The effectiveness of tax incentives in attracting Foreign Direct Investment to Ethiopia

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List of Acronyms

ECCU	Eastern Caribbean Currency Union
EIA	Ethiopian Investment Agency
EPRDF	Ethiopian People Revolutionary Democratic Front
ERP	Economic Reform Program
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GLS	Generalized Least Square
IMF	International Monetary Fund
MNC	Multi-national Corporations
MNE	Multi-national Enterprise
OLI	Ownership, Location and Internalization
OLS	Ordinary Least Square
TGE	Transitional Government of Ethiopia
VIF	variance inflation factors

Abstract

Foreign direct investment plays a significant role in the development process of developing countries. Given this many developing countries particularly, Ethiopia made a number of attempt to attract FDI. Fiscal incentive was one among the attempts made to create investment friendly environment. Tax holiday and custom duty exemptions have been extensively used by Ethiopian government to attract foreign direct investment. However the results of the available empirical evidence on effectiveness of such incentive in attracting FDI are inconsistent. This paper analyzes the effectiveness of tax incentive in attracting foreign direct investment to Ethiopia. It also analyzes the differential impacts tax incentive has on different sector by disaggregating FDI in to ten sectors. Dummy variables are used to indicate the presence and absence of tax incentives, tax holiday and custom duty exemption, in the sectors under consideration. Panel data on 10 sectors over the period of 1992-2012 and an econometric model that include tax holiday, custom duty exemption and control variables are used in the analysis. The empirical result shows that of the tax incentives, only tax holiday was found significant while custom duty exemption is insignificant in the general model. Among the control variables, openness of the economy was significant. However when sectorial distribution of FDI is taken into account, tax holiday have significant impact only on the manufacturing sector while custom duty exemption have a significant impact on construction and electricity and water supply sectors. This result indicates that tax incentive sensitivity of FDI depends on the sector to which the investment is flowing. Using aggregate data in these types of analysis will have a risk of underestimating or overestimating the results. On the other hand market size and openness of the economy were found important in attracting FDI to the country.

Relevance to Development Studies

Foreign direct investment has an important role in the development processes of developing countries with low saving rate, through its provision of capital, employment opportunity and technological spillover. Therefore promoting foreign direct investment is necessary to achieve growth and overall development. Policy and other factors have been used to promote investment by many developing countries. However researches on the effectiveness of policy variables in attracting FDI are limited in developing countries. This research paper analyzes the effectiveness of tax incentives in attracting foreign direct investment to Ethiopia, as Ethiopian government providing a wide range of fiscal incentives to attract FDI, crucial to development. Furthermore unlike other studies used aggregate data of FDI in their analysis this research paper used disaggregated data on sectoral basis. Therefore this research paper contributes and adds empirical evidence to the existing literature regarding the relationship of FDI and fiscal incentives

Keywords

Foreign Direct Investment (FDI), Tax holiday, Custom duty exemption

Chapter 1
Introduction

1.1 Background

Foreign Direct investment is very crucial for economic growth of a developing country. Because many developing countries especially Africa has low domestic saving and low income to fund investment, FDI provides the capital to fill the saving and investment gap. It also contributes to economic development through: transferring advanced technology and organizational skills; generating technological spillover and creating linkage with local firms; generating employment and developing the skill of human capital and helping to create competitive business environment.(Basu and Guariglia 2007; Gohou and Soumare, 2012).

Given the role of FDI in economic growth many developing countries, particularly in Africa, have undertaken many structural reforms and provided investment incentives in order to attract FDI. Cleeve (2008). Among these reforms tax policy reforms and tax incentives are the most popular one. However the effectiveness of the fiscal incentives in attracting FDI among other determinants of FDI remained inconclusive in literature. (Zee, Stotsky and Ley, 2002). There appears to be two perspectives regarding the effectiveness of fiscal incentives, some argue that fiscal incentives promote investment which generate job opportunities and leads to overall economic growth. On the other hand, some argue that fiscal incentives are not effective means of attracting FDI. According to them the revenue loss from fiscal incentives outweighs the gain from the investment.

The opposing theoretical arguments and the ambiguity of the issue leave the matter to empirical scrutiny. On top of that, there is a possibility that the impacts may differ across countries depending on different economic, political and social factors. As one of the developing countries, Ethiopia has been also undertaking many tax reforms and changing incentives in order to attract FDI given the role of FDI in promoting growth by providing capital which every developing country lacks. Since 1992 the Ethiopian government has been providing investment incentives to encourage private investment and to promote the inflows of foreign capital. Reduced Custom import duties, exemptions from payment of export customs duties, income tax holding, tax holidays and losses carried forward are some among the investment incentives given by Ethiopian government. Accordingly, in my research paper I am going to look at the effectiveness of these incentives in attracting FDI.

1.2 Statement of Research Problem

Theoretically FDI is considered as a growth catalyst basically in developing countries where raising domestic capital is difficult. Empirically, the work of Borensztein, 1998 to mention one has shown there is remarkable positive relationship between FDI and economic growth. Based on this arguments many countries have put incentives, to attract FDI, in place. Similarly, the

Ethiopian Government has been providing a wide range of tax incentives in order to attract foreign direct investment. However, there are debates regarding the effectiveness of tax incentives in attracting FDI. Despite the aforementioned debate, developing countries, particularly Ethiopia has continued giving tax incentives to FDI. On the other hand even if FDI inflows to the country increased in absolute term since 1992, Ethiopia performed poor in relative term. This paper is aimed at contributing to existing literature/ debate by analyzing the efficacy of these incentives in attracting FDI by taking Ethiopian case.

1.3 Objectives of the study

The general objectives of the study are to assess the effectiveness of tax incentives in attracting FDI. The specific objectives are:-

- Controlling the other determinants of FDI, to look at the significance of fiscal policy in trends of FDI for the periods of the incentives.

- To look at the effects of tax incentives on the composition of FDI

1.4 Research questions

The main research questions are:-

- ❖ Are tax incentives significant in attracting FDI in Ethiopia?

- ❖ What are the effects of the tax incentives on FDI composition?

1.5 Relevance and Justification

Since early times fiscal policy and investment in general and FDI in particular has been a major topic or area of research. Many theoretical and empirical studies were undertaken in the area and came up with mixed results. This research paper tried to look at the effect of tax policy, specifically tax incentives, on the composition of FDI (sectoral distribution) which makes it significant as most of the literature of the period used aggregate data in evaluating the effect of tax policy on FDI inflows.(Morisset and Pirnia, 2000). By doing so this paper contributes to the existed debate on the topic. Moreover Ethiopia relied on foreign direct investment since domestic saving rate is low to finance investment which has an important role in overall growth. Considering the importance of investment Ethiopian government has been introducing tax incentive policies to attract foreign direct investment. However the effectiveness of tax incentive in meeting their objectives has been area of debate, some found it significant while other did not. Given the importance of FDI in the country and mixed evidence on the area it worth to build country specific evidence. It also helps in evaluating the policy intervention whether it attained the desired goal. In addition knowing the effect by composition of FDI will help policy makers in identifying the type of investment sensitive to incentives and the right type of incentives. Further there is no research done in this area in Ethiopia.

1.6 Methodology

The study relied on secondary data collected from different sources. The major data sources are Ethiopian Investment Agency, Ethiopian Customs and Revenue Authority, National Bank of Ethiopia and Freedom House. The data was analyzed using panel data econometric model. The main variables in the analysis for which data collected are tax holiday, custom duty exemption, FDI, GDP, Openness and political instability.

1.7 Scope and Limitations

The focus of this research paper is to examine the impacts of tax incentive on FDI and to look at differential impact tax incentive has across sectors. The analysis is limited to the 10 sectors, Agriculture, Manufacturing, Mining, Education, Health, Hotel and Tourism, transport and communication, construction, Electricity and water supply and real estate for which data is available over the period 1992 to 2012. Due to the unavailability of data this studies unable to separate FDI by their nature (Greenfield and Merger and Acquisition).

As for the limitations, apart from the theoretically identified panel data analysis shortcomings like design and data collection problems and measurement errors, this study faced challenges from the fact that the investment data is not collected primarily for this type of analysis, and the division of the sectors was very much aggregated even though most of them are fundamentally different. Additionally, due to the nature of the incentives which appeared in the form of legislations to show polices put in place by government our only source document was the proclamations, it was impossible to quantify or categorize the incentives by degree that a rather uniform dummy variable across all sectors and time is used. Thirdly, in two of the sectors, agriculture and manufacturing, the descriptive analysis failed to show the trend without incentives due to data unavailability before 1992 (where FDI flows were zero) and unlike the others, the incentives in these sectors started early.

1.8 Organization of the paper

This paper is divided in to five chapters. Chapter one is an introduction which includes research problem, objectives and research questions. Chapter two reviews literatures and previous researches which are related to the topic. Chapter three describes the trends of foreign direct investment and tax incentives in Ethiopia. Chapter four defines data, variables and methodology followed by discussion and analysis. Chapter five provide conclusions and recommendations.

Chapter 2
Theoretical Background and Literature review

FDI is promoted by governments to fill the savings gap and for the same reason they promote domestic investments plus the technological advantage usually discussed in relation overseas investment. Though the expected impact on the host country's economy is known, the motives of the investors are also different. Investors pursue their own profit; so governments who seek the inflow of the FDI are indirectly obliged to do things that they think would attract the foreign investors. Given this most developing countries have been using tax incentive widely to attract foreign direct investment. Several studies have been conducted to identify the major determinants of FDI and to assess the effectiveness of tax incentives in determining FDI. Therefore this chapter reviews theories and empirical literatures related to the topic.

2.1 Determinants of FDI

There are four types of FDI theories that tried to explain why multinational companies prefer to operate in foreign countries. These are neoclassical, product life cycle, internalization and eclectic theories of FDI.

After World War II the neoclassical theory of portfolio was developed in the work of Iverson, (1936) to explain the motives of FDI flows. According to this theory the main driving forces of MNCs to operate abroad is interest rate differential because low interest rate increase returns to capital and cause capital to move from low returns to higher return countries. However this theory is based on two conditions which exposed it to many critics. These conditions are no barrier to capital movement and risk and uncertainty. This theory is criticized for its unrealistic assumption because in reality capital moves not only in one direction. (Cited in Hosseini, 2005)

According to Dunning (1993) the other theory of FDI, product life cycle, was developed by Vernon in 1966. This theory argues that FDI is one stage of product life cycle which comes after maturity stage. Firms first produce for home market then export their products after maturity they begin to operate abroad where cost of production is low. However there also cases where MNCs start their business in home and abroad at the same time. (Cited in Woldemeskel, 2008)

From the works of Buckley and Casson (1976), Casson (1983), and Rugman (1982) another theory of FDI, internalization theory, was also emerged. According to this theory when firms need input or intermediate goods from other supplier for their production they internalize the supplier in order to reduce transaction cost. This forces multinational companies to open a subsidiary in a foreign country instead of buying the input from other supplier. (Cited in Hosseini, 2005)

The other theory developed by Dunning (1980, 1988, and 1993) was an eclectic theory of FDI. This theory argues that FDI takes place when Firms has ownership advantage which includes advantage in technology, in management techniques, different products and brands and economies of scale; when

there is locational advantage which include availability of natural resources, infrastructure and political and macroeconomic stability and when there is internalization advantage. (Cited in Hosseini, 2005)

Coming to empirical literature most of the studies found and concluded that Market size, economic growth rate, GDP, infrastructure, natural resource, political situation and human capital are important factors that can influence inflows of FDI to developing countries. Some also emphasized that the choice of location of FDI might be different depending on the motives behind the investment activities. So the relative importance of these factors is changed with the context of the multi-national corporations (MNC). In Dunning (1993) four types of motives are identified. These are resource seeking, market seeking, efficiency seeking and strategic asset seeking FDI. (Cited in Astatike and Assefa, 2006)

- Market seeking FDI: are FDI aimed at supplying local and regional markets. The host countries' situations that can affect these types of FDI are market size, per capita income and growth of market.

- Resource seeking FDI: are types of FDI aimed at acquiring location specific resources like mineral, raw material, labor and agricultural products. Their purpose is to benefit from cheaper inputs in a particular location.

- Efficiency seeking FDI: are FDI type in which MNC move to a place where labor is cheap in order to increase their cost efficiency, and with the aim of taking advantage of production scale of economics and diversifying risks.

- Strategic asset seeking FDI: are FDI aimed at developing firm specific advantage that helps them to expand. Their purpose is not extraction of resources rather acquiring strategic asset that may or may not be tangible.

Many studies proved that domestic market size is an important determinant of foreign direct investment. (Shamsuddin, 1994; Asiedu, 2006) Usually it is proxied by GDP and per capita GDP. According to Dunning (1998) and Caves (1996) market size found mostly influential in attracting market seeking FDI mode. Market seeking FDIs are aimed at serving local and regional market. Large markets help multinational enterprises to benefit from economies scale in producing large amount. (Cited in Cleeve, 2008)

Natural resource is also found by many studies as important factor affecting the location decision of multinational enterprises. FDI flows to developing country mostly influenced by resource endowment of the host country. (Asiedu, 2006; Onyeiwu and Shrestha, 2004) Resource seeking FDIs are the type of FDI mostly attracted by the availability of natural resource. (Woldemeskel, 2008) The motives behind is acquiring natural resource which is not available in the home country. These resources could be mineral, oil, labour etc.

Level of infrastructure was also found to determine flows of FDI. Since good infrastructure minimizes transaction cost countries with good infrastructure were able to attract more FDI. Political stability and Human capital are also among an important factor determining the inflows of FDI to developing

countries. (Biswas, 2002; Asiedu, 2006; Noorbakhsh, Paloni and Youssef, 2001)

Investment incentives in the form of tax reductions & exemptions, special tax allowances, low interest loans, subsidies and repatriation of capital and transfer of profits found to affect the inflows of FDI.(Woldemeskel, 2008). However the efficacy of these policy variables in determining FDI generated a considerable debate. (Zee, Stotsky and Ley, 2002)

2.2 Tax incentives and FDI

Tax incentives are special tax grant applicable only for selected investment area. Tax incentives have been used by countries to promote investment specially FDI with the belief that it facilitate growth through creating employment and technology transfer. There appears to be two perspectives regarding the effectiveness of fiscal incentive. Supporter of tax incentive base their argument on the capability of tax incentives in increasing investment while the opponents put their argument in terms of distortionary effect created by tax incentives which favours selected project.

2.2.1 Theoretical framework

Theoretical frameworks used to analyse the impacts of tax policy on investments are the OLI (ownership, location and internalization framework, the neo-classical investment model and the new economic geography. Under OLI framework firms must have ownership advantage or firm specific advantage like specific technology, managerial skill, trade mark … etc.; further there must be locational advantage like shipping costs, tariffs, low wages and specific resource which is not available in home; and there must be also internalization advantage to FDI in order to operate profitably abroad. This theory emphasizes also the need to consider tax aspects. The other theory used to explain the relationship between tax policy and investment is the neoclassical investment theory which is a widely used theoretical framework in most literature. The main argument of this theory is that firms accumulate capital as far as the benefit exceeds the costs. Recently new theory called new economic geography is also developed to explain the effects of tax policy on investment. This model challenge the direct or linear relationship between tax policy and investment which is taken for granted. The model also emphasized the self-reinforcing nature of business concentration in the core and the non-linearity of the relationship between tax policy and investment due to capital stickiness in the core. (OECD, 2007)

However this paper is based on the explanation given by neoclassical investment theorists regarding the relationship between tax policy and investment. This theory is preferred on the basis that it incorporates tax parameter in to the investment model explicitly. According to this theory firms base their investment decision on their optimization problem: profit maximization given costs and benefits. Firms invest up to the point net present value of capital equals its costs. The effects of tax policy on investment behaviour enter the investment function through the user cost of capital. Change in tax policy affect investment through its impact on user cost of capital. According to this

theory since tax reductions decrease the user cost of capital /increase the returns to capital, investment assumed to increase. (ibid)

The conventional view that investment enhances growth has directed governments in to making endeavours to make these investment costs less and to encourage the firms to invest more. In addition to creating stable macroeconomic and political environment, sometimes, in a very competitive environment it is expected from the governments of the host countries to introduce some fiscal incentives to attract investment. Investors focus on their final profit margin, so governments in their incentive schemes try to address this through their tax and subsidy policies. Because of its expensiveness subsidy is not a choice for less developed countries with scarce public funds.

However incentives, as a main tool of attracting foreign direct investment, have gained attention only recently. Literatures indicate that multinational corporations have been basing their overseas investment decisions on economic fundamentals of the host country mainly on market size, level of real income, skill level, infrastructure, resources, trade policies, and political and macroeconomic stability. (Blomstrom and Kokko, 2003)

The view that FDI attracted by strong economic fundamental in the host country, the most important being market size and the level of real income, have begun to change as the views on the importance of incentives get more popularity. Incentives broadly take two forms: fiscal incentives and financial incentives. The acceptance of this view is apparent from the increase of investment incentives across the world. There are substantial theoretical arguments in favour of public support to FDI through fiscal incentives like tax holidays and lower taxes, and financial incentives such as preferential loans, infrastructure and monopoly rights. The main reason, for the prominence of incentives as a way to attract FDI, is globalization which had made it easy for multinational corporations to sell their output to international customers and increased regional integrations that has reduced the focus on market size as the major determinant of FDI flows. As a result of this change of dynamics, incentives became the main competition tools for attracting FDI. (ibid)

Of the two types of incentives mentioned earlier, developing countries tend to base their incentive schemes on tax holidays and other fiscal measures that do not require direct payments as public funds are scarce.(Cleeve, 2008)

2.2.2 Empirical evidence

Empirical literatures on the effectiveness of fiscal incentives in determining foreign direct investment are mixed. Earlier studies have pointed out that incentive as a determinant of FDI flows was very insignificant. The dynamics of FDI seem to be related more with economic fundamentals by then. Many other studies also tried to see how effective incentive schemes were by comparing the costs and benefits.

Among the studies that found insignificant impact of incentives are a broad cross country analysis in ECCU member countries by Chai and Goyal (2008). The study used primary surveys that involved the investors themselves that have already received some sort of incentive packages. They have found that the benefit of tax concessions in terms of attracting FDI is very limited compared to its cost in terms of foregone revenue, by using cross country

analysis. The study used firm level investor survey and regression analysis, both methods showed that lower statutory tax rates, the absence of FDI restrictions, and better institutional and infrastructural quality are the most important factors that affect FDI rather than tax incentives. And they finally recommend the need for re-evaluation of the strategy using tax incentives as to promote FDI by many developing countries. However, their study may have suffered from bias because of the difference among the cross sections. Given the differences in economic fundamentals among countries it is apparent that their responsiveness to incentives will also be different. In addition, the impact of incentives on different sectors could also be different.

A joint study by justice network Africa and Action Aid international on tax competition in east Africa has indicated Kenya, Uganda, Tanzania and Rwanda are losing up to USD 2.8 billion a year because of the tax incentives they offer to FDI companies. Hence, they suggest these kinds of incentives should stop because they are costly and inefficient. In addition, their analysis showed the incentives have not been helpful in attracting the FDI either; Uganda was able to attract higher level of FDI in the region though Kenya has been more generous in the incentive schemes. This study, however, used simple descriptive analysis that it is difficult to separate the impact of incentives from other factors when it comes to attracting FDI. Similarly, there are arguments forwarded against tax incentives, as a means of attracting FDI, in IMF reports stating these incentives have many related costs like loss of current and future revenue, creating distortion between activities subsidised and those that are not, require large administrative costs that outweigh the benefit. Rather than tax incentives, other factors like good quality of infrastructure, political stability, predictable macroeconomic policy, and low administrative costs of setting up play an important role in attracting FDI. (Tax Justice Network, 2005).

A study by Wells and Allen (2001) presents another case against incentives, consistent result with the above findings. The study is based on Indonesian experience where tax holiday were offered for foreign investors and then dropped. In this paper it is found that foreign investment continued to grow even after the tax holiday is dropped proving the negligible role of tax incentives in attracting foreign direct investment. This could be a strong case against incentive schemes as it has showed an actual natural experiment outcome.

A study by Tuomi (2009) that focused on middle income country, particularly on South Africa, looked at the topic from microeconomic perspectives by using firm level data. He found that investment climate is more important than incentives. According to this study, incentives play a negligible role in attracting foreign firms and countries economic, social and institutional fundamentals are more important. The study also argues there are cases in which incentives may play a positive role. This could be related to Forsyth's (1972) argument that once the decision to set up in a broad area is made inducements and incentives may affect the decision regarding the more precise location as referred in Morisset and Pirnia (2000).

On the other hand, most of the studies conducted in the past decade have shown positive impact of incentives on FDI inflow. Supporters of tax incentives argue that fiscal incentives are needed to increase investment which in turn generates economic and social benefit through its spill over effect on local firms, nurturing domestic production and building local capabilities. It is

also believed, Productivity of local firms also increases as a result of forward and backward leakage with foreign firms. (Madiès and Dethier, 2010) Some of the researchers tried to identify which type of incentives work best instead of generalizing. Emmanuel Cleeve (2008) in his study on the effectiveness of fiscal incentives to attract FDI in 16 Sub-Sahara African countries, for the period 1990-2000 using pooled data, found that among fiscal incentives tax holidays were the most effective and while the other concessions seem to cause an adverse effect specially in countries that offered too many concessions. According to this study all fiscal incentives may not benefit the economy through attracting FDI, because some fiscal incentives may result in economic distortions. The study recommended that countries should be selective in their fiscal incentives.

Blomstrom and Kokko (2003) also argue that under a certain condition tax incentives increase investment; create job opportunity and leads to overall growth. According to them incentives should be given for foreign firms that are engaged in activities that have strong potential for spill over, activities that create linkage between local and foreign firms, education, training and R & D. They are also of the view that it is necessary to build the absorbing capacity of the local firms at the same time. It is under these conditions that tax incentives will have a significant impact on increasing investment.

Mudambi (1995), unlike the other studies in the 1990s, in his study found that corporate tax rate has a significant effect in attracting foreign direct investment suggesting low tax rate have a persistent effect on MNE location decision. His finding also shows that labour cost is an important determinant of MNE investment, which is in line with the other studies that identified resource and other economic fundamentals as the main factors attracting FDI. On the other hand infrastructural factor found ineffective in MNE investment decision.

A study by Simmons even though it did not directly address the impact of incentives, it has tried to capture the general sensitiveness of FDI to corporate tax system measured by an index. The study constructed an index based on the evaluation obtained from investors and tax expert on different attributes of tax system of selected countries and prior research. The result showed a significant positive relationship between corporate tax attractiveness indices and inflows of FDI supporting the idea that host countries tax system is an important determinant of FDI. (Simmons, 2003)

Another strong support comes from Margalioth (2003) who argued that tax incentives are good and appropriate policies to attract FDI to developing countries. He justified the effectiveness of incentives by addressing the main arguments forwarded by the opponents of tax incentives. These arguments are: incentives distort behaviour, they are harmful and ineffective and incentive may also divert focus from other important determinants of FDI. But according to Margalioth as far as incentives attract FDI that would not come otherwise, it is not inefficient even if it create distortion. His arguments have the notion that the effectiveness of the incentive schemes should only be evaluated against its primary goal of attracting FDI. Furthermore, tax incentives become ineffective only if it is given to FDI that would have come even without the incentives. So it is not the incentives that are ineffective rather it is the administration and the implementation of the incentives that are no effec-

tive. In addition he argues that incentives are not given as compensation to other determinants of FDI rather it is an addition to the other policy efforts.

Tung and Cho (2000) also provided evidence on the effectiveness of tax incentives in attracting FDI in China. According to them the increased flows of FDI to the country were attributed to the incentives and concessionary taxes offered, controlling other factors. Before 1991 concessions and tax incentives were given to joint venture only and the values of this form of FDI were increased faster than other forms of FDI. After 1991 when incentives introduced to all forms of FDI, all forms had similar patterns of growth. In general this study supports the notion that tax incentives are effective in attracting foreign direct investment.

On the other hand, Tanzi and Shome cited in Zee (2002) witnessed a mixed result, Countries' experience showed a success and failure story of using tax incentives as a means to attract foreign direct investment. In East Asian countries (Taiwan, Korea and Singapore) tax incentives were found successful. In these countries tax incentives encouraged rapid industrialization through attracting FDI. In addition there also countries cited such as Ireland and Mauritius where tax incentives are effective. In contrast in Malaysia, Indonesia, Thailand and Philippines tax incentives appeared ineffective in achieving its goal. This finding strongly supports that view that the effectiveness of the incentives depends on the economic fundamentals and specific situations of every country.

The arguments presented so far have ignored the fact that companies (investors) may not respond the same way to incentives. Morisset and Pirnia (2000) presented a rather balanced view after a thorough review of literatures; it could not be said incentives failed in general, they do affect the decisions of some investors some of the time. They also pointed out that it is reasonable to believe that impact of tax incentives differs greatly depending on the characteristics of the multinational company. It is noted that the impact of tax rates on investment decisions tend to be higher on export oriented companies than on those that look for domestic market or location specific advantages. Export oriented industries are more sensitive to taxes because they operate in a highly competitive environment with very small profit margins, moreover, those firms are highly mobile and they are likely to compare taxes across different locations that it can be an important part of their cost structure. In a similar way the responsiveness of the companies may also differ based on the nature of the incentive scheme, whether the companies are new or existing and the size of the company. According to Rolfe et.al (1993) and Coyne (1994) as referred by Morisset and Pirnia, new companies prefer incentives that reduce their initial expenses while expanding companies prefer incentives that target profit; regarding size it is suggested that small companies are more responsive to tax incentives than the large ones. (Morisset and Pirnia, 2000) These arguments make sense as they do not suggest uniform aggregate treatment of FDI, studies should rather treat the investors in terms of their market orientation, size and time in business.

Another related argument forwarded by Cleeve is that the sources of FDI may also determine the effectiveness of fiscal incentives. If the investments are from USA, UK…etc. incentives will have a little effect on their location decision because these countries provide foreign tax credit. (Emmanuel Cleeve, 2008). Furthermore the impact of tax incentives on FDI may also dif-

fer among regions. Klemm and Parys, among other questions tried to answer how effective incentives were in attracting investment by employing panel data analysis technique on Latin America and the Caribbean and African countries. Their result showed that lower tax rates and longer tax holidays were effective in attracting FDI in Latin America and the Caribbean but not in Africa. (Klemm and Parys, 2012) However, the study still did not address heterogeneity of countries, in terms of the incentives they give and their economic fundamentals, as it was conducted in aggregate (regional) level.

It has also been argued that incentives are needed to remain in competition for FDI among regions. This is supportive of the view that, once the basic factors like market size, resource, political stability and others are fulfilled tax incentives could be the only factors that make difference between countries. There is also a case in which high technology industries found sensitive to tax incentive policies in Philippines. (Chalk, 2001)

In general from this wide range of debate in literatures it is clear that the effectiveness of fiscal incentives in attracting FDI still remain inconclusive. Roughly speaking the literatures in the past decade seem to agree on the positive impact, though some of them showed exceptions in terms of geographical areas and countries. In the earlier times, incentives were only important after factors like resource availability, market size, and macroeconomic and political stability. Most of the researches done until around 1990 have the same spirit; impact of tax incentives on FDI were negligible if any. However, studies since the 1990s were encouraging to policy makers, as some positive results were observed. Moreover, the increased globalization and regionalization of the international economy and scarcity of public funds in developing countries case have left with limited policy choices that they turned to tax incentives.

Another factor adding to the debate in the area is the fact that policy makers and investors have different views on the effectiveness of incentives. Surveys done by different researchers confirmed this. Survey studies by Barlow and Wender in 1955 have revealed that only 10% of the surveyed companies mentioned foreign tax policies as important factor in their decisions. In a similar way, a study by Robinson in 1961 and Aharoni in 1966 have shown that companies regard tax incentives as a weak stimulant or never consider it. On the other hand, the surveys uncovered that government officials think tax exemption is a very powerful determinant of FDI inflows. (Cited in Morisset and Pirnia, 2000)

Even though the debate is still there, those studies came up with different important conclusions. It is noted that economic fundamentals and stability still play a major role in attracting FDI; companies respond differently based on their size, years of operation, their market orientation, the type of resource they use and regional differences; the globalization of the world economy has limited the ability of governments to use exchange rate and other trade policy instruments; and some type of incentives are more effective than others. Methodologically, most of the studies employed a cross sectional analysis, time series analysis for specific countries and surveys on investors and government officials. However, none of them analysed the impact of tax incentives on different sectors; this study is believed to fill this gap by taking sectors as cross sectional units and applying panel data analysis technique, and focusing on one country, Ethiopia.

Chapter 3
Overviews of Foreign Direct Investment and Tax Incentives in Ethiopia

This chapter provides the trends in FDI flows to Ethiopia including its sectoral and regional distribution; overview fiscal incentives provided by Ethiopian government to attract FDI; and finally discuss the costs and benefits associated to tax incentives.

3.1 Foreign Direct investment in Ethiopia

In the Pre 1974, emperor Hailesilase, period a liberal policy was followed to encourage the establishment of private industries and import substitution strategy was promoted. The liberal policies were able to attract few investments though the amount is not significant. (Melese and Waldkirch, 2011)

From 1974- 1991, when Derg came to power the liberal policy of imperial era was replaced by command system of economic management that discouraged market economy and private property. During this time land, private large and medium scale enterprises were nationalized. Average GDP growth in period was about 2% and average per capita GDP was negative. The environment was not encouraging for private investment in general and FDI in particular. Political instability, insecurity, and the nationalization of major industries made the environment unattractive for private investment. As a result there were no foreign direct investment inflows during that time. (Astatike and Assefa, 2005)

In post 1991 Ethiopian Peoples' Revolutionary Democratic Front (EPRDF) thrown the Derg regime and has governed Ethiopia ever since. EPRDF replaced the command system to free market system and undertaken many macroeconomic reforms. The government implemented a series of reform measures like deregulation, privatization, liberalization of foreign exchange market, elimination of export tax except for coffee, lowering of maximum import duties from 230% to 60% and Provision of adequate incentives in order to increase private sector participation in the economy which is believed to have an important role in the development process of the national economy. (Astatike and Assefa, 2005). The government has also adopted agriculture-led industrialization program, rural development policy and strategy, industrial development strategy and other sectoral policies and strategies, with a focus on productivity growth on small farms and labour-intensive industrialization with the view that agriculture centred development will bring about a fast economic growth. Economic growth during this period (1992-2012) has improved with an average rate of 8.9%. GDP per capita has also grown by 3% per annum and the rate of inflation declined from 21% in 1992 to less than 7% in per annum.

In recognition of the role of private sector in the economy, the government has revised the in-vestment code five times in the last twenty one year (1992-2013) to make the investment climate attractive. As a result of the implementation of the above mentioned reforms, policies and strategy, agricultural and industrial production, investment and export trade has improved.

Due to the investment friendly environment created through the introduction of investment guarantee schemes and incentives, the inflow of foreign direct investment has been increasing over the last twenty one years but it is still small relative to other African countries. Out of the total investment project licensed between 1992-2012 FDI's shares is about 15.8%. China, India, Sudan, Germany, Italy, Turkey, Saudi Arabia, Yemen, the United Kingdom, Israel, Canada and United States are the major sources of FDI.

The main business sectors which are open and in which the country is currently seeking foreign investment is: Manufacturing industries (including food, beverages, chemicals and pharmaceuticals, plastics, metallic and non-metallic products, paper products, leather and leather products, textiles and garments); Agriculture, including agribusiness and processing for exports; Real-estate development; Education and health services; Grade 1 construction contract; Mining and quarrying of gold, marble and granite; and Engineering and management consultancy.

Since 1996, with the objective of promoting private investment and the inflow of foreign investment, a series of investment proclamations have been issued. The investment legislation has also attempted to provide a favourable investment climate by offering fiscal incentives and investment guarantees to foreign and domestic investors engaged in new enterprise development and expansion. As a result these incentives helped to raise the share of inward FDI in total investment form 5.8% in 1992 to 57% in 2012. According to Ethiopian Investment Agency (EIA) during the year 2012 a total of 687 FDI projects has been processed, of which 77 projects have become operational while another 5 projects are under implementation and the rest 605 are approved but under the stage pre-implementation. Despite the improvements in the flow FDI to Ethiopia since 1992 in absolute term, FDI as a percentage of GDP remained low.

Figure 1 Trends of Foreign direct investment as a percentage of total investment (%)
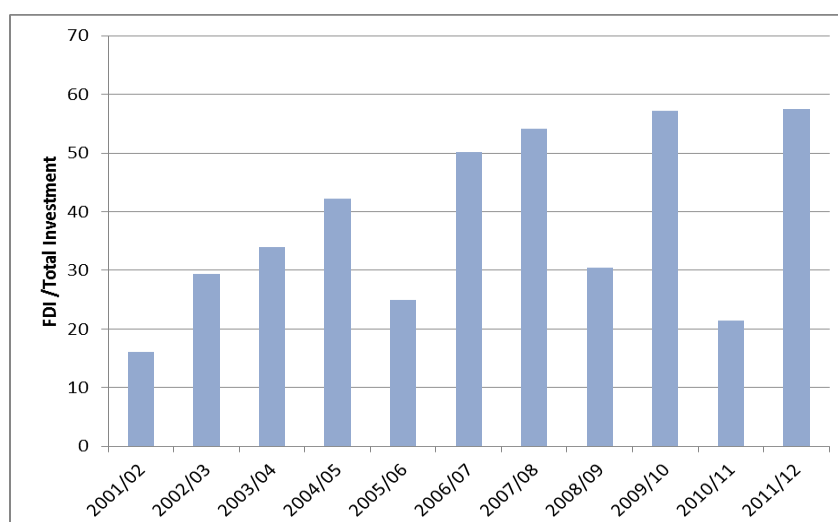
Source: Own computation using data from Ethiopian Investment Agency

3.1.1 Sectoral distribution of FDI

When we look at the distribution of FDI among three main economic sectors: agriculture, manufacturing and service sector, where agriculture includes all agriculture related activities and mining, manufacturing includes all types of

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industries and service sector includes all kinds of services provided, manufacturing sector accounted for about almost half (49%) of total FDI inflows to Ethiopia from 1992 to 2012. The sectors, agriculture and service accounted for about 28% and 24% respectively. According to the data provided by Ethiopia investment agency (EIA) cash crop farming accounted for half of the investment goes to agriculture sector. Industries like food, beverage and textile accounted about 58% of manufacturing investment while real estate, construction, hotel and health service accounted for the high share of FDI to the service sector. Most of the industries flows to the country used a labor intensive technology. This indicates that the industries are more resource and market seeking than efficiency and would have come in the absence of incentives.

Figure 2 Distribution of FDI flows to Ethiopia by Sector (from 1992-2012)
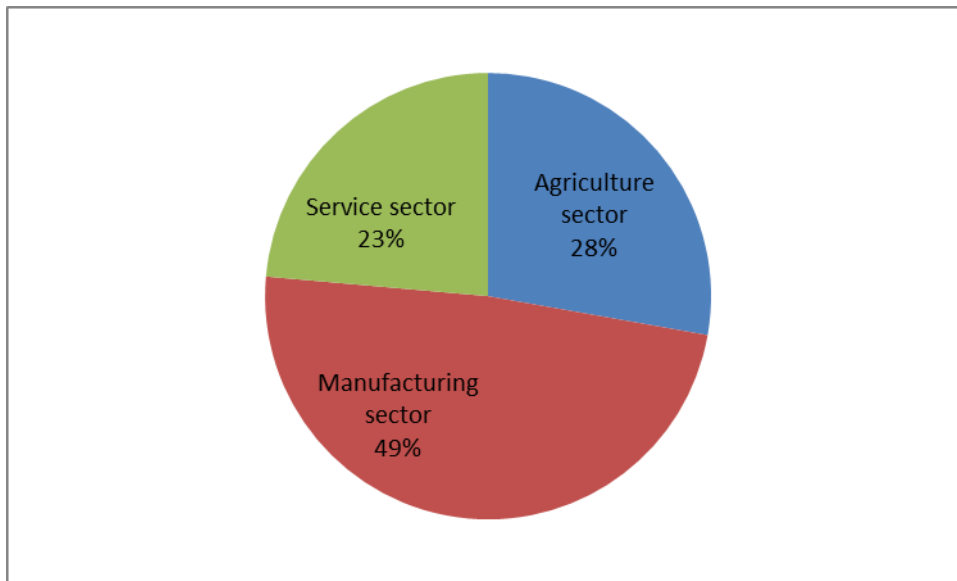
Source: Own computation using data from Ethiopian Investment Agency

3.1.2 Regional Distribution of FDI

The regional distribution of FDI inflows have been quit uneven. Most of the share of FDI flows is taken by the Oromia region followed by the capital city, Addis Ababa. Out of the total flows of FDI to the country Oromia region take 37%, Addis Ababa 24% and Amhara 14%. Other regions like Afar, Tigray, Benshangul Gumuze and Gambela were able to attract very few and insignificant amount where as Harari and Somali attracted no FDI at all. From the distribution it can be seen that despite numerous incentives (fiscal and nonfiscal) have been offered to attract FDI to less developed regions, their performance remained very poor. The justification for this might be the low infrastructure development, less political stability and lack of market due to transportation problems in these regions. On the other hand Oromia region and Addis Ababa able to attract a significant amount of FDI due to improved infrastructure and availability of market. From this we can say that where other determinants of FDI like Market, infrastructure and political stability in place are not sufficient, provision of fiscal incentives cannot promote investment to these regions.

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Figure 3 Distribution of FDI Flows by Region (1992-2012)
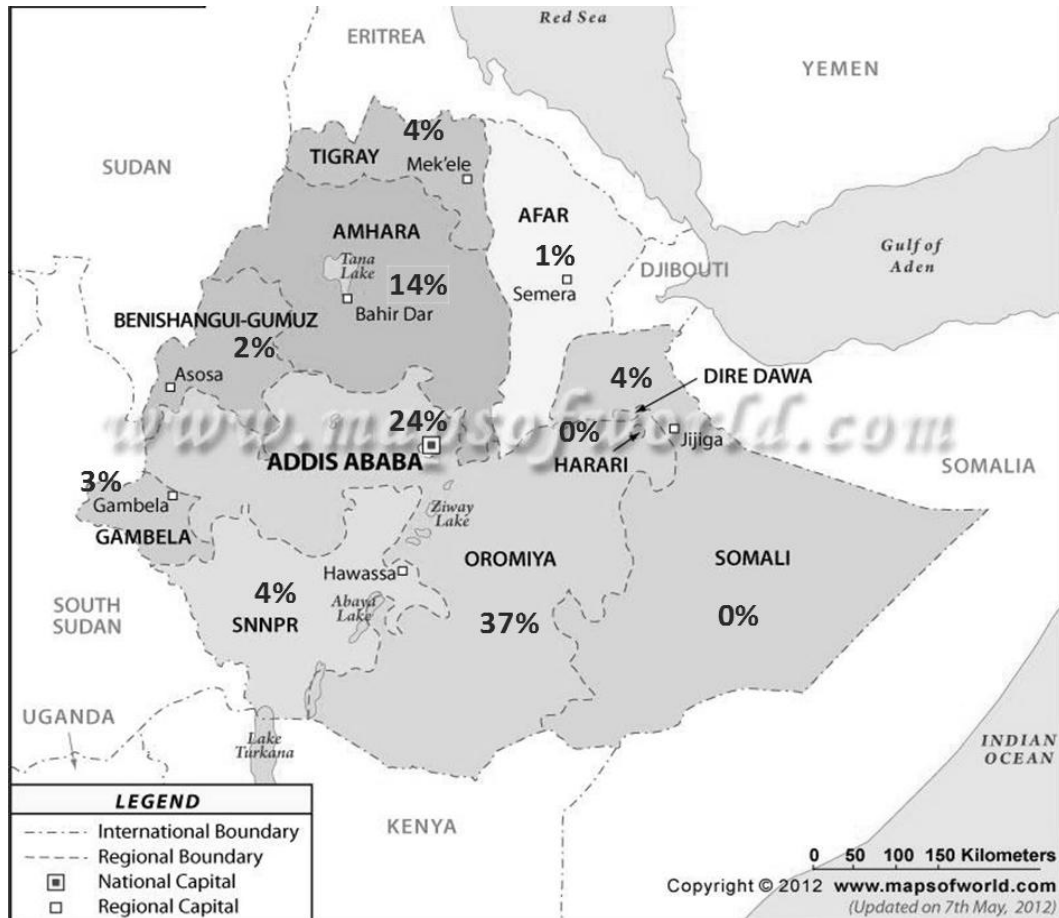
Data Source: Ethiopian Investment Agency

3.1.3 FDI Flows by Country of Origin

The major sources of FDI inflows to Ethiopia are India, Turkey, China, Saudi Arabia and USA. These countries accounted for more than half of the FDI flows to the country. Germany, Sudan, and Britain are the second major sources of FDI flows to Ethiopia. Most of the FDI sources are developing countries like china, India and Saudi Arabia. This may indicate that most of the FDI flows to Ethiopia are resource and market seeking. Despite Ethiopian government offered many incentives FDI flows from developed country is very low. This raises a question of attractiveness of Ethiopian investment environment to efficiency seeking industries which has believed to have a significant role in promoting growth through its spillover effect.

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Figure 4 FDI flows by country of origin from 1992-201(%)
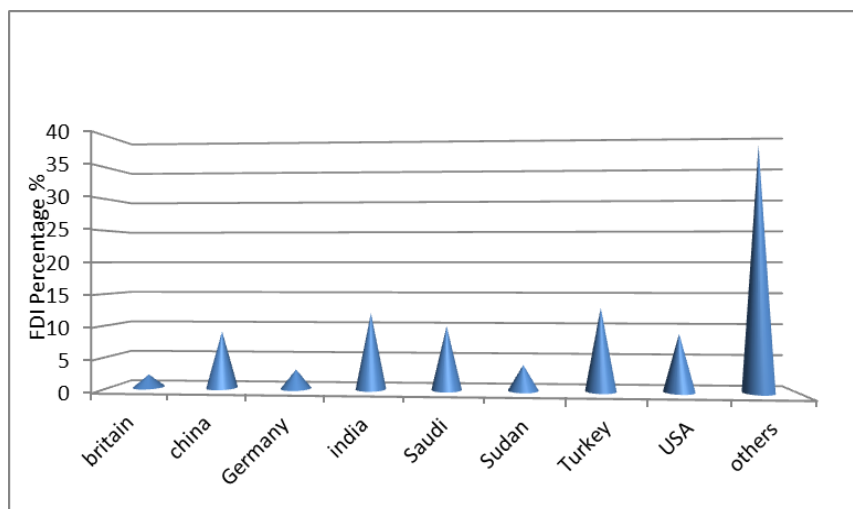
Source: Own computation using data from Ethiopian Investment Agency

3.2 Overview of Tax incentives in Ethiopia

Ethiopia has implemented Economic Reform Program (ERP) and has been modernizing tax and custom administration by overhauling the legislations and improving administration since 1992/93 with the aim of encouraging trade, investment and hence development. Given the important role of FDI in the development process of developing countries, Ethiopian tax policy is geared towards promoting investment, supporting industrial development and broadening the tax base and decreasing the tax rate in the view of financing the need of government expenditure. With the view of creating investment friendly environment and attract foreign direct investment, Ethiopian government have been providing a wide range of fiscal incentives. (Ethiopian Customs and Revenue Authority, 2011)

Transitional Government of Ethiopia (TGE) issued the first investment code (Proclamation No. 15/1992) on May, 25 1992 with the aim of encouraging private investment under this code areas eligible for investment incentives were limited to manufacturing and Agriculture sectors. The incentives provided were 100% exemption from custom duty on importation of capital goods and income tax exemption (tax holiday) ranging from 1-8 years depending on type and location of the investment. This proclamation had been in force for four years and replaced by Proclamation No. 37/1996 in June 1996.The revised Investment Code of 1996 extended areas eligible to incentives to Education, health, tourism and construction sectors. Capital entry requirements for joint ventures reduced from US$500,000 to US$300,000 and for technical consultancy services reduced to US$100,000. This code was opened the real estate sector and Electricity and water supply to foreign investors, extended the losses carried forward provision, and cut the capital gains tax from 40% to 10%.

Furthermore Proclamation No. 37/1996 improved and replaced by proclamation No.116/1998 in June 1998. The major changes introduced in this proclamation were Defense and telecommunication sectors allowed to private sectors to invest jointly with government which was reserved for government only in the earlier codes. The investment code was also amended in July 2002 (Proclamation No. 280/2002) and in September 2012 (Proclamation No. 769/2012) and further liberalized the investment regime and removed most of the remaining restrictions. In general all areas of investments are open for foreign investors except Banking, insurance and microcredit and saving services; forwarding and shipping agency services; broadcasting services; and air transport services using aircraft with a seating capacity of up to 20 passengers which are reserved for government, domestic investors and Ethiopian nationals.

Investment incentives provided in the investment codes are free repatriation of capitals; Duty free importation of goods and vehicles related to the investment; Tax holidays up to eight years; Opening and operating foreign currency accounts; owning immovable property for the purpose of the investment, Loss carry forward, duty drawback scheme and voucher scheme. Among the fiscal incentives given the most popularly used are custom duty exemption and income tax exemption (tax holiday).

3.2.1 Tax holiday (exemption from income tax)

Any investors who invest to establish a new enterprise in manufacturing, agro-processing, production of agricultural products and information and communication technology development are entitled to income tax exemptions. Any income tax derived from approved new investment shall be exempted for periods of 1 to 8 years, depending upon the priority area of investment activities and the geographical location of the investment. Conditions for income tax exemption eligibility are:-

➢ If at least 50% of its production is to be exported; Profit Tax Exemption Years is 5 Years, if the Investment is made in relatively under-developed regions, the exemption period is 6 years.

➢ If at least 75% of its production will be an input for the production of export items; Profit Tax Exemption Years is 5 Years, if the Investment is made in relatively under-developed regions, the exemption period is 6 years.

➢ If the project is evaluated under a special circumstance by the BOI; Profit Tax Exemption Years is no longer than 7 Profit Tax Exemption Years. If the Investment is made in relatively under-developed regions the exemption is No longer than 8 years. However, the granting of income tax exemption for a period longer than 7 years requires the decision of the Council of Ministers.

➢ If less than 50% of the production is to be exported; Profit Tax Exemption Years is 2 Years, if the Investment is made in relatively under-developed regions the exemption shall be 3 years.

> ➢ If the production is for the local market; Profit Tax Exemption Years is 2 Years, if the Investment is made in relatively under-developed regions it will be 3 years.

In addition investors that establish new enterprise in the regions of Gambella, Benshangul, Afar, Somali, Guji and Borena and South Omo Zone are entitled to an income tax deduction of 30% for three consecutive years after the expiry of income tax exemption.

For expansion or upgrading of enterprises that increases the existing production by 25% in value and 50% of the production is to be exported; the Profit Tax Exemption granted is 2 years. Notwithstanding the information given above, directives issued by the Board may prohibit exemption from income tax with respect to an investor who supplies his products only to the domestic market. Moreover, an investor who exports hides and skins after processing up to crust level is not entitled for income tax holiday. The period of exemption of profit tax begins from the date of commencement of production or provision of services, as the case may be.

3.2.2 Custom Duty exemption

To encourage private investment and to promote the inflows of foreign capital the government of Ethiopia provide an incentive of custom duty exemption for investors engaged in eligible new enterprise or expansion project. The eligible sectors are Agriculture, manufacturing, construction, education, health, electricity and water supply and hotel and tourism. These incentives include:-

- 100% exemption from the payments of custom duties and other taxes levied on imports granted to all capital goods, such as plant, machinery and equipment and construction material.

- Spare parts worth up to 15% of the total value of the imported investment capital good, provided that the goods are also exempt from the payments of custom duties.

- An investor granted a custom duty exemption will be allowed to import spare parts duty free within five years from the date of commissioning of a project.

- With the exception of few products (e.g. semi-processed hide and skins-150%) no export tax is levied on export products of Ethiopia.

- Any investors who export or supplies to an exporter as a production or service input, at least 60% of his product or service shall be entitled to income tax exemption for 2 years in addition to the exemption period provided.

- Duty paid at the port of entry or locally, on raw materials used in the production of commodities is refunded, 100%, upon exportation of the commodity processed.

In addition three duty incentive schemes are available for exporters. They are Duty Draw-Back Scheme, Voucher Scheme and Bonded Warehouse

Scheme. Taxes and duties paid on raw materials are drawn back at the time of export of finished products. The duty draw back scheme applies to all taxes at the time of importation, and those paid on local purchases.

3.2.3 Others

In addition to the above stated the most popular incentives the following incentives are also given to investors in order to promote private investment.

- Business enterprises encountering losses during the tax holiday period can carry forward such losses following the expiry of the exemption period for 3 to 5 years

- Free repatriation of profits and dividends

- Expenditures for training and research are tax deductible.

Table 1 Principal Taxes currently in effect in Ethiopia

No.	Types of Taxes	Rate
1	Corporate income Tax	30%
2	Turn over Tax	2% and 10%
3	Excise Tax	10% up to 100%
4	Custom Duties	0% up to 35%
5	Income Tax from Employment	0% up to 35%
6	Withholding Tax	2%
7	Value added Tax (VAT)	15%
8	Export Tax	0 (with exception of hide and skins-150%)
9	Royalty Tax	5%
10	Dividend Tax	10%

Source: Ethiopian Customs and Revenues Authority (2011)

3.3 Costs and Benefits of Tax incentives

The policy rationale for tax incentives are aimed at creating conducive environment for both domestic and foreign private investor with the objective of enhancing economic growth. It is believed that since tax incentives increase the returns to capital investors will be encouraged to invest in the area where the returns are very high. However providing duties and incentives have related costs that need to be considered. In their study Zee, Stotsky, and Ley (2002) identified four types of costs related to granting tax incentives for investors and business community. These are: - i) Distortions between investments granted incentive and those without incentives. ii) Forgone revenue. iii) Administrative resources required. iv) The social cost of corruption/rent seeking activities. However it is difficult to quantify these costs. But there are some data's collected by Ethiopian Customs and Revenues Authority on revenue costs of duties and tax exemptions for the year 2005-2009. These data helps in estimating forgone revenue due to incentives given.

According to data collected by customs and revenue authority revenue forgone from duties and tax exemptions are on average 51% of total revenue and 5% of GDP per annum. The duties and taxes exempted had shown an annual average growth rate of 49.22% which is an evidence for the increase in incentives. Furthermore since incentive scheme involves imposing multiple tax rates on different sectors and firms it requires many resources to manage and administer it. It may also discourage investment by creating distortion between sectors granted incentives and those not offered incentives. In addition incentives create an opportunity for rent seeking activities.

On the other hand granting tax incentives have also benefits like increasing inflows of FDI, creating employment opportunities and creating technological spill-over effect to domestic firms. Following the structural reforms undertaken which include the provision of tax incentives, FDI flows to Ethiopia have been increasing in absolute term though performing low relative to other African countries. Flows of FDI increased form 5.8 percent in 1992 to 57 percent in 2012. However the spillover effects of FDI such as technology transfer and know how is very limited in developing countries like Ethiopia; because most of the FDI flows to this country are industries like textile, food, beverage and cash crop farming which used labor intensive technology. Even if the spillover effects are limited in these types of industries it still benefits the country in creating employment opportunity for both skilled and unskilled labor. Even if it is difficult to undertake costs-benefits analysis due to the unquantifiable nature both costs and benefits tax incentives need to be considered and carefully analyzed.

In general since 1992 following the reforms private investment in general and FDI in particular has shown a considerable increase. Total investment increased from US$221 million in 1992 to US$8.1 billion in 2012. Foreign direct investment flows into Ethiopia have also gradually increased in the last 20 years. According to Ethiopian investment agency data, the annual inflow of FDI increased from US$12.9 million in 1992 to US$4.7 billion in 2012. Manufacturing of textile and leather; floriculture and horticulture are the sectors that have attracted the most FDI. Fiscal incentive has been widely used by Ethiopian government to increase the flows of FDI to the country. Tax holiday ranges between 1 to 8 years has been given, depending upon the priority area of investment activities and the geographical location of the investment. Custom duty exemption has been also granted to investors engaged in eligible new enterprise or expansion project. On the other hand granting tax incentives have related costs and benefits that need to be taken into account. Costs related to tax incentives are revenue forgone, additional administration cost required and distortions created among industries. The benefits related to offering tax incentives are increased FDI flows which create employment opportunity and technological spillover. The next chapter provides empirical evidence on the effectiveness of tax incentives in attracting FDI to Ethiopia.

Chapter 4 Discussion and Analysis

4.1 Model, Data and Description of Variables

The study utilizes panel data analysis technique, involving multiple regressions, to determine the effects of tax incentives (Tax holiday and custom duty exemption) on foreign direct investment and to identify whether it has a different effect across sectors. As reviewed in the earlier section, the specification of the model is based on neo-classical investment theory that predicts increase in flows of FDI following a provision of tax incentive which decrease the tax burden. This theory put investment as a function of after tax marginal rate of return on capital; taxation affects FDI through rates of return to capital. Depending on the theoretical framework and the earlier work of Cleeve (2008) and Fowowe (2013) the model is written as:

$$FDI_{it} = A_i + \alpha INCENTIVE_{it} + \beta X_{it} + \varepsilon_{it}$$

That specifies FDI as a function of the priority variable (incentives) and other control variables (X). The model is modified to take special features of the country and theories in to account. FDI_{it} is the dependent variable measuring the inflow of FDI to sector i at time t. which is defined as the birr (local currency) values of FDI inflows in thousands. Most researches have focused on the effects of tax incentives on aggregate FDI. However this study provides a departure by taking sectoral distributions of FDI rather than the aggregate one. $INCENTIVE_{it}$ is the focus explanatory variable, tax incentives, proxied by tax holiday and exemptions from custom duty which are the most popular incentives used in Ethiopia. Given the difficulty of measuring tax incentives, this study uses dummy variable to show the presence and absence of tax incentives in sectors under consideration. It is assumed that both tax holiday and custom duty exemption take a value of 1 if the incentives are offered and zero otherwise. Vector X_{it} represent other variables which affect the inflows of FDI. These control variables are Market size, Openness of the economy and political instability. Though many variables have been proposed by literatures as determinants of FDI it is not possible to include all of them. Due to this fact we chose few of them depending on previous studies specific to a country, the strength of the variable and availability of data. Market size is proxied by GDP which is expected to have a positive relationship with FDI. Openness of the economy measures how open the economy is and integrated to the global economy. It is captured by the ratio of import plus export to GDP. Higher ratio represents more openness. It is also expected to have a positive relationship with FDI. That means the higher the ratio the more open the economy and the higher the inflows of FDI. Political instability is a dimension of governance which measures country risk with the expectation that it might have negative impact on inflows of FDI. Average index of political freedom and civil liberty is used to proxy this variable. Data for these indices are drawn from freedom house database. These indices take a value ranges between 1 and 7, with 1 representing good political environment and 7, weak political environment. ε_{it} is an error term and A_i is an intercept of each sector.

This study utilizes data over the period 1992 to 2012, for ten selected sectors based on data availability. These sectors are Agriculture, Manufacturing, Mining, Education, Health, Hotel and Tourism, transport and communication, construction, Electricity and water supply and real estate. The sectoral distribution was important in this study on the ground that effects of tax incentives on FDI may differ across sectors. The study also tried to be as comprehensive as possible by using different data sources. Data on FDI inflows by sector are collected from Ethiopian investment agency, investment incentives and tax law from Ethiopian Revenue Authority and other macro-economic data from central bank of Ethiopia.

Panel data analysis technique is used to estimate the above model. The 10 Sectors are used as a cross-sectional unit over 20 years of time series. Both heteroskedasticity and autoregressive errors are taken into account. GLS method is applied to estimate the model which has a total of 200 observations.

4.2 Discussion of Empirical Findings

As mentioned earlier this study utilizes panel data analysis technique taking sectors as a cross-sectional unit and the data covers the period from 1992 to 2012. Random effect econometric approach is chosen over fixed effect approach to analyse the data. The main reason to choose this approach was that it takes both within and between subject variations which helps us in making a formal inference. In addition using this approach allows us to include relevant explanatory variables that do not change over time and others that do change over time but have the same value for all cross-sectional units. Variables, Openness of the economy and political instability are the same for all sectors while incentive variables are a slow changing variable overtime. Fixed effect will not allow us to incorporate those types of variables because it rules out these time and entity invariant variables as specific characteristics of the sectors. Besides, since the aim of this paper is to examine whether our explanatory variable, tax incentive, has different impacts on FDI across sectors, random effect approach will give us a better inference. This approach is based on an assumption that time invariant part of the entity's error term is not correlated with predictor variables. If this assumption does not hold it leads to biased estimate. But given the little data we have and the nature of the explanatory variables, which is invariant across entity, random effect estimator is considerably better than the fixed effect estimator. In addition to the reasons mentioned earlier Hausman test is undertaken to identify the right model between fixed effect and random effects models. The test result also confirmed the use of random effect model to estimate the impacts of tax incentives, proxied by tax holiday and custom duty exemption, on FDI controlling for market size, political stability and openness of the economy. These facts obliged this paper to use random effect model.

The main objectives of the study are to assess the effects of fiscal incentives on foreign direct investment and to examine whether it has a different effect across sector. The sectors included in the analysis are Agriculture, Manufacturing, Mining, Education, Health, Hotel and Restaurants, transport and communication, construction, Electricity and water supply and real estate. Among these sectors tax holiday is given only for agriculture and manufacturing sectors. It has been given since 1992. On other hand except Mining,

transport and communication and real estate all other sectors are exempted from custom duty on importation of capital goods and exporting their product.

In the descriptive statistics presented below the means and the standard deviation of the variables show a significant variation within and across sectors for variable FDI and GDP. The average FDI inflow is 1,553 birr in millions with highest variation among sectors. The highest record is for manufacturing sector with 7,637 birr in millions while the lowest is for Electricity and water supply with 23 birr in millions. The average market size measured by GDP is 11,231 birr in millions with highest value of 69,190 birr in millions in agricultural sector and lowest 1,230 birr in millions in mining sector.

Table 2 Descriptive Statistics of Variables, 1992-2012

Variable	Obs	Mean	Std. Dev.	Min	Max
lfdi	200	1553.55	5373.798	0	36561.63
lgdp	210	11230.99	32694.45	83.202	331444.1
taxh	200	.2	.4010038	0	1
cde	200	.6	.4911273	0	1
opn	200	.162	.1370031	.02	.53
pols	210	4.952381	.4867813	4	6

To identify the right functional form of the FDI and the independent variables scatterplot was plotted. The scatter plot showed GDP and FDI are linearly related in their log forms. The scatter plot is shown below. For the dummy variables a clear functional form could not be visualized, so all entered to equation in linear form based on theory and literature. However, Some Zero values of our dependent variable caused a problem in transforming FDI data in to logarithmic form. The logarithmic value of the zero's became undefined. To overcome these kinds of problems some studies discard the observations with zero values while other set the log value of the dependent variable to zero. In this paper the second option is preferred to solve the problem. However both approaches have consistency problems which became a limitation to this research paper.

Figure 5 GDP and FDI log relationship
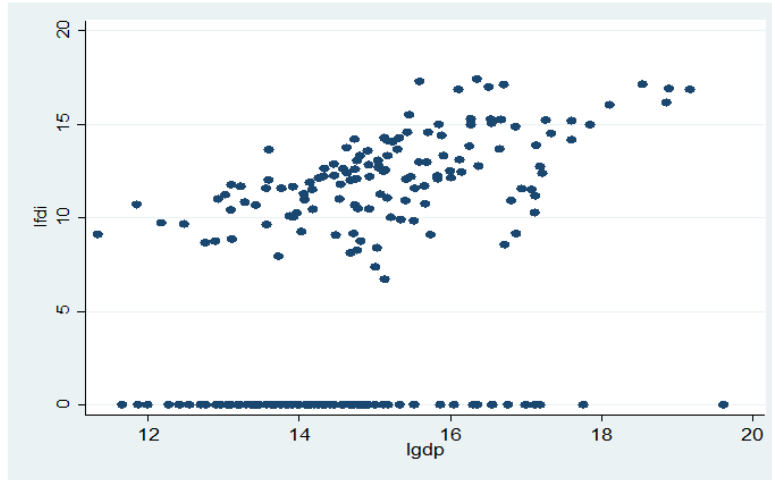
On the other hand due to some zero observations in the data tobit model is also tried as an option. But the result remained almost the same with the random effect model. This might be related to the caution given by Maddala (1992) in using Tobit model. According to Maddala having zeros in some observation is not enough to apply Tobit model rather there should be censoring arisen due to nonobservability of the data. In this case the zero values are not due to censoring but it is due to absence or insignificant amount of FDI flows to that sector in that time.

The data were also tested to detect if there are multicollinearity and hetroskedacity problems. Correlation matrices and variance inflation factors (VIF) were used to detect multicollinearity. All correlation coefficients are below 0.4 and the VIF is also less than 10 confirming that there is no severe collinearity between the explanatory variables. Breusch-Pagan and white tests were used to detect the presence of hetroskedacity error. The results of both tests indicate the existence of hetroskedasticity that we reject the null hypothesis of homoscedasticity. After detection of hetroskedasticity error corrective measures were taken using White's robust standard error.

An ordinary (generalized) least square regression is conducted to estimate twelve separate regression models. The F-statistic of all regressions indicates the significance of the overall model. Table 3 and 4 below presents regression results for model used. In table 3 we have three equations included; which present the general random effect model with and without incentive variables and the fixed effect model.

Table 3 Regressions Results for general model with and without incentives

	lfdi	lfd	lfdi
lgdp	1.437***	0.531	0.242
	(0.283)	(0.339)	(0.324)
pols	-0.389	-0.387	
	(1.146)	(1.167)	
opn	14.036***	18.906***	
	(4.015)	(4.254)	
taxh		4.081***	5.173***
		(1.096)	(1.056)
cde		0.622	-0.498
		(0.769)	(0.767)
Constant	-13.581**	-2.149	3.766
	(6.649)	(7.149)	(4.742)
Observations	200	200	200
Number of year	20	20	20
R-squared	0.33	0.38	0.22

Standard errors in parentheses

* Significant at 10%; ** significant at 5%; *** significant at 1%

In the regression table the first column reports random effect model without incentive variables, the second column reports random effect model with the inclusion of incentive while the third column reports fixed effect model. In the regression result of the first equation without including the focus variable tax incentives, the control variables market size and openness of the economy were found significant in attracting FDI while political instability was found insignificant. The F-test of the model also indicates the overall significance of the model. In the second equation where incentive variables, tax holiday and custom duty exemptions, were included tax holiday was found significant while custom duty exemptions turned out to be insignificant. On the other hand, the control variable market size lost its significance while openness of the economy remained significant. However R^2 of the models indicate that the variation in the dependent variable is more explained in the second model, the model that includes incentive variables, relative to the first model.

Table 4 Regression result that include interaction of both incentives and sector dummy

	lfdi	lfdi	lfdi	lfdi	lfdi	lfdi	lfdi	lfdi	lfdi
lgdp	1.101***	1.101***	0.724*	0.724*	0.755*	0.733*	0.739*	0.967**	0.726*
	(0.397)	(0.397)	(0.401)	(0.401)	(0.401)	(0.400)	(0.383)	(0.414)	(0.400)
taxh	5.307***	0.770	4.373***	0.715					
	(1.168)	(1.650)	(1.643)	(1.962)					
cde	0.617	0.617	1.476	1.476	2.260**	1.138	1.387	-1.933**	1.119
	(0.756)	(0.756)	(1.246)	(1.246)	(0.920)	(0.908)	(0.920)	(0.946)	(0.911)
pols	-0.373	-0.373	-0.349	-0.349	-0.318	-0.362	-0.352	-0.475	-0.363
	(1.160)	(1.160)	(1.168)	(1.168)	(1.150)	(1.163)	(1.162)	(1.201)	(1.163)
Opn	15.58***	15.58***	17.19***	17.19***	16.46***	17.37***	17.16***	18.13***	17.43***
	(4.404)	(4.404)	(4.452)	(4.452)	(4.346)	(4.412)	(4.434)	(4.590)	(4.399)
Taxhagri	-4.536***								
	(1.702)								
taxhmanu		4.536***							
		(1.702)							
cdeagri			-3.658**		-0.324	1.106	0.782	4.207**	1.153
			(1.605)		(1.619)	(1.690)	(1.834)	(1.827)	(1.658)
cdemanu				3.658**	3.406***	4.785***	4.475***	8.430***	4.814***
				(1.605)	(1.266)	(1.274)	(1.334)	(1.350)	(1.268)
cdecons			1.302	1.302		1.648	1.389	4.720***	1.671
			(1.460)	(1.460)		(1.172)	(1.213)	(1.237)	(1.168)
cdeeduc			-0.587	-0.587	-1.380		-0.494	2.929**	-0.218
			(1.459)	(1.459)	(1.175)		(1.179)	(1.218)	(1.167)
cdeheal			-0.172	-0.172	-0.936	0.186		3.569***	0.199
			(1.523)	(1.523)	(1.270)	(1.231)		(1.260)	(1.245)
cdeelec			-5.97***	-5.97***	-6.752***	-5.62***	-5.872***		-5.6***
			(1.472)	(1.472)	(1.198)	(1.176)	(1.165)		(1.183)
cdehote			-0.622	-0.622	-1.420	-0.273	-0.531	2.852**	
			(1.457)	(1.457)	(1.170)	(1.165)	(1.191)	(1.223)	
Constant	-9.908	-9.908	-4.515	-4.515	-4.831	-4.690	-4.732	-8.364	-4.587
	(7.661)	(7.661)	(7.738)	(7.738)	(7.686)	(7.706)	(7.520)	(7.958)	(7.715)
Observations	200	200	200	200	200	200	200	200	200
Number of year	20	20	20	20	20	20	20	20	20

Standard errors in parentheses
* Significant at 10%; ** significant at 5%; *** significant at 1%

The First column of the regression table reports random effect model that includes interaction variable(tax holiday *sector dummy) with manufacturing sector as a base category; second column reports random effect model as does column 1 except that base category is changed to agriculture sector; columns 3-9 presents random effect model including interaction of custom duty exemption and sector dummy by changing base category; manufacturing, Agriculture, construction, education, health, electricity and water supply and hotel and tourism as a base category respectively.

Table 4 presents model which include interaction of incentives and sector dummy in addition to the focus and control variables. The first equation tries to capture the sector specific impact of tax holiday by using interaction terms (tax holiday*sector dummy) taking manufacturing sector as a base category that the coefficient of tax holiday shows the impact of the tax holiday on the manufacturing sector while the interaction term shows the impact of the tax holiday on the agriculture sector relative to the manufacturing sector. The coefficient of tax holiday on the first equation indicated that tax holiday had a significant positive impact on the FDI inflow, at 1% significance level; on average the presence of the incentives has increased the FDI in the manufacturing sector by 530% percentage relative to agriculture sector. The result also indicates that market size and openness of the economy are significant determinants FDI at 1% significance level. But political instability found insignificant. On the other hand the interaction term (tax holiday * sector dummy) indicate that the effects of tax holiday on FDI in agriculture sector is less relative to the base category, manufacturing sector.

In the second equation, where the base category is changed to agriculture sector, both focus explanatory variables, tax holiday and customs duty exemption, were found insignificant while control variables, market size and openness of the economy were found statistically significant. Political instability still remained insignificant. Equation two shows the impact of incentives on the FDI flows to the agriculture sector was not significant. The interaction term on the second regression also confirms the above result that tax holiday affect the manufacturing sector more compared to other sectors. Market size and openness of the economy were statistically significant at 1% significance level.

The regressions results from column 3 to 9 present equations that include interaction of sector dummy and custom duty exemption by changing the base category. The results of the regressions indicate that custom duty exemption is an important determinant of FDI flows to construction and electricity and water supply sectors only. Custom duty exemption granted to construction sector on average increased flows of FDI to the sector by 226% relative to other sectors. In the construction sector custom duty exemption was found significant because the sector is highly dependent on imported materials and equipment from abroad. But custom duty exemption was found to affect the electricity and water supply sector negatively. The possible explanation could be, even if this sector is opened up for foreign investors with incentive of custom duty exemption since 1996 FDI started to flow to this sector only in 2004. There were no FDI flows to this sector from 1996 to 2003 though incentives were in place. On the other hand, the control variables, market size and openness of the economy were found significant in all equations at different significance levels suggesting that they are important determinants of FDI flows to all the sectors and the country.

In general the focus explanatory variable tax holiday was found to have a significant impact in attracting FDI to the manufacturing sector while its impact was insignificant in the agriculture sector. The possible explanation for this might be the high sensitiveness of garments, food and beverage industries, which are all classified under manufacturing, for tax incentives due to their slim profit margins, because these types of industries that take the highest share of manufacturing in Ethiopia operate in a highly competitive market. On the oth-

er hand, FDI in primary sectors focus more on the availability of natural resources and infrastructure than tax incentives. FDI in agriculture are usually resource driven thus it is not affected by tax incentive. Custom duty exemption, have a statistically significant impact on the FDI flows to construction and electric and water supply sectors while it has no significant impact on the other sectors. On the other hand, among the control variables market size (at different percent significance level) and openness of the economy (at 1% level) were found significant in all equations consistently while political instability was found insignificant. This may be due to the fact that most of the FDI flows to the country are resources and market seeking type as classified by Dunning which mainly affected by availability of resources and domestic market rather than political factors.

Chapter 5
Conclusion

Foreign direct investment has been recognized as a facilitator of economic growth for developing countries. As a result Ethiopian government undertaken many structural reforms (privatization, liberalization etc.) and introduced investment incentives (fiscal and non-fiscal incentives) since 1992 to promote FDI. Among the incentive provided tax holiday and custom duty exemptions are the most popular. Following the reforms and the provision of incentives private investment in general and FDI in particular has shown a considerable increase. The annual inflow of FDI increased from US$12.9 million in 1992 to US$4.7 billion in 2012. However Ethiopia is still among the poor performer in attracting FDI relative to other African countries.

This study conducted an empirical analysis on the effectiveness of tax incentives in attracting foreign direct investment and looked at differential impacts of tax incentive across sectors. In the study panel data analysis technique is used by taking sectors as a cross-sectional unit of analysis for the year 1992-2012. This study departs from previous researches by looking at sectoral composition of FDI rather than aggregate FDI. In the study twelve separate regressions models were run. In the first part three regression models were included to analyse the general effects of tax incentive, tax holiday and custom duty exemption and control variables, market size openness of the economy and political instability, on foreign direct investment. In the second part which has nine regression models, interaction of tax incentive and sector dummy are included; each models representing different sector as a base category.

In the general regressions model tax holiday was found to significantly affect the flows of FDI while custom duty exemption was found insignificant. Among the control variables only openness of the economy was found significant at 5% significance level while the other variables market size and political instability were found to be insignificant.

In the model that includes interaction of tax holiday and sector dummy the key explanatory variable, tax holiday was found statistically significant in affecting FDI flow to the manufacturing sector. This suggests that granting tax incentive for FDI in the manufacturing sector increases the flows of FDI to the sector. Control variables market size and openness of the economy were also found to affect FDI significantly. The impact of political instability remained insignificant in in the equation as in the general regression. On the other hand, focus explanatory variable, tax holiday and custom duty exemption were found insignificant in attracting FDI to the agriculture sector while market size and openness was remained to affect significantly the flows of FDI.

In the other regressions that include interaction of custom duty exemption and sector dummy, custom duty was found to affect only FDI in construction and electricity and water supply sectors. Market size and openness remained significant in determining FDI in all sectors while political instability has no significant impact on FDI to all sectors.

In the general model, where there was no sectoral decomposition, tax holiday was found to have a significant effect on the overall inflows of FDI.

But when FDI sectoral distribution is taken into account, tax holiday have significant impact only in the manufacturing sector. Tax holiday was found to be significant in the general equation because manufacturing sector takes more than half of the share of the FDI flows in to the country. Custom duty exemption appeared insignificant in the general model but found to attract FDI in two sectors, construction and electricity and water supply, when sectoral decomposition is taken into account.

In summary, the findings indicate the differential impact tax incentive has on FDI flows to different sectors. However, most previous researches which support and oppose the provision of tax incentives in order to attract FDI have based their analysis on aggregate FDI; which has the risk of overestimating or underestimating the results.

In addition to policy factor, market size and openness of the economy were also found to be important determinants of FDI flows to Ethiopia. This suggests that FDI flows to all sectors is mainly affected or attracted by market availability and liberalization of the economy. This finding is consistent with the idea that the motives of most FDI flows to developing countries are resource and market seeking. Kolstad and Wiig (2012). Given the country's abundant natural resource, high population and cheap labour, it is obvious that these types of FDI will be attracted.

The other explanatory variables, political instability was found to be insignificant. The possible explanation for this may be that source countries of FDI flows to Ethiopia are mostly a developing countries which have nearly the same institutional and political set up; as a result, they are less likely to be affected by political factors in the host country. It could also be the case that the level of political instability is too low to determine the FDI flows to the country.

From the above regression results it is clear that incentive schemes have a significant positive impact on inflows of FDI; but not in all sectors. Incentives should not be given to investors that would have come without incentives. In the provision of incentives the types of FDI and the motives need to be carefully assessed. In addition the costs and benefits related to incentives have to be taken in to consideration. The results and interpretation of this study have to be taken with care given the aforementioned limitations and little data. However the result shows an important difference of tax incentive sensitiveness of FDI across sectors. The policy implication of this study is that government of Ethiopia should be selective in granting tax incentives. Tax holiday has to be given to the manufacturing sector and custom duty exemption to construction sector where it has a significant positive impact. Due to lack of data this study was unable to distinguish FDI between Greenfield and M&A which were important. So further researches is needed in this area which incorporate the nature of FDI in disaggregate manner.

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Appendices

Appendices 1 Hausman test

```
. xtreg  lfdi lgdp, fe

Fixed-effects (within) regression            Number of obs     =        210
Group variable: year                         Number of groups  =         21

R-sq:  within  = 0.1018                       Obs per group: min =         10
       between = 0.2372                                      avg =       10.0
       overall = 0.1504                                      max =         10

                                              F(1,188)          =      21.31
corr(u_i, Xb)  = 0.1538                        Prob > F          =     0.0000

------------------------------------------------------------------------------
        lfdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lgdp |    1.20387   .2607889     4.62   0.000     .6894217    1.718319
       _cons |  -10.26583   3.905058    -2.63   0.009     -17.9692    -2.56247
-------------+----------------------------------------------------------------
     sigma_u |  3.9414006
     sigma_e |  4.5135568
         rho |  .43263738   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(20, 188) =      7.45            Prob > F = 0.0000

. estimates store fixed

. xtreg  lfdi lgdp, re

Random-effects GLS regression                Number of obs     =        210
Group variable: year                         Number of groups  =         21

R-sq:  within  = 0.1018                       Obs per group: min =         10
       between = 0.2372                                      avg =       10.0
       overall = 0.1504                                      max =         10

                                              Wald chi2(1)      =      26.00
corr(u_i, X)   = 0 (assumed)                   Prob > chi2       =     0.0000

------------------------------------------------------------------------------
        lfdi |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lgdp |   1.280919   .2512251     5.10   0.000     .7885266    1.773311
       _cons |  -11.41588   3.845944    -2.97   0.003     -18.9538    -3.87797
-------------+----------------------------------------------------------------
     sigma_u |   3.643353
     sigma_e |  4.5135568
         rho |   .3945175   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. estimates store random

. hausman fixed random

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              |    fixed        random         Difference          S.E.
-------------+----------------------------------------------------------------
        lgdp |   1.20387      1.280919        -.0770485          .0699772
------------------------------------------------------------------------------
                   b = consistent under Ho and Ha; obtained from xtreg
       B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

           chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                   =        1.21
             Prob>chi2 =     0.2709
```

Appendices 2 Regression result for general random effect model with and without incentive variable included

. ** General equation without incentive**

. xtreg lfdi lgdp pols opn

```
Random-effects GLS regression              Number of obs     =        200
Group variable: year                       Number of groups  =         20

R-sq:  within  = 0.1064                     Obs per group: min =         10
       between = 0.6310                                    avg =       10.0
       overall = 0.3288                                    max =         10

                                           Wald chi2(3)      =      75.69
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	1.436868	.2834908	5.07	0.000	.8812359	1.9925
pols	-.3892699	1.146191	-0.34	0.734	-2.635764	1.857224
opn	14.03631	4.014938	3.50	0.000	6.16718	21.90545
_cons	-13.58145	6.649003	-2.04	0.041	-26.61326	-.549647

sigma_u	1.0348561	
sigma_e	4.6138144	
rho	.04789861	(fraction of variance due to u_i)

. **General Equation with incentives**

. xtreg lfdi lgdp taxh cde pols opn

```
Random-effects GLS regression              Number of obs     =        200
Group variable: year                       Number of groups  =         20

R-sq:  within  = 0.2090                     Obs per group: min =         10
       between = 0.6082                                    avg =       10.0
       overall = 0.3791                                    max =         10

                                           Wald chi2(5)      =      94.97
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	.5314081	.3389066	1.57	0.117	-.1328366	1.195653
taxh	4.081074	1.095598	3.72	0.000	1.933742	6.228406
cde	.622328	.7688221	0.81	0.418	-.8845356	2.129192
pols	-.3865293	1.16721	-0.33	0.741	-2.674219	1.90116
opn	18.9063	4.25391	4.44	0.000	10.56879	27.24381
_cons	-2.148659	7.148619	-0.30	0.764	-16.1597	11.86238

sigma_u	1.1732495	
sigma_e	4.3327346	
rho	.06831641	(fraction of variance due to u_i)

Appendices 3 Regression result for fixed effect model

. ** Total effect and sector effect **

. xtreg lfdi lgdp taxh cde, fe

```
Fixed-effects (within) regression          Number of obs      =        200
Group variable: year                       Number of groups   =         20

R-sq:  within  = 0.2208                     Obs per group: min =         10
       between = 0.3558                                    avg =       10.0
       overall = 0.1469                                    max =         10

                                            F(3,177)           =      16.72
corr(u_i, Xb)  = 0.0422                     Prob > F           =     0.0000
```

lfdi	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lgdp	.2419232	.3244846	0.75	0.457	-.3984332	.8822796
taxh	5.172687	1.055616	4.90	0.000	3.089474	7.255901
cde	-.4984252	.767167	-0.65	0.517	-2.012396	1.015546
_cons	3.766338	4.741593	0.79	0.428	-5.590993	13.12367
sigma_u	4.0014814					
sigma_e	4.3327346					
rho	.46031651	(fraction of variance due to u_i)				

```
F test that all u_i=0:      F(19, 177) =      5.34           Prob > F = 0.0000
```

Appendices 4 Regression result for the model includes interaction of tax holiday and sector dummy

. ** tax holiday interactons**

. *manufacturing as base category*

. xtreg lfdi lgdp taxh cde pols opn taxhagri

```
Random-effects GLS regression              Number of obs      =        200
Group variable: year                       Number of groups   =         20

R-sq:  within  = 0.2316                     Obs per group: min =         10
       between = 0.6375                                    avg =       10.0
       overall = 0.4038                                    max =         10

                                            Wald chi2(6)       =     104.23
corr(u_i, X)   = 0 (assumed)                Prob > chi2        =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	1.101069	.397	2.77	0.006	.3229633	1.879175
taxh	5.306576	1.168003	4.54	0.000	3.017333	7.595819
cde	.616966	.7564326	0.82	0.415	-.8656146	2.099547
pols	-.3734009	1.159996	-0.32	0.748	-2.646951	1.90015
opn	15.57487	4.403768	3.54	0.000	6.943639	24.20609
taxhagri	-4.536423	1.702108	-2.67	0.008	-7.872494	-1.200352
_cons	-9.907599	7.661069	-1.29	0.196	-24.92302	5.107821
sigma_u	1.1909243					
sigma_e	4.2842417					
rho	.07172906	(fraction of variance due to u_i)				

```
. *agriculture as base category*

. xtreg lfdi lgdp taxh cde pols opn taxhmanu

Random-effects GLS regression              Number of obs      =        200
Group variable: year                       Number of groups   =         20

R-sq:  within  = 0.2316                     Obs per group: min =         10
       between = 0.6375                                    avg =       10.0
       overall = 0.4038                                    max =         10

                                           Wald chi2(6)       =     104.23
corr(u_i, X)   = 0 (assumed)               Prob > chi2        =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lgdp	1.101069	.397	2.77	0.006	.3229633	1.879175
taxh	.7701532	1.650331	0.47	0.641	-2.464435	4.004742
cde	.616966	.7564326	0.82	0.415	-.8656146	2.099547
pols	-.3734009	1.159996	-0.32	0.748	-2.646951	1.90015
opn	15.57487	4.403768	3.54	0.000	6.943639	24.20609
taxhmanu	4.536423	1.702108	2.67	0.008	1.200352	7.872494
_cons	-9.907599	7.661069	-1.29	0.196	-24.92302	5.107821

sigma_u	1.1909243					
sigma_e	4.2842417					
rho	.07172906	(fraction of variance due to u_i)				

Appendices 5 Regression result for the model includes interaction of custom duty exemption and sector dummy

```
. ** Custom duty exemption interactions**

. *Manufacturing as base category*

. xtreg lfdi lgdp taxh cde pols opn cdeagri cdecons cdeeduc cdeelec cdeheal cde
> hote cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression              Number of obs      =        200
Group variable: year                       Number of groups   =         20

R-sq:  within  = 0.3728                     Obs per group: min =         10
       between = 0.6499                                    avg =       10.0
       overall = 0.4900                                    max =         10

                                           Wald chi2(11)      =     149.62
corr(u_i, X)   = 0 (assumed)               Prob > chi2        =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lgdp	.7244791	.4011411	1.81	0.071	-.0617429	1.510701
taxh	4.373028	1.643497	2.66	0.008	1.151834	7.594223
cde	1.475753	1.246127	1.18	0.236	-.966611	3.918117
pols	-.3491858	1.167695	-0.30	0.765	-2.637825	1.939454
opn	17.1847	4.451868	3.86	0.000	8.459203	25.91021
cdeagri	-3.658272	1.605441	-2.28	0.023	-6.804878	-.5116666
cdecons	1.301883	1.460278	0.89	0.373	-1.560209	4.163975
cdeeduc	-.5872221	1.458962	-0.40	0.687	-3.446736	2.272291
cdeelec	-5.970364	1.472117	-4.06	0.000	-8.855659	-3.085068
cdeheal	-.1719928	1.522764	-0.11	0.910	-3.156556	2.81257
cdehote	-.6216064	1.457297	-0.43	0.670	-3.477856	2.234643
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.514994	7.738298	-0.58	0.560	-19.68178	10.65179

sigma_u	1.3193686					
sigma_e	3.8897812					
rho	.10317823	(fraction of variance due to u_i)				

. *agriculture as base category*

. xtreg lfdi lgdp taxh cde pols opn cdemanu cdecons cdeeduc cdeelec cdeheal cd
> ehote cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression   Number of obs   =   200
Group variable: year   Number of groups   =   20

R-sq: within = 0.3728   Obs per group: min =   10
       between = 0.6499   avg =   10.0
       overall = 0.4900   max =   10

                                                Wald chi2(11)   =   149.62
corr(u_i, X)   = 0 (assumed)   Prob > chi2   =   0.0000

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lgdp	.7244791	.4011411	1.81	0.071	-.0617429	1.510701
taxh	.7147562	1.961751	0.36	0.716	-3.130206	4.559718
cde	1.475753	1.246127	1.18	0.236	-.966611	3.918117
pols	-.3491858	1.167695	-0.30	0.765	-2.637825	1.939454
opn	17.1847	4.451868	3.86	0.000	8.459203	25.91021
cdemanu	3.658272	1.605441	2.28	0.023	.5116666	6.804878
cdecons	1.301883	1.460278	0.89	0.373	-1.560209	4.163975
cdeeduc	-.5872221	1.458962	-0.40	0.687	-3.446736	2.272291
cdeelec	-5.970364	1.472117	-4.06	0.000	-8.855659	-3.085068
cdeheal	-.1719928	1.522764	-0.11	0.910	-3.156556	2.81257
cdehote	-.6216064	1.457297	-0.43	0.670	-3.477856	2.234643
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.514994	7.738298	-0.58	0.560	-19.68178	10.65179
sigma_u	1.3193686					
sigma_e	3.8897812					
rho	.10317823	(fraction of variance due to u_i)

"Construction sector as base category"

. xtreg lfdi lgdp cde pols opn cdemanu cdeagri cdeeduc cdeelec cdeheal cdehot
> e cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression   Number of obs   =   200
Group variable: year   Number of groups   =   20

R-sq: within = 0.3608   Obs per group: min =   10
       between = 0.6776   avg =   10.0
       overall = 0.4943   max =   10

                                                Wald chi2(10)   =   150.22
corr(u_i, X)   = 0 (assumed)   Prob > chi2   =   0.0000

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lgdp	.7552161	.4009741	1.88	0.060	-.0306786	1.541111
cde	2.259513	.9196289	2.46	0.014	.457074	4.061953
pols	-.3183217	1.150113	-0.28	0.782	-2.572502	1.935858
opn	16.46177	4.34648	3.79	0.000	7.942828	24.98072
cdemanu	3.405719	1.265856	2.69	0.007	.9246871	5.886751
cdeagri	-.3242272	1.619403	-0.20	0.841	-3.498198	2.849743
cdeeduc	-1.379917	1.175271	-1.17	0.240	-3.683406	.9235722
cdeelec	-6.752433	1.198103	-5.64	0.000	-9.100671	-4.404195
cdeheal	-.9361832	1.270184	-0.74	0.461	-3.425697	1.553331
cdehote	-1.419651	1.169839	-1.21	0.225	-3.712492	.8731904
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.830573	7.68558	-0.63	0.530	-19.89403	10.23289
sigma_u	1.2995981					
sigma_e	3.9557782					
rho	.09741834	(fraction of variance due to u_i)

```
. *education as base category*

. xtreg lfdi lgdp cde pols opn  cdemanu  cdeagri  cdecons cdeelec cdeheal cdehc
> te cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression                   Number of obs     =        200
Group variable: year                            Number of groups  =         20

R-sq:   within  = 0.3759                         Obs per group: min =        10
        between = 0.6382                                        avg =       10.0
        overall = 0.4870                                        max =        10

                                                Wald chi2(10)     =     150.23
corr(u_i, X)    = 0 (assumed)                    Prob > chi2       =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	.7333192	.3998937	1.83	0.067	-.050458	1.517096
cde	1.137545	.9079661	1.25	0.210	-.6420363	2.917125
pols	-.3619869	1.162884	-0.31	0.756	-2.641198	1.917224
opn	17.36725	4.411837	3.94	0.000	8.720214	26.0143
cdemanu	4.785238	1.274369	3.75	0.000	2.28752	7.282955
cdeagri	1.106352	1.690192	0.65	0.513	-2.206364	4.419067
cdecons	1.647997	1.172181	1.41	0.160	-.6494365	3.94543
cdeelec	-5.617603	1.176238	-4.78	0.000	-7.922986	-3.31222
cdeheal	.18591	1.230836	0.15	0.880	-2.226484	2.598304
cdehote	-.2734402	1.165184	-0.23	0.814	-2.557159	2.010278
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.689581	7.706335	-0.61	0.543	-19.79372	10.41456
sigma_u	1.3172582					
sigma_e	3.8969272					
rho	.10254403	(fraction of variance due to u_i)				

```
. *health as base category*

. xtreg lfdi lgdp cde pols opn  cdemanu  cdeagri  cdecons cdeelec cdeeduc cdeh
> ote cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression                   Number of obs     =        200
Group variable: year                            Number of groups  =         20

R-sq:   within  = 0.3736                         Obs per group: min =        10
        between = 0.6475                                        avg =       10.0
        overall = 0.4894                                        max =        10

                                                Wald chi2(10)     =     150.52
corr(u_i, X)    = 0 (assumed)                    Prob > chi2       =     0.0000
```

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	.7392303	.3829734	1.93	0.054	-.0113837	1.489844
cde	1.386806	.9203356	1.51	0.132	-.4170186	3.190631
pols	-.3522606	1.162288	-0.30	0.762	-2.630304	1.925781
opn	17.15996	4.433957	3.87	0.000	8.469566	25.85036
cdemanu	4.475149	1.333774	3.36	0.001	1.861	7.089298
cdeagri	.782459	1.833925	0.43	0.670	-2.811948	4.376906
cdecons	1.388794	1.21307	1.14	0.252	-.9887794	3.766368
cdeelec	-5.872361	1.165233	-5.04	0.000	-8.156175	-3.588547
cdeeduc	-.4943186	1.17876	-0.42	0.675	-2.804646	1.816009
cdehote	-.5312703	1.191096	-0.45	0.656	-2.865775	1.803234
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.732254	7.519592	-0.63	0.529	-19.47038	10.00588
sigma_u	1.3170195					
sigma_e	3.8977339					
rho	.1024726	(fraction of variance due to u_i)				

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. *electricity as base category*

. xtreg lfdi lgdp cde pols opn cdemanu cdeagri cdecons cdeheal cdeeduc cde
> hote cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression   Number of obs   =   200
Group variable: year   Number of groups   =   20

R-sq: within = 0.3497   Obs per group: min =   10
       between = 0.5239   avg =   10.0
       overall = 0.4240   max =   10

                                                  Wald chi2(10)   =   123.58
corr(u_i, X)   = 0 (assumed)   Prob > chi2   =   0.0000

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	.96657	.4139428	2.34	0.020	.1552569	1.777883
cde	-1.932715	.9463339	-2.04	0.041	-3.787496	-.0779349
pols	-.4746139	1.200855	-0.40	0.693	-2.828247	1.879019
opn	18.12869	4.589679	3.95	0.000	9.133083	27.1243
cdemanu	8.430081	1.349725	6.25	0.000	5.784669	11.07549
cdeagri	4.20729	1.827025	2.30	0.021	.6263871	7.788192
cdecons	4.719586	1.236855	3.82	0.000	2.295395	7.143776
cdeheal	3.568562	1.259822	2.83	0.005	1.099355	6.037768
cdeeduc	2.928826	1.217672	2.41	0.016	.5422323	5.315419
cdehote	2.852305	1.2231	2.33	0.020	.4550731	5.249538
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-8.364412	7.958415	-1.05	0.293	-23.96262	7.233795
sigma_u	1.3032642					
sigma_e	3.9436985					
rho	.09845646	(fraction of variance due to u_i)				

. *hotel as base category*

. xtreg lfdi lgdp cde pols opn cdemanu cdeagri cdecons cdeheal cdeeduc cd
> eelec cdemine cderest cdetour
note: cdemine omitted because of collinearity
note: cderest omitted because of collinearity
note: cdetour omitted because of collinearity

Random-effects GLS regression   Number of obs   =   200
Group variable: year   Number of groups   =   20

R-sq: within = 0.3762   Obs per group: min =   10
       between = 0.6371   avg =   10.0
       overall = 0.4867   max =   10

                                                  Wald chi2(10)   =   150.20
corr(u_i, X)   = 0 (assumed)   Prob > chi2   =   0.0000

lfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lgdp	.7255728	.4003819	1.81	0.070	-.0591614	1.510307
cde	1.11867	.9110892	1.23	0.220	-.6670316	2.904372
pols	-.3628942	1.162824	-0.31	0.755	-2.641988	1.9162
opn	17.42568	4.39854	3.96	0.000	8.804703	26.04666
cdemanu	4.813505	1.267821	3.80	0.000	2.328622	7.298388
cdeagri	1.152682	1.658319	0.70	0.487	-2.097562	4.402927
cdecons	1.671134	1.168222	1.43	0.153	-.6185384	3.960807
cdeheal	.1987169	1.245237	0.16	0.873	-2.241903	2.639337
cdeeduc	-.2175266	1.166606	-0.19	0.852	-2.504033	2.06898
cdeelec	-5.60029	1.182974	-4.73	0.000	-7.918876	-3.281704
cdemine	(omitted)					
cderest	(omitted)					
cdetour	(omitted)					
_cons	-4.586801	7.715332	-0.59	0.552	-19.70857	10.53497
sigma_u	1.3171225					
sigma_e	3.8973857					
rho	.10250343	(fraction of variance due to u_i)				