, can be seen in Table 4.4.1.

Total

The trade openness variable has a negative, but insignificant effect on total FDI in the APTA sample. The reason for this insignificance could be attributed to the noise of the three FDI sectors distorting the aggregate FDI effect. The APTA countries comprise a very diverse set of countries in terms of stage-of-development and thus openness. While Loas has a GDP per capita in 2013 of US\$1,645 and a population size of 6.77 million, South Korea had a GDP per capita of US\$25,976 and population of over 50 million. Perhaps these vast discrepancies are contributing to the poor significance.

³⁸ These initial results are uncorrected for any irregularities in variance and the error terms, they were previously run and can be seen in the Table 4.1.5, column 2.

³⁹ See Appendix, Table A4.4.1.

The Inflation variable is positive and significant. It is the only significant variable in this APTA sample using total FDI. A 1% increase in the rate of inflation of an EMC, results in a 0.00531% increase in the manufacturing sector FDI, ceteris paribus. This very weak, but positive sign on the inflation coefficient may seem counter intuitive, though it can be explained. Since this variable is the proxy for monetary policy in the EMC's, it suggests that the impact of monetary policy in these countries on FDI is positive. A similar positive effect of inflation on FDI was found in Portugal, in a study by Leitão & Faustino (2010). They suggested that a specific type of FDI may be responsible for this positive sign on higher inflation rates.

Table 4.4.1 APTA Total, Primary, Secondary, and Tertiary Sector FDI. Macroeconomic Variables (FE). Corrected						
corrected for heteroscedasticity and/or serial correlation (within)						
FE	APTA	1990-2010	xtreg, fe			
Sectoral FDI and Macroeconomic Variables						
Dependent Variables			1	2	3	4
			Total FDI	Primary FDI	Secondary FDI	Tertiary FDI
Independent Variables						
openness	In_TradeR4		-0.563 (1.096)	-0.0306 (0.101)	-1.080** (0.251)	-0.207 (0.284)
log REER2			0.367 (0.294)	-0.0420 (0.187)	0.0436 (0.934)	0.560 (0.435)
real GDP growth			0.216 (0.146)	-0.00591 (0.0101)	-0.00592 (0.0391)	0.0129 (0.0176)
P2			0.00531** (0.00159)	0.00663*** (9.17e-05)	0.00357*** (0.000309)	0.0104*** (0.000281)
Log GDP per capita			-0.104 (0.101)	-0.0249 (0.0683)	-0.111 (0.392)	0.119 (0.123)
Constant			1.250 (5.632)	0.558 (1.070)	5.535 (7.599)	-2.108 (2.805)
F			880.15			
Prob>F			0.0000			
rho			0.3295	0.7213	0.8893	0.5078
N			75	46	46	52
i			6	5	5	5
Source: Author's own calculations.						
*** p <= .01 ** p <= .05 * p <= .1						
Standard errors are shown below the coefficient in parenthesis						

Primary

In the primary sector regression, a negative but insignificant effect of trade openness on primary FDI was found on the APTA sample. While Kandiero & Chitiga's (2003) also find a negative effect, their result was statistically significant. The insignificant effect found follows the findings of Faini (2004), in that investment in this sector seems to ignore macroeconomic variables.

Secondary

The trade openness variable is negative and significant at the 95% level. A 10% decrease in the trade openness of an EMC (i.e. higher trade barriers), results in a 10.8% increase in the manufacturing sector FDI, ceteris paribus. This somewhat surprising finding seems to validate the tariff jumping FDI theories, and the non-export orientated horizontal FDI as suggested by Siem (2009). He finds a similar negative relationship between openness and FDI in his sample of Transition countries⁴⁰. This is also in line with the findings of research by Jordaan (2004). He suggests MNC's seeking to supply the local host country market, might decide to set up subsidiaries in the host country if it is prohibitive to export their product from the home country.

Tertiary

In the tertiary sector regression, a negative but insignificant effect of trade openness on tertiary FDI was found on the APTA sample.

4.5 EMC vs APTA (PTA)

Does being in a PTA exhibit different effects from trade openness on FDI inflows?

Table 4.5.1 combines the regression results of both the EMC macroeconomic variables, and those of the APTA sample. The comparison here is between EMC and APTA for each of the four FDI sectors. In evaluating the table, we will focus purely on the trade openness variable's effect on FDI.

Total

Trade openness variable for EMC (column 1) is positive and significant at the 99% confidence level, while APTA (2) is negative and insignificant.

Primary

The effect of trade openness on primary FDI for EMC (3) is positive but insignificant. For APTA (4), the effect is negative but still insignificant.

⁴⁰ The Transition countries in his study include most of the Eastern European countries, plus China

Table 4.5.1 EMC vs APTA Total, Primary, Secondary, and Tertiary Sector FDI. Macroeconomic Variables (FE)

corrected for heteroscedasticity and/or serial correlation (within)								
GLS/FE		1990-2010			gls/xtreg, fe			
Sectoral FDI and Macroeconomic Variables								
Dependent Variables	1	2	3	4	5	6	7	8
	EMC - Total FDI	APTA - Total FDI	EMC - Primary FDI	APTA - Primary FDI	EMC - Secondary FDI	APTA - Secondary FDI	EMC - Tertiary FDI	APTA - Tertiary FDI
Independent Variables								
openness	0.843***	-0.563	0.0750	-0.0306	0.401***	-1.080**	0.110	-0.207
(ln_TradeR4)	(0.252)	(1.096)	(0.0682)	(0.101)	(0.0691)	(0.251)	(0.132)	(0.284)
log REER2	-0.210	0.367	-0.117	-0.0420	-0.776***	0.0436	0.876***	0.560
	(0.455)	(0.294)	(0.119)	(0.187)	(0.138)	(0.934)	(0.260)	(0.435)
real GDP growth	0.0148	0.216	0.00282	-0.00591	0.0231**	-0.00592	0.00227	0.0129
	(0.0183)	(0.146)	(0.00326)	(0.0101)	(0.00954)	(0.0391)	(0.0158)	(0.0176)
P2	0.00103	0.00531**	0.000624	0.00663***	-0.00833***	0.00357***	-0.0159***	0.0104***
	(0.00662)	(0.00159)	(0.00182)	(9.17e-05)	(0.00214)	(0.000309)	(0.00452)	(0.000281)
Log GDP per capita	-0.0612	-0.104	-0.159***	-0.0249	-0.00639	-0.111	0.212***	0.119
	(0.142)	(0.101)	(0.0438)	(0.0683)	(0.0481)	(0.392)	(0.0754)	(0.123)
Constant	0.755	1.250	1.677***	0.558	2.837***	5.535	-4.685***	-2.108
	(2.544)	(5.632)	(0.643)	(1.070)	(0.823)	(7.599)	(1.389)	(2.805)
F	13.62	880.15	15.04		99.36		37.20	
Prob>F	0.0180	0.0000	0.0102		0.0000		0.0000	
rho		0.3295		0.7213		0.8893		0.5078
N	314	75	304	46	284	46	296	52
i	35	6	35	5	35	5	35	5

Source: Author's own calculations.

*** p <= .01** p<= .05 * p<=.1

Standard errors are shown below the coefficient in parenthesis

Secondary

The Trade Openness variable for EMC secondary FDI (5) and APTA secondary FDI (6) are both significant. Where they differ is in the direction of their signs. EMC trade openness has a positive effect, while APTA trade openness has a strong negative effect on secondary FDI

inflows. It appears that in the EMC's, manufacturing FDI inflows are efficiency seeking or vertical in nature. While APTA country's manufacturing FDI is perhaps of the non-export horizontal type. Horizontal FDI substitutes for trade and is generally fostered by high trade barriers in host countries. (Faini, 2004)

Tertiary

In the services industry, it appears that trade for EMC (7) could be complementary with tertiary FDI inflows. This result must be taken with care, since the variable is insignificant at the normal levels. APTA's (8) trade openness appears to have a negative effect on tertiary FDI inflows (Though this coefficient is also insignificant). Walsh and Yu (2010) believed that most services FDI is likely to be of a horizontal nature, aimed at the host country market in which the investment is made, rather than vertical, intended for export. As a result, they expected regression results on tertiary FDI that have little to do with trade flows per se. In their paper, they were surprised to find a strong positive coefficient of trade openness on tertiary FDI. In this present paper, the ambiguous direction and insignificance of both the EMC and APTA results for tertiary FDI, seems to exhibit the a priori theory.

Implications of the research for EMCs

- (i) It is hoped that governments will ensure that their companies, and the companies investing within its borders be held more accountable for their transactions. In addition, MNC's dealings with the host country are completed in a more transparent manner.
- (ii) To enhance FDI flows in an effort to catch up those of the developed world, EMCs can liberalise their trade regimes.
- (iii) Improving the corruption perception index score in the EMCs would have a positive effect on primary FDI inflows. Governments in these countries need to ensure stability of their institutions, reliable and credible policy with long term goals of reducing corruption.

Implications of the research for MNCs

- (i) The type of trade agreement – that the particular host country is a member of – is important.
- (ii) The MNC looking to accrue improved production efficiencies (through vertical FDI), should seek investment opportunities in the EMC countries, if they expect trade policy in those countries to be liberalised (Particularly if the MNC's line of business is involved with manufacturing). If the MNC is concerned with expanding its market by investing in an export platform in a host country, it could exert pressure on its home country Government and lobby for more trade openness in the host countries it intends investing in.

These findings are evidence that making inferences simply on empirical results at an economy-wide level could miss-interpret or incorrectly predict the sign (direction) of the change in FDI, following an increase in a nation's economic trade openness.

Having examined the regression results and attempted to answer the paper's objectives, we next move to the concluding chapter, where the findings are summarised.

5. Conclusions and Way Forward

The purpose of this study was to address a central research question that will enable us to understand the impact trade openness has on FDI. Do efforts by governments to liberalise trade barriers (thereby increasing trade openness), lead to an increase of FDI into the host country? The empirical evidence would suggest there is certainly a link, but whether this is a positive link, depends on the sample of countries examined, and the sector into which the FDI is flowing.

Previous research has focused on the effect trade openness has on total FDI to GDP, at the aggregate level.⁴¹ Only a handful of research has been done at a disaggregated level.⁴²

Regarding which of the numerous trade openness variables postulated should be used, it was established that the simple trade intensity ratio was the most appropriate for examining the link between trade openness and FDI. It is the one of the most common measures of the trade openness variable. It allowed for the largest sample size to be included compared to the other possible proxies, and seemed to provide robust regression results in this study.

5.1 EMC

Using a comprehensive sample of emerging market countries, together with panel data techniques, the paper disaggregated total FDI inflows to empirically investigate - at sectoral level - the effect trade openness has on primary, secondary and tertiary FDI inflows. From the regression tests, it was determined that GLS was the most appropriate regression method in this sample of countries. EMC regression results seem to follow the findings of Gastanaga et

⁴¹ Gastanaga, Nugent, & Pashamova (1998), Asiedu (2002), Addison & Heshmati (2003), Nonnemberg & Cardoso de Mendonça (2004), and Faini (2004)

⁴² Lee & van der Mensbrugghe (2001), Walsh & Yu (2010)

al (1998), and Faini (2004). The trade openness variable has a positive and significant effect on total FDI, and secondary FDI inflows. A 10% increase in the trade openness of an EMC member (i.e. lower trade barriers), resulted in an 8.43% increase in the total sector FDI, and a 4.01% increase in the secondary sector FDI, *ceteris paribus*. Trade liberalisation is therefore an important motive for FDI in the manufacturing sector of EMCs. These findings validate both the efficiency seeking (vertical FDI) and market seeking (horizontal FDI) theories. As the EMC's liberalise their trade policies, MNC's looking to improve production efficiencies in their organisation, seem to turn to EMCs for either their upstream or downstream value-chain expansions. Regarding the market seeking theory, the results seemed to be consistent with previous empirical research such as Benassy-Quere et al (2001), among others. MNC's seeking a market to set up an export platform, will tend to increase their FDI into the host country the more open that particular country is to trade.

When run on the primary and tertiary sectors, the results of the trade openness variable – while positive - were not statistically significant enough to draw any conclusions.

EMCs with less perceived corruption have a higher flow of FDI into the manufacturing sector, when they liberalise their trade regime.

When an EMC's infrastructural facilities are accounted for, the more liberal the trade regime, the more inflows of FDI into the services sector occurs, *ceteris paribus*.

An important point is that determinants of FDI flows differ significantly across countries. Focusing only on total FDI inflows, one could miss the changes specific to each of the three Industry Sectors. Each of these sectors appears to have their own set of determinants. Aggregating them could lead to significant noise, which may make any interpretation meaningless. Very little research has previously attempted to undertake this level of disaggregation of FDI at the sector level. This paper's contribution to the literature is to stress the need for FDI flows to be examined as FDI into primary, secondary, and tertiary sectors.

With these findings in mind, the policy makers of EMCs seeking increased FDI from home countries should continue a number of policy changes to further liberalise their economies to trade:

They should aim to reduce bureaucratic red-tape hampering free trade e.g. import licences. It is important that governments implement trade policies in a transparent way. There should be clear and open dialogue between key stakeholders. They should reduce trade restrictive effects that exceed what is deemed necessary to reach a required regulatory objective. They should endeavour to remove all tariff and non-tariff barriers between themselves and their trade partners. This would include the removal of import bans, export prohibitions, import levies, export taxes and subsidies.

At the very least, These EMCs should be obeying externally set tariff rate guidelines, as set by the WTO.

5.2 APTA

Fixed Effects was the most appropriate method in this sample of countries.

In contrast to the EMC sample, the APTA trade openness variable has a negative and significant effect on manufacturing sector FDI inflows. A 10% decrease in the trade openness of an APTA member (i.e. higher trade barriers), results in a 10.8% increase in the manufacturing sector FDI, *ceteris paribus*. This somewhat surprising finding is in line with the - once popular - tariff jumping theories of FDI. This follows the findings of Siem (2009), although his sample covered transitional countries. FDI flowing into the countries in the APTA region appears to be an attempt to circumvent tariff restrictions.

5.3 Future research

More effort needs to be spent on improving the data collection of FDI at the sectoral level. Different countries use different methods and standards to account for the FDI. UNCTAD's country profiles are probably the most comprehensive and standardised of all the data available, but even this data is not widespread enough nor does it cover sufficient countries. As the quality of the data improves and the period of observation increases, this will only help to strengthen the empirical analysis' validity.

Future research could be undertaken on (i) Sectoral FDI data, disaggregated at an even further level. Ideally, using investment-level data, classified by industry, and available across a wide variety of countries. At this time, such a dataset is not readily available.

(ii) Extending the work done by this paper (regressing the variables on sectoral FDI), and supplementing it with the approach used by Kandiero & Chitiga (2003) (sectoral trade openness variables). This future research could prove useful to the Governments of these countries seeking to target certain industries/sectors for growth. If Governments want to increase FDI into a particular sector, this research could possibly tell them on which trade and non-trade barriers in a specific sector they need to focus their liberalisation efforts.

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Appendix

Table A2.1 Trade openness measures			
	Measure	Variable	Author
1.		Exports/GDP	
2.		Imports/GDP	
3a.	Tariff Simple Mean		
3b.	Tariff Weighted Mean		
4.	Simple Trade Share	$(\text{Exports} + \text{Imports}) / \text{GDP}$	<i>Dollar & Kraay (2001)</i>
5.		$(\text{Exports} + \text{Imports}) / \text{GNP}$	Kumar Kar (1983)
6.		$(\text{Exports} + \text{Imports}) / \text{PPP}(\text{GDP})$	<i>Brahmbhatt (1998)</i>
7.	size of immigrant population		<i>Brahmbhatt (1998)</i>
8.	Restrictions on export proceeds		Asiedu & Lien, Capital Controls and Foreign Direct Investment (2004)
9	Composite Dummy Var		Sachs and Warner (1995)
10	Corrected for size of country	$\text{Exports} / \text{GDP}_{\text{PerCapita}}$	Barro & Sala-i-Martin (1999), Jaumotte (2004)
11		$(\text{Exports} + \text{Imports}) / \text{GDP}_{\text{PerCapita}}$	
12	Trade Openness Index (TOI)		Skipton (2003)
13	Composite trade intensity	$(\text{TI} + \text{RWTI})$	Squalli & Wilson (2006)
14	Adjusted trade intensity	$(X + M) / 2(\text{GDP} + M)$	Anderson (2004)
15	Adj trade intensity	$1 - [(X + M) / 2\text{GDP}] \times 100$	Frankel (2000)
16		$(X + M) / \text{rGDP}$	Alcala and Ciccone (2004)

1. Export/GDP ratio.

The export ratio is the percentage of domestic output that is exported.

Source: Authors own classification

2. Import/GDP ratio.

The import penetration rate is the percentage of domestic demand fulfilled by imports (OECD, 2003).

3a. Tariff Simple Mean

Taken from The World Bank's definition:

“Simple mean applied tariff is the unweighted average of effectively applied rates for all products subject to tariffs calculated for all traded goods. Data are classified using the

Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups. Effectively applied tariff rates at the six- and eight-digit product level are averaged for products in each commodity group. When the effectively applied rate is unavailable, the most favored nation rate is used instead.” (The World Bank, 2013)

Dollar and Kraay (2001) find contention with this method. They argue that available data on tariffs are an imperfect measure of trade policy. They tend to be biased upwards, giving disproportionate weighting to tariffs on products that represent a small proportion of imports.

3b. Tariff Weighted Mean

Taken from The World Bank’s definition:

“Weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups and import weights. To the extent possible, specific rates have been converted to their ad valorem equivalent rates and have been included in the calculation of weighted mean tariffs. Import weights were calculated using the United Nations Statistics Division's Commodity Trade (Comtrade) database. Effectively applied tariff rates at the six- and eight-digit product level are averaged for products in each commodity group. When the effectively applied rate is unavailable, the most favored nation rate is used instead.” (The World Bank, 2013)

In a global market place where trade policy distortions are increasingly obscure, calculating a country’s total barriers to trade is prohibitively complex:

“Simply using tariff data, clearly fails to deal with non-tariff barriers to trade. These non-tariff barriers ranging from explicit quotas & licensing schemes to local content requirements and health & safety standards can often constitute significant obstacles to trade and should be accounted for. Trade-weighted tariffs also give no weight to tariffs on goods that are so high that imports are choked off entirely.” (Hiscox & Kastner, 2004).

4. The Simple Trade Share, as proposed by Dollar and Kraay (2001). This comprises $(Exports+Imports)/_nGDP$ and measures the proportional changes in trade volumes relative to GDP. Also known as the Simple Trade Intensity (Squalli & Wilson, 2006), it is one of the most commonly used ratios in the literature as a proxy for measuring trade openness. The advantage of a trade volumes measure is that they in part account for non-tariff trade barriers (Dollar & Kraay, 2001). Trade to GDP ratios are not without their critics:

“They tend to bias against countries with large internal markets and countries that are relatively isolated from other countries (and hence would be expected to trade less for any given level of policy openness).” (Hiscox & Kastner, 2004).

7. Brahmabhatt (1998) suggested an alternative approach to measuring openness. He suggested the size of immigrant population be used as a proxy. A country with a larger immigrant population, would be seen to be more open.

10. Exports/GDP (corrected for size of country). see Barro & Sala-i-Martin (1999). This variable is also used in Jaumotte (2004).

11. $(\text{Exports} + \text{Imports}) / \text{GDP}_{\text{PerCapita}}$. An extension of Barro & Sala-i-Martin’s Openness variable, including Imports into the equation.

12. Trade Openness Index (TOI). see Skipton (2003)

13. The Composite Trade Intensity ratio proposed by Squalli & Wilson (2006) extends on the popular Simple Trade Share. It comprises two dimensions: Trade Intensity and Relative World Trade Intensity (TI + RWTI). The first dimension (TI) comprises the proportion of a given country’s total income accrued via international trade. It is essentially $(\text{Exports} + \text{Imports}) / \text{GDP}$.

The second dimension added by Squalli & Wilson (RWTI) attempts to account for the share of trade that a country generates relative to total global trade. They suggest that using just the Trade Intensity dimension on its own is a prohibitive method of accounting for Trade Openness. It only looks at the relative position of a country’s trade performance compared to its own domestic economy.

14. Adjusted trade intensity $(X + M) / 2(\text{GDP} + M)$. GDP and Imports are added together and multiplied by two in the denominator. See Anderson (2004) for further clarification.

15. Adjusted trade intensity $1 - [(X + M) / 2\text{GDP}] \times 100$. See Frankel (2000).

Table A2.2: APTA countries

Bangladesh	China	India	Republic of Korea (South)	Lao People’s Democratic Republic	Sri Lanka
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Table A3.1: Sources of EMCs in sample

	EMI	The Economist	IMF	EMGP
Argentina	*		*	*
Bolivia			*	
Brazil	*	*	*	*
Bulgaria	*		*	
Chile	*	*	*	*
China	*	*	*	*
Colombia	*	*	*	
Costa Rica			*	
Croatia			*	
Czech Republic		*	*	
Dominican Republic	*		*	
Ecuador	*		*	
Egypt	*	*	*	
El Salvador			*	
Hungary	*	*	*	*
India	*	*	*	*
Indonesia	*	*	*	
Israel				*
Jordan			*	
Kenya	*			
Lebanon	*			
Malaysia	*	*	*	
Mexico	*	*	*	*
Morocco	*	*	*	
Pakistan	*		*	
Panama			*	
Paraguay			*	
Peru	*	*	*	
Philippines		*	*	
Poland	*	*	*	*
Romania	*		*	
Russia	*	*	*	*
Senegal	*			
Slovak Rep.			*	
Slovenia				*
South Africa	*	*	*	*
South Korea		*		*
Taiwan		*		*
Thailand	*	*	*	*
Tunisia	*		*	
Turkey	*	*	*	*
Ukraine	*		*	
Uruguay	*		*	
Venezuela	*		*	
Vietnam	*		*	

Table A3.2: EMCs in sample

Synthesized Country List				
Arranged according to Continental origin (Excluded countries in parentheses)				
North America	South America	Europe	Asia	Africa
Costa Rica	Argentina	Bulgaria	China	Egypt
Dominican Republic	Bolivia	Croatia	India	Morocco
El Salvador	Brazil	Czech Republic	Indonesia	Nigeria
Mexico	Chile	Hungary	Malaysia	South Africa
	Columbia	Poland	Pakistan	Tunisia
	Ecuador	Romania	Thailand	
	Paraguay	Russian Federation	Vietnam	
	Peru	Slovak Republic		
			(Froot & Stein, 1991)	
		Turkey	(Froot & Stein, 1991)	
		Ukraine		
(Jamaica)	(Uruguay)		(Jordan)	(Israel)
(Panama)			(Philippines)	
(Trinidad and Tobago)			(South Korea)	

Table A3.3 shows Total FDI as the dependent variable. Using the Simple Mean Tariff (Trade3a) and Simple Weighted Mean Tariff as the openness variable (Trade3b) on Total Sector-Wise FDI did not produce significant statistics. Neither of their Wald Chi-squared values (5.00 and 4.68 respectively), are significant at the normal levels. This suggests using the actual tariff values are poor measures for openness on Total FDI inflows.

The Simple trade intensity variable (ln_TradeR4) for total FDI is positive and significant. The Wald Chi-squared test statistic shows the model using this variable is significant at the 95% level.

The Composite Trade Intensity variable (ln_TradeR13) has a negative and strongly significant effect on total FDI. The model's fit is also slightly more significant, at the 99% level.

Table A3.3 EMC Trade Openness: Total Sector FDI, xtgl

Dependent Variables	1	2	3	4	5	6	7	8	9	10	11	12
Independent Variables												
TradeR1	0.0114 (0.00753)											
TradeR2		0.0258*** (0.00799)										
Trade3a			-0.0143 (0.0246)									
Trade3b				0.00334 (0.0254)								
TradeR4					0.00944** (0.00396)							
In_TradeR4						0.853*** (0.323)						
Trade7							-2.65e-07 (2.14e-07)					
In_TradeR10								-0.581*** (0.117)				
In_TradeR11									-0.602*** (0.123)			
In_TradeR13										-0.519*** (0.126)		
In_TradeR14											-0.317*** (0.0606)	
In_TradeR15												-0.319*** (0.0597)
log REER2	0.916 (0.651)	0.336 (0.663)	1.031 (0.699)	1.089 (0.694)	0.629 (0.660)	0.485 (0.671)	1.189 (1.169)	1.354** (0.580)	1.415** (0.581)	1.845*** (0.602)	1.201** (0.578)	1.118* (0.578)
real GDP growth	0.0106 (0.0391)	0.00896 (0.0383)	0.0316 (0.0514)	0.0322 (0.0515)	0.00839 (0.0387)	0.00793 (0.0386)	-0.00378 (0.0923)	0.0622 (0.0384)	0.0616 (0.0384)	0.0590 (0.0391)	0.0607 (0.0381)	0.0602 (0.0380)
P2	-0.00611 (0.0109)	0.000308 (0.0110)	-0.0185 (0.0197)	-0.0227 (0.0203)	-0.00366 (0.0110)	-0.00377 (0.0109)	-0.00174 (0.0176)	-0.0126 (0.0106)	-0.0143 (0.0106)	-0.0116 (0.0107)	-0.0139 (0.0105)	-0.0133 (0.0105)
Log GDP per capita	-0.0182 (0.185)	-0.109 (0.183)	0.0535 (0.244)	0.130 (0.240)	-0.0665 (0.184)	-0.0477 (0.181)	0.239 (0.305)	-0.212 (0.180)	-0.227 (0.181)	0.352* (0.187)	0.365** (0.180)	0.354** (0.179)
Constant	-1.117 (3.679)	1.610 (3.699)	-1.399 (4.298)	-2.414 (4.171)	0.258 (3.701)	-2.069 (3.445)	-3.826 (6.660)	2.747 (3.530)	3.181 (3.570)	-3.596 (3.376)	1.829 (3.449)	3.706 (3.546)
Wald chi2	8.30	16.61	5.00	4.68	11.76	13.11	3.91	31.30	30.53	23.25	33.93	35.20
prob > chi2	0.1403	0.0053	0.5611	0.4568	0.0382	0.0224	0.5619	0.0000	0.0000	0.0003	0.0000	0.0000
rho												
N	314	314	233	233	314	314	67	314	314	314	314	314
i	35	35	35	35	35	35	33	35	35	35	35	35
Source: Author's calculations.	*** p <= .001 ** p<= .01 * p<=.05					Standard errors are shown below the coefficient in parenthesis						

Table A3.4 shows the various trade openness variables, regressed on Primary FDI inflows. The Simple Mean Tariff (Trade3a) and Simple Weighted Mean Tariff (Trade3b) variables on Primary FDI did not produce significant statistics. However, when using each of these tariff variables in turn, the model is reasonably specified, significant at the 99% confidence level.

When regressing on Primary FDI inflows, the log of Simple Trade Intensity (ln_TradeR4) is now a negative relationship, but no longer significant. The actual model itself is significant at the 99% level.

	1	2	3	4	5	6	7	8	9	10	11	12
Independent Variables												
TradeR1	-0.00472 (0.00368)											
TradeR2		-0.00515 -0.00396										
Trade3a			0.00585 (0.0121)									
Trade3b				0.00549 (0.0124)								
TradeR4					-0.00257 (0.00195)							
ln_TradeR4						-0.113 (0.162)						
Trade7							-1.49e-07 (1.35e-07)					
ln_TradeR10								-0.208*** (0.0591)				
ln_TradeR11									-0.225*** (0.0620)			
ln_TradeR13										-0.265*** (0.0616)		
ln_TradeR14											-0.110*** (0.0310)	
ln_TradeR15												-0.105*** (0.0307)
log REER2	0.364 (0.317)	0.398 (0.327)	0.138 (0.339)	0.123 (0.336)	0.388 (0.323)	0.314 (0.329)	-0.352 (0.562)	0.246 (0.287)	0.271 (0.287)	0.503* (0.293)	0.194 (0.287)	0.168 (0.288)
real GDP growth	-0.0142 (0.0191)	-0.0157 (0.0190)	-0.0247 (0.0250)	-0.0248 (0.0250)	-0.0148 (0.0190)	-0.0162 (0.0190)	0.0219 (0.0452)	-0.00197 (0.0191)	-0.00143 (0.0191)	0.00303 (0.0190)	-0.00296 (0.0190)	-0.00386 (0.0190)
P2	0.0134** (0.00540)	0.0126** (0.00550)	0.0117 (0.00963)	0.0114 (0.00990)	0.0129** (0.00544)	0.0135** (0.00544)	0.0179** (0.00849)	0.0125** (0.00529)	0.0118** (0.00530)	0.0122** (0.00524)	0.0122** (0.00530)	0.0125** (0.00530)
Log GDP per capita	-0.404*** (0.0918)	-0.404*** (0.0919)	-0.442*** (0.119)	-0.446*** (0.117)	-0.403*** (0.0920)	-0.422*** (0.0905)	-0.344** (0.149)	-0.515*** (0.0905)	-0.524*** (0.0909)	-0.273*** (0.0943)	-0.309*** (0.0943)	-0.318*** (0.0938)
Constant	2.336 (1.803)	2.215 (1.833)	3.532* (2.090)	3.652* (2.031)	2.242 (1.821)	3.009* (1.709)	4.834 (3.218)	4.958*** (1.753)	5.207*** (1.767)	2.661 (1.659)	4.542*** (1.720)	5.080*** (1.770)
Wald chi2	42.42	42.47	27.13	27.09	42.53	41.11	13.21	54.55	55.49	61.60	54.76	53.87
prob > chi2	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0215	0.0000	0.0000	0.0000	0.0000	0.0000
rho												
N	304	304	228	228	304	304	65	304	304	304	304	304
i	35	35	35	35	35	35	33	35	35	35	35	35
Source: Author's calculations.	*** p <= .001 ** p<= .01 * p<= .05					Standard errors are shown below the coefficient in parenthesis						

Another variable with a good model fit is the Composite Trade Intensity variable (ln_TradeR13). Its Wald Chi-squared value of 61.60 is the highest of all the openness variables and significant at the 99% level. Using ln_TradeR4 in this model has a reasonable Wald Chi-squared statistic of 41.11, but still highly significant at even the 99% level. The coefficient ln_TradeR13 has a statistically significant and negative effect on Primary FDI inflows.

Table A3.5 EMC Trade Openness: Secondary Sector FDI, xtglS

	1	2	3	4	5	6	7	8	9	10	11	12
Independent Variables												
TradeR1	0.00959*** (0.00276)											
TradeR2		0.0136*** (0.00297)										
Trade3a			-0.0104 (0.0114)									
Trade3b				-0.00962 (0.0135)								
TradeR4					0.00593*** (0.00146)							
ln_TradeR4						0.487*** (0.121)						
Trade7							-1.02e-07 (1.16e-07)					
ln_TradeR10								-0.0603 (0.0455)				
ln_TradeR11									-0.0631 (0.0478)			
ln_TradeR13										0.0147 (0.0489)		
ln_TradeR14											-0.0438* (0.0237)	
ln_TradeR15												-0.0479** (0.0233)
log REER2	-0.515** (0.258)	-0.732*** (0.265)	-0.226 (0.269)	-0.190 (0.261)	-0.630** (0.262)	-0.673** (0.267)	-0.715 (0.531)	-0.149 (0.241)	-0.141 (0.241)	-0.174 (0.248)	-0.169 (0.240)	-0.184 (0.240)
real GDP growth	0.0485*** (0.0161)	0.0500*** (0.0157)	0.0563*** (0.0180)	0.0566*** (0.0180)	0.0487*** (0.0159)	0.0492*** (0.0159)	0.0174 (0.0404)	0.0626*** (0.0167)	0.0626*** (0.0167)	0.0556*** (0.0169)	0.0642*** (0.0166)	0.0647*** (0.0165)
P2	-0.00696 (0.00481)	-0.00450 (0.00482)	-0.0103 (0.00819)	-0.0101 (0.00820)	-0.00574 (0.00481)	-0.00582 (0.00481)	-0.00877 (0.00886)	-0.0105** (0.00488)	-0.0106** (0.00489)	-0.00943* (0.00490)	-0.0108** (0.00486)	-0.0108** (0.00485)
Log GDP per capita	-0.0385 (0.0750)	-0.0536 (0.0736)	0.0250 (0.0887)	0.0293 (0.0905)	-0.0490 (0.0744)	-0.0277 (0.0732)	0.00840 (0.142)	0.0146 (0.0747)	0.0125 (0.0750)	0.0215 (0.0818)	0.0888 (0.0794)	0.0923 (0.0788)
Constant	3.145** (1.438)	4.050*** (1.448)	1.789 (1.665)	1.557 (1.620)	3.644** (1.446)	2.089 (1.342)	4.256 (2.935)	1.815 (1.414)	1.862 (1.425)	1.354 (1.374)	1.857 (1.390)	2.193 (1.422)
Wald chi2	32.63	42.01	15.83	15.49	37.44	37.14	3.58	21.53	21.56	19.80	23.34	24.21
prob > chi2	0.0000	0.0000	0.0073	0.0084	0.0000	0.0000	0.6107	0.0006	0.0006	0.0014	0.0003	0.0002
rho												
N	284	284	214	214	284	284	59	284	284	284	284	284
i	35	35	35	35	35	35	32	35	35	35	35	35
Source: Author's calculations.	*** p <= .001 ** p<= .01 * p<= .05						Standard errors are shown below the coefficient in parenthesis					

Using the log of Simple Trade Intensity variable (ln_TradeR4) seems to have one of the better model fits when regressing on Secondary FDI data. As exhibited in Table A3.5. It has a Wald Chi-squared value of 37.14, easily significant at the 99% level.

Both of the tariff variables (Trade3a and Trade3b) are negative but insignificant. ln_TradeR4 and ln_TradeR13 have positive coefficients, but only ln_TradeR4 has a statistically significant effect on Secondary FDI. No serial correlation is present when each of these variables (ln_TradeR4 and ln_TradeR13), are included.

	1	2	3	4	5	6	7	8	9	10	11	12
Independent Variables												
TradeR1	0.00250 (0.00498)											
TradeR2		0.0129** (0.00531)										
Trade3a			-0.0390* (0.0215)									
Trade3b				-0.0313 (0.0254)								
TradeR4					0.00381 (0.00263)							
ln_TradeR4						0.273 (0.214)						
Trade7							3.29e-08 (1.56e-07)					
ln_TradeR10								-0.335*** (0.0758)				
ln_TradeR11									-0.342*** (0.0797)			
ln_TradeR13										-0.351*** (0.0826)		
ln_TradeR14											-0.172*** (0.0394)	
ln_TradeR15												-0.172*** (0.0388)
log REER2	1.352*** (0.459)	0.897* (0.474)	1.023** (0.521)	1.186** (0.509)	1.142** (0.468)	1.154** (0.477)	1.905** (0.930)	1.440*** (0.408)	1.484*** (0.408)	1.826*** (0.418)	1.353*** (0.408)	1.302*** (0.409)
real GDP growth	0.00114 (0.0278)	-0.00377 (0.0274)	0.00244 (0.0335)	0.00366 (0.0337)	-0.00202 (0.0276)	-0.00103 (0.0276)	-0.0497 (0.0694)	0.0327 (0.0275)	0.0325 (0.0275)	0.0367 (0.0278)	0.0306 (0.0274)	0.0299 (0.0273)
P2	-0.0239*** (0.00779)	-0.0202** (0.00784)	-0.0438*** (0.0146)	-0.0424*** (0.0147)	-0.0224*** (0.00782)	-0.0228*** (0.00781)	-0.0148 (0.0155)	-0.0286*** (0.00755)	-0.0295*** (0.00759)	-0.0287*** (0.00757)	-0.0289*** (0.00756)	-0.0285*** (0.00754)
Log GDP per capita	0.261** (0.130)	0.191 (0.128)	0.185 (0.169)	0.222 (0.172)	0.224* (0.129)	0.239* (0.127)	0.452* (0.243)	0.152 (0.123)	0.143 (0.124)	0.515*** (0.132)	0.467*** (0.127)	0.459*** (0.126)
Constant	-6.464** (2.547)	-4.265* (2.583)	-3.557 (3.230)	-4.763 (3.146)	-5.415** (2.576)	-6.439*** (2.384)	-10.37** (5.107)	-3.679 (2.400)	-3.501 (2.425)	-7.682*** (2.295)	-4.305* (2.364)	-3.282 (2.429)
Wald chi2	30.74	36.95	26.48	24.64	32.78	32.26	10.43	51.97	50.72	50.34	51.41	52.05
prob > chi2	0.0000	0.0000	0.0001	0.0024	0.0000	0.0000	0.0640	0.0000	0.0000	0.0000	0.0000	0.0000
rho												
N	296	296	221	221	296	296	62	296	296	296	296	296
i	35	35	35	35	35	35	32	35	35	35	35	35
Source: Author's calculations.	*** p <= .001 ** p <= .01 * p <= .05					Standard errors are shown below the coefficient in parenthesis						

The final table of the four, looks at the different openness variables with Tertiary sector FDI as the dependent variable. As shown in Table A3.6. Almost all of the models in this table have high Wald Chi-square values (all significant at the 1% level), except for Trade7 (which is significant, but only at the 90% level). Trade3b and ln_TradeR4 are insignificant variables.

Referring still to Table A3.6, ln_TradeR13 and Trade3a are both significant variables, but whilst they both have negative signs, this has conflicting meanings. For ln_TradeR13, it suggests as a country liberalises trade (increased openness), Tertiary FDI would decrease. In the case of Trade3a's negative effect, as a country lowers tariff rates on exports and imports (thus liberalising trade), this would result in an increase of Tertiary FDI.

Table A4.2.1 APTA (FE) method versus APTA (GLS) method, Total FDI. Macroeconomic Variables. Corrected			
Corrected for heteroscedasticity and/or serial correlation			
FE/GLS		1990-2010	xtreg, fe and xtgls
Sectoral FDI and Macroeconomic Variables			
		1	2
Dependent Variables		APTA (FE)	APTA (GLS)
Independent Variables			
openness	In_TradeR4	-0.563 (1.096)	-0.0306 (0.101)
	log REER2	0.367 (0.294)	-0.0420 (0.187)
	real GDP growth	0.216 (0.146)	-0.00591 (0.0101)
	P2	0.00531** (0.00159)	0.00663*** (9.17e-05)
	Log GDP per capita	-0.104 (0.101)	-0.0249 (0.0683)
	Constant	1.250 (5.632)	0.558 (1.070)
	F	880.15	
	Prob>F	0.0000	
	rho	0.3295	0.7213
	N	75	46
	i	6	5
Source: author's calculations.			
*** p <= .01 ** p <= .05 * p <= .1			
Standard errors are shown below the coefficient in parenthesis			

When testing for serial correlation, there seems to be some evidence present when using either the In_TradeR4 and In_TradeR13 openness variables on Tertiary FDI.

The APTA subset was run, using the GLS method after correcting for any heteroscedasticity and serial correlation present in the Total FDI regressions (to compare against the EMC sample GLS model. As shown in Table A4.2.1). Using the GLS method - like in the EMC regressions – rather than the FE method resulted in weaker Openness Variable, but the sign remained negative. REER and GDP growth variables became negative, but remained

insignificant. The Inflation variable remained slightly positive, but increased significance. The GDP per capita variable weakened, but remained negative and insignificant.

Table 4.2.2 Modified Wald Test for Heteroscedasticity (xttest3)

xttest3	modified Wald test	chi2(34)	Prob > chi2	< 0.05% reject	Heteroskedasticity
1	total FDI	8765.16	0.0000	yes	yes
2	primary FDI	1.9e+05	0.0000	yes	yes
3	secondary FDI	10803.55	0.0000	yes	yes
4	tertiary FDI	1872.00	0.0000	yes	yes

Source: Author's own calculations

Table 4.2.3 Test for Serial Correlation in the error structure (xtserial)

xtserial	Test for serial correlation	F stat	prob>F	serial correlation
1	total FDI	5.152	0.0297**	yes
2	primary FDI	14.792	0.0005***	yes
3	secondary FDI	2.39	0.1317	no
4	tertiary FDI	3.995	0.0539	no

Source: Author's own calculations

Table A4.3.1: EMC Total Sector FDI, uncorrected Control Variables (xtgls)

Generalised Least Squares		xtgls	1990-2010		Prior to corrections for Heteroscedasticity and Serial Correlation			
Sectoral FDI and Institutional Variables								
		1	2	3	4	5	6	7
Dependent Variables		Total FDI as a share of GDP						
Control Variables		In_InfraSu m2Mis	Educ2nd	EducTer	Corrup	NatResTotExProt	OilResDum	In_InfraT
openness (ln_TradeR4)		1.373*** (0.431)	0.742** (0.364)	0.779** (0.353)	1.221 (0.771)	0.606* (0.332)	0.884*** (0.332)	0.780** (0.331)
log REER2		-0.268 (0.911)	0.218 (0.877)	0.0271 (0.835)	-0.257 (2.794)	0.191 (0.657)	0.516 (0.675)	0.533 (0.674)
real GDP growth		0.000232 (0.0477)	0.0152 (0.0404)	0.00601 (0.0400)	-0.154 (0.104)	0.0133 (0.0385)	0.00743 (0.0386)	0.00685 (0.0386)
P2		0.00527 (0.0139)	-0.00829 (0.0141)	-0.0348** (0.0163)	-0.0271 (0.0248)	0.00525 (0.0108)	-0.00427 (0.0110)	-0.000794 (0.0111)
Log GDP per capita		-0.212 (0.220)	-0.554** (0.245)	-0.0738 (0.236)	-0.0371 (0.476)	-0.254 (0.181)	-0.0171 (0.196)	-0.338 (0.287)
Qualitative Var.		-0.222 (0.199)	0.0466*** (0.0107)	0.00511 (0.0101)	0.411 (0.275)	-0.910*** (0.196)	0.150 (0.375)	0.321 (0.248)
Constant		2.548 (4.850)	0.205 (4.114)	0.724 (4.058)	-0.846 (13.24)	3.799 (3.542)	-2.667 (3.753)	-1.990 (3.453)
Wald Chi2		16.19	33.23	17.45	9.34	37.60	13.28	14.82
prob > chi2		0.0128	0.0000	0.0078	0.1555	0.0000	0.0388	0.0217
Observations		213	265	233	72	302	314	313
i		33	35	34	15	34	35	35
AR(1) (p-value)								
AR(2) (p-value)								
Source: Author's own calculations.								
*** p <= .01 ** p <= .05 * p <= .1								
Standard errors are shown below the coefficient in parenthesis								

Table A4.3.2 Total FDI Modified Wald Test for Heteroscedasticity (xttest3)

xttest3	modified Wald test	chi2(34)	Prob > chi2	< 0.05% reject	Heteroskedasticity
1	In_InfracSum2Mis	1.9e+05	0.0000	yes	yes
2	Educ2nd	5476.48	0.0000	yes	yes
3	EducTer	36705.50	0.0000	yes	yes
4	Corrup	4421.54	0.0000	yes	yes
5	NatResTotExProt	5140.65	0.0000	yes	yes
6	OilResDum	10484.86	0.0000	yes	yes
7	In_InfracT	7360.09	0.0000	yes	yes

Source: Author's own calculations

Table A4.3.3 Total FDI Test for Serial Correlation in the error structure (xtserial)

xtserial	Test for serial correlation	F stat	prob>F	serial correlation
1	In_InfracSum2Mis	2.833	0.1048	no
2	Educ2nd	1.938	0.1735	no
3	EducTer	0.408	0.5281	no
4	Corrup	0.000	0.9828	no
5	NatResTotExProt	5.111	0.0305	yes
6	OilResDum	5.152	0.0297	yes
7	In_InfracT	5.246	0.0283	yes

Source: Author's own calculations

Table 4.3.4 Primary FDI Modified Wald Test for Heteroscedasticity (xttest3)

xttest3	modified Wald test	chi2(34)	Prob > chi2	< 0.05% reject	Heteroskedasticity
1	In_InfracSum2Mis	4.5e+05	0.0000	yes	yes
2	Educ2nd	6.6e+05	0.0000	yes	yes
3	EducTer	82116.18	0.0000	yes	yes
4	Corrup	29629.04	0.0000	yes	yes
5	NatResTotExProt	59431.37	0.0000	yes	yes
6	OilResDum	1.6e+05	0.0000	yes	yes
7	In_InfracT	6.7e+05	0.0000	yes	yes

Source: Author's own calculations

xtserial	Test for serial correlation	F stat	prob>F	serial correlation
1	In_InfracSum2Mis	20.193	0.0001	yes
2	Educ2nd	46.240	0.0000	yes
3	EducTer	2.868	0.1007	no
4	Corrup	8.720	0.0161	yes
5	NatResTotExProt	14.484	0.0006	yes
6	OilResDum	14.792	0.0005	yes
7	In_InfracT	15.056	0.0005	yes

Source: Author's own calculations

xttest3	modified Wald test	chi2(34)	Prob > chi2	< 0.05% reject	Heteroskedasticity
1	In_InfracSum2Mis	1.2e+05	0.0000	yes	yes
2	Educ2nd	5725.98	0.0000	yes	yes
3	EducTer	10314.2	0.0000	yes	yes
4	Corrup	1.6e+05	0.0000	yes	yes
5	NatResTotExProt	8008.60	0.0000	yes	yes
6	OilResDum	16482.16	0.0000	yes	yes
7	In_InfracT	4138.19	0.0000	yes	yes

Source: Author's own calculations

xtserial	Test for serial correlation	F stat	prob>F	serial correlation
1	In_InfracSum2Mis	11.976	0.0020	yes
2	Educ2nd	1.700	0.2016	no
3	EducTer	0.670	0.4198	no
4	Corrup	2.396	0.1560	no
5	NatResTotExProt	2.441	0.1281	no
6	OilResDum	2.390	0.1317	no
7	In_InfracT	2.402	0.1307	no

Source: Author's own calculations

xttest3	modified Wald test	chi2(34)	Prob > chi2	< 0.05% reject	Heteroskedasticity
1	ln_InfracSum2Mis	3975.71	0.0000	yes	yes
2	Educ2nd	6250.68	0.0000	yes	yes
3	EducTer	1796.44	0.0000	yes	yes
4	Corrup	1.7e+05	0.0000	yes	yes
5	NatResTotExProt	1607.32	0.0000	yes	yes
6	OilResDum	2281.62	0.0000	yes	yes
7	ln_InfraT	1395.96	0.0000	yes	yes

Source: Author's own calculations

xtserial	Test for serial correlation	F stat	prob>F	serial correlation
1	ln_InfracSum2Mis	2.306	0.1419	no
2	Educ2nd	2.713	0.1093	no
3	EducTer	3.395	0.0756	no
4	Corrup	1.890	0.1992	no
5	NatResTotExProt	4.045	0.0528	no
6	OilResDum	3.995	0.0539	no
7	ln_InfraT	4.101	0.0510	no

Source: Author's own calculations

APTA

xtserial	Test for serial correlation	F stat	prob>F	< 0.05% reject	serial correlation
1	total FDI	21.063	0.0059***	yes	yes
2	primary FDI	2.742	0.1731	no	no
3	secondary FDI	2.570	0.1842	no	no
4	tertiary FDI	10.458	0.0319**	yes	yes

Source: Author's own calculations

17 March 2015

Mr Gareth Gray (201500735)
School of Accounting, Economics & Finance
Westville Campus

Dear Mr Gray,

Protocol reference number: HSS/0161/015M

Project title: The economic impact of Trade Openness on Foreign Direct Investment into Emerging Market Countries

Full Approval – No Risk / Exempt Application

In response to your application received on 06 March 2015, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



.....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Marcel Kohler
Cc Academic Leader Research: Dr HPE Ngalawa
Cc School Administrator: Mr Sihle Khuzwayo

Humanities & Social Sciences Research Ethics Committee

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