

Master Thesis

The effect of firms' growth dynamism on the income of their employees:
A case study of medium and large-scale manufacturing enterprises
in Tigray, Ethiopia

By

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The master thesis is carried out as a part of the education at the University of Agder and is therefore approved as such. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Abstract

The paper investigates firms' growth status, firms' growth factors, employees' salary levels, and employees' salary growth factors in medium and large manufacturing firms in Tigray, Ethiopia. The results indicate that medium and large manufacturing firms in Tigray are growing but at a decreasing rate. There are however differences in growth rates among the various sub-sectors. Moreover, factors like a firm's age, firm size, level of education and the experience of firm leaders, and forms of enterprises also influence the growth of firms. The relationship between the age of a firm and its growth is found to be U-shaped. Moreover, the growth rate of large firms' is higher than of medium firms. The experience of the leaders of a firm is positively and significantly correlated with firm growth. Firm and salary growth rates run in parallel, although the growth rate of an employees' salary is often higher than that of the firm's growth rate. The findings indicate that the annual salary of male employees' is higher than of females'; moreover, while the males' salary increases at an increasing rate, the salary of females increases at a decreasing rate. This shows there is gender-wage gap between males and females. Finally, the results indicate that medium firms pay a higher salary than that of large firms; but the employees' salary growth rate of large firms' is higher than that of medium firms. A number of factors are identified that can be used to improve the firm and salary growth rates of firms although more should be done to reduce the gender-income gap. Indeed, more research should also be done investigating the reasons behind gender-income gaps in the medium and large manufacturing firms in Tigray.

Key Words: medium and large manufacturing firms, firms' growth dynamism, employees' salary, panel data, Tigray, Ethiopia

Dedication

This dissertation is dedicated to:

My mother: Mrs. Mulu Kahsay

My wife: Mrs. Hamanot Haile

My sons: Naod Desta
and
Dagmawi Desta

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Lastly, but not least, I would like to thank the medium and large manufacturing enterprises in Tigray that helped me in providing necessary data for my thesis.

Declaration

I hereby declare that the thesis:

**The Effect of Firms' Growth Dynamism on the Income of their Employees:
A Case Study of Medium and Large Scale Manufacturing Enterprises
In Tigray, Ethiopia**

has not been submitted to any other universities than the University of Agder for any type of academic degree.



Desta Kidanu

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List of Abbreviations

CIA	Central Intelligence Agency
CLEP	Commission on legal empowerment of the poor
CSA	Central Statistical Authority
DPPC	Disaster Prevention and Preparedness Commission
EBDSN	Ethiopian Business Development Services Network
EPA	Environmental Protection Authority
EEPCO	Ethiopian Electric Power Corporation
EPRDF	Ethiopian peoples' Revolutionary Democratic Front
EU	European Commission
HDR	Human Development Report
MDGs	Millennium Development Goals
MIT	Ministry of Trade and Industry
MoFED	Ministry of Finance and Economic development
NBE	National Bank of Ethiopia
PCC	Population Census Commission
SBRC	Small Business Research Center
<i>SDPRP</i>	<i>Sustainable Development and Poverty Reduction Program</i>
TEMISS	Tigray Education Management Information System Service
UNDP	United Nations Development Program
USAID	US Agency for International Development

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1. Introduction

1.1 Background of the study

Tigray region is located in the northern part of Ethiopia. The region is negatively affected by both natural and manmade hazards. The natural hazards include drought, and the manmade hazards include wars and the oppressive policy of local governments. The region has a history of conflict with Ethiopia fighting countries such as Italy and Eritrea in that region. Before that the region was ravaged by civil war.

The current government, EPRDF, has been ruling Ethiopia since mid- 1991; EPRDF follows a market-oriented economy. This policy has encouraged and promoted private investments throughout the country. As a result, many investors have invested their capital in different sectors in the country, including in the Tigray region. These investors have created more job opportunities and generated substantial income to their employees; this has contributed to the improvement in the living condition of the many of the people of Ethiopia and the adjacent regions. This goes hand in hand with the central aim of the EPRDF government which is to increase employment and reduce poverty.

According to the Ethiopian ministry of Trade and Industry, manufacturing firms in Ethiopia are classified as both micro and small firms or medium and large firms based on paid up capital. Firms with paid up capital of more than Ethiopian birr 500,000 are classified as medium and large. The investment areas can be in any of the three sectors like agriculture, industry, service or any combination of them. These three sectors are the main components of the GDP of Ethiopia.

In 2000 the GDP shares of the agriculture and service sectors were 50% and 39% respectively; but as of 2009, the GDP shares of agriculture and service sectors were 43% and 44% respectively (MoFED, 2009:1). In both years, the GDP contributions of the industrial sector were 11% and 13% respectively. As of 2008/9, the annual growth rates in the agriculture, industry and service sectors were 6.4%, 9.9% and 14% respectively (pp.1). As per the report of the ministry, while the growth rate and share of GDP of the agricultural sector has declined over time, the growth rate and share of GDP of the service sector has increased; but the growth rate and GDP share of the industry sector is fluctuating (pp. 1). In the years 2003/04 to 2008/09, on average, the real GDP growth was 11.5%; in the same years, the average growth rates in agriculture, industry and service sectors were 10.8%, 10.1% and 13% respectively (MoFED, 2009:4). Due to the recent global financial crisis and lower domestic demand, the GDP growth rate in 2008/09 declined to 9.9% (CSA, 2009).

The GDP contribution of the industry sector in the past ten years was minimal and varied from 5.3% in 2000 to 11.6% in 2004 (pp.1). As of 2009, the labour force occupation in agriculture, industry and service were estimated at 85%, 5% and 10% respectively (CIA, World fact book, 2010). These statistics suggest that the contribution of the industrial sector to Ethiopia's GDP and employment is minimal.

Though the contribution of industry is minimal, many job opportunities were created in such areas. For example, in 2007/8 fiscal year, there were 43,338 small scale manufacturing firms in Ethiopia; they created job opportunities for 138,951 persons (CSA

2010: 20/55). On average, each small scale manufacturing firm created job opportunities for three persons. In the same year, there were 1930 medium and large firms, which created job opportunities for 133,673 employees (CSA, 2010: 19/48, 29/48); each firm has created job opportunities for 69 employees. This shows that both types of manufacturing areas are creating equivalent job opportunities.

The minimal contribution of the industrial sector to the GDP of Ethiopia raises interesting questions: Is this contribution minimal because of the lack of growth of firms in the country? What are the firm growth factors? How much salary do the manufacturing firms pay to their employees? What are the factors that can increase the salary level of employees? The answers to these questions are sought in the study that follows.

1.2 The research problem/motivation of the study

The population size of urban areas in Ethiopia is expanding. This is due to natural growth [the difference of death and birth rates] as well as migration from rural and conflict areas like boarder of Ethio-Eritrea. Such population growth can aggravate the socio-economic problems of cities or towns. Unemployment is one of the social problems of cities/towns. In 2006, the employment ratio in urban Tigray was 37.6% (CSA, 2006: 21). In 2009, the urban employment rate in Tigray was about 46.5% (CSA, 2009:117). The data shows that there is improvement in the employment rate in urban Tigray. That is, in 2006, there were 131,648 employees in Urban Tigray (CSA, 2006:21). In 2009, the numbers of employees in urban areas of the region levels was 304,216 (CSA 2009:151-154). This shows that the number of employees in 2009 was about 230% of the employee size of 2006. On the other hand, in 2006, unemployment in urban Tigray was 13.7% (CSA, 2006:35). But in 2009, unemployment increased to 21.1% (CSA, 2009:229).

Along with wholesale and retail activity, manufacturing creates a number of job opportunities in urban areas. For example, as of 2006, about 22.7% and 15.3% employees were employed in wholesale and retail and manufacturing sectors in urban Ethiopia (CSA, 2006: 35). In addition, in 2009 about 20.3% and 18.5% urban employees were employed by wholesale and retail, and manufacturing sectors in Tigray (CSA, 2009:153, 154).

The sales revenue of countries can be determined by the volume and types of products they produce; the countries compete in the international market through the products they have. Such types of products can determine their income and development status. While developed countries avail their industrial products to the international market, developing countries export agricultural products and other commodities to the international market. But the exchange values of industrial and other products are not comparable; the exchange values of the industrial goods are very high as compare to the other types of goods. This can indicate that industrialization is important tool for a country's development. Hence, understanding the status of manufacturing firms and the factors that can promote or constrain the activities are crucial. Ideally, developing countries should engage more in the industrial sector too with the aim of reducing exports allowing them to compete in the global market.

For the sake of industrialization and creation of more job opportunities in the urban areas, giving due attention to manufacturing sector too is important; but note that giving attention to industrial sector doesn't mean ignoring the agricultural sector, which is the

main stay of Ethiopians in general and Tigrayans in particular. Therefore, it is important to see how the manufacturing sector is growing in Tigray. That is, to know the employment condition in the urban areas of Tigray, understanding the growth status and dynamism of the manufacturing sector is important because employment can help poverty alleviation. Within this context, understanding the factors that can promote or constrain the growth of the manufacturing firms is vital. Moreover, from poverty alleviation point of view, the ultimate goal of employment should be linked with the welfare level of the poor. Hence, understanding the main factors that can increase the income of the employees is also important.

Compared to small scale firms, large and medium firms have better recorded data. Because the study is about dynamism, which needs data for number of periods, I have chosen to conduct the study on the medium and large manufacturing.

1.3 Main research objectives and research questions

1.3.1 Main research objective

The main research objective is to investigate the effect of a firms' growth dynamism on the income of their employees' and the factors that affect their dynamism in medium and large scale manufacturing enterprises in Tigray.

1.3.2 Research questions

- a. Are the medium and large scale manufacturing enterprises in Tigray growing over time? Which sub sectors of the sector are growing in the region?
- b. What are the firm and individual characteristics that affect the growth of medium and large scale manufacturing enterprises in Tigray?
- c. What is the average annual salary paid by the medium and large scale manufacturing enterprises to their employees? Does this change parallel to the growth dynamism of the enterprises?
- d. What are the firms and individual characteristics that affect the income level of employees in the medium and large scale manufacturing enterprises in Tigray?

1.4 Significance of the study

The findings of the thesis can be used by a number of bodies such as local government, firms, and/or interested individuals. The findings of the thesis can be classified into four main groupings: firm growth status, firm growth factors, employees' salary level, and employees' salary growth factors.

First of all understanding the growth status of a firm is important for policy makers, firm owners and potential investors. The government can develop a policy which can help to promote the growth of firms. That is, the government cannot intervene if there is no data that can show growth status of firms. If the firms are liquidated, because of lack of information and support of government, the socio-economic problems can be aggravated

in urban Tigray. That is, due to the lack of employment and lack of [enough] products, poverty can be aggravated in the region. Moreover, government may not collect enough revenues in the form of employment income tax and profit tax. In addition, government can be forced to import goods that could be produced domestically; and this may need hard currency. All these problems can be created when there is no information about the growth status of firms. Hence, because of the availability of information about firms' growth status, government can intervene when necessary in order to protect the above stated problems. Moreover, potential investors can understand firm growth status of firms in Tigray. Hence, they can be encouraged to invest in the manufacturing sub-sectors that can maximize their benefits. If there are additional investors, employment, government revenue, outputs can be increased. But due to lack of such data, potential investors may not be attracted; as a result, the above stated potential benefits may not be realized. Hence, understanding the firm growth status is important for many stakeholders.

Secondly, understanding the firm growth factors is also important. Understanding the factors that constrain or promote firms 'growth is important. If the decision maker understands the factors that can increase the growth of firms, he/she can use them appropriately. The reverse will also be true if the factors can harm the growth of a firm. For example, the results of the study indicate that internal experience is positively and highly correlated with firm growth. This knowledge can help owners to retain their firm managers as long as possible; otherwise, owners will understand from the thesis result that their firm growth may decline if there is high turnover of firm managers.

Thirdly, using the thesis result, concerned bodies can better understand the average salary of employees who work in medium and large manufacturing firms in Tigray. Moreover, the gender-salary gap, the firms which pay high and low salaries, etc can be checked from the analysis result. Finally, the determinants of the employees' salary growth can be traced from the thesis result. Hence, employees can understand the requirements they must fulfill so that to earn higher salaries. Generally, the findings of the thesis can be used by different bodies may be for different purposes.

1.5 Scope of the study

As the topic indicates, this paper revolves around the medium and large scale manufacturing enterprises in Tigray region.

The research is conducted under the following scope/delimitations:

- To know whether or not a firm is medium/large, the researcher has used the paid up capital amount;
- To know whether or not the sector is growing, the sales volume of different times is used as unit of measurement; this is done on an annual basis.
- Firms and employees older than three years, as of December 2009, are included in the study;
- The focus of the researcher is on the growth dynamism in terms of sales volume; hence, the startup issues are not considered.
- Only the firm and individual characteristics that can affect firm and income growths are investigated. Other factors that can affect the firm and employees' salary are not investigated; they are controlled.

- The annual income of employee's is stated in gross; it is not net income.

1.6 Definition of terms and concepts

a. Definition of medium and large enterprises

The number of employees, annual turnover, annual balance sheet, paid up capital amount, etc are some of the parameters used to define the enterprises (MTI 1997:8, EC 2005:14). Ethiopia uses the the number of employees and paid up capital to define firms. while the Ministry of Trade and Industry (MTI) use paid up capital (with some exeptions), the Central Statistical Authority uses number of employees [with capital intensive technologies] (EBDSN 2009:1, CLEP 2006:13).

Using number of employees, the Ethiopia Central Statistical Agency (CSA 2006:2) used the following definition during its survey of small scale manufacturing enterprises in 2005/6:

- a) Large and Medium Scale Manufacturing Establishments, engaging 10 or more persons and using power -driven machines.*
- b) Small Scale Manufacturing Establishments engaging less than 10 persons and use power -driven machines.*
- c) Cottage/Handicraft Manufacturing establishments performing their activities by hand (i.e., using non -power driven machines).*

But the Ministry of Trdae and Industry (MTI 1997:8) has defined the enterprises using amount of paid up capital as follows:

Micro Enterprises are those small business enterprises with a paid-up capital of not exceeding birr 20,000, and excluding high tech. consultancy firms and other high tech establishments.

Small Enterprises are those business enterprises with a paid-up capital of above 20,000 and not exceeding birr 500,000, and excluding high tech. consultancy firms and other high tech. establishments.

Firms with paid up capital of more than birr 500,000 are classified under medium and large enterprises. But the second definition lacks the demarcation between medium and large scale firms. Hence, the second definition is used to distinguish the medium and large firms other ones. One US Dollar is roughly equivalent to about 11 Ethiopian birr.

b. Vertical and horizontal expansion of firms

The expansion of firms can be vertical or horizontal. Vertical expansion refers to the growth of the specific activity of the firm; it doesn't include additional activity. Horizontal expansion refers to, for example, the establishment of a new business that can be related or unrelated to the existed sector. For this thesis we investigated a firm's vertical expansion as a measure of firm growth.

c. Meaning and code of manufacturing enterprises

This paper revolves around the medium and large scale manufacturing firms. ISIC revision 4 (2008:85) defines manufacturing activity as:

“Physical or chemical transformation of materials, substances, or components in to new products.... The materials, substances, or components transformed are raw materials that are products of agriculture, forestry, fishing, mining or quarrying as well as products of other manufacturing activities. [...] Industrial engineering of the component parts of manufactured products is considered manufacturing. This includes the Industrial engineering of manufactured products from either self-produced or purchased components

Using the International Standard Industrial Classification (ISIC revision-4), the following sub-sectors are manufacturing firms; the manufacturing sub-sectors are presented with their respective ISIC codes as follows.

Table 1.1: Sub-sectors and their ISIC codes

Sub-sector	Major ISIC code	Specific ISIC code
Cement	23	2394
Industrial engineering	29	2920
Pharmaceutical	21	2100
Leather	15	1511
Textile and garment	13 and 14	all
Geo-textile	25	2599
Printing	18	1811 and 1812
Alcohol and liquor	11	1101
Water bottling	11	1104
Flour and bread	10	1061 and 1071
Steel	25	2591
Plastic	22	2220
Marble	23	2396
Gravel, cement products and bricks	23	2392 and 2395

- e. Paid up capital: - it is the amount of capital which is contributed/paid by owner(s) during the establishment of a firm.
- f. Revenue from sales: - represents the total sales value of all products and by-products, which are valued at market price.
- g. Basic salary – refers the regular payment made every year, which excludes commissions, bonuses, professional and hardship allowances.
- h. Sole proprietorship is a firm owned by single individuals.
- i. Private limited company is an enterprise which is owned by two or more persons.

1.7 Outline of the thesis

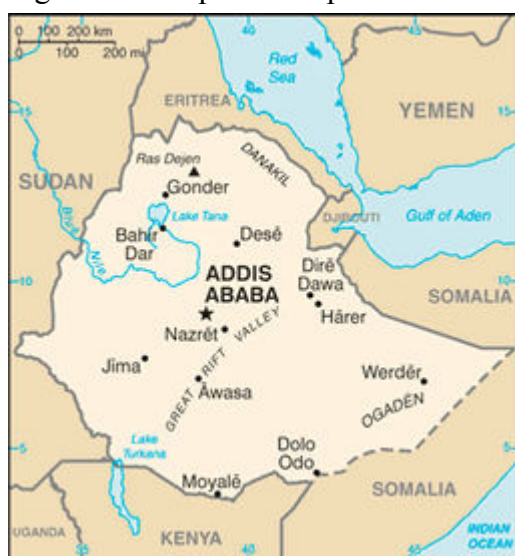
The thesis contains seven chapters. The second chapter presents the background of the study area; this investigates about location, socio-economy variables, political system of Ethiopia, demography and the like. The third chapter deals about related literature; in this part theoretical framework and empirical findings are presented. In the fourth chapters presents the research methodology; this includes sampling technique, data collection and analysis methods, etc. The fifth chapter covers is about analysis and discussion. Chapter six shows the limitation of the paper. Finally, chapter seven concludes about the findings of the paper.

2. Background of study area

2.1 Geographic location, map and flag of Ethiopia

Ethiopia [also called Abyssinia] is land locked and located in the horn of Africa; it is the oldest independent country in Africa and is surrounded by Eritrea, Sudan, Kenya, Somalia, and Djibouti (see Figure2.1). The specific location of the country is 3-15⁰ North latitude and 33-48⁰ East longitude. The total area of the country is 1.1 million square kilometers. The capital city of the country is Addis Ababa; as per Ethiopian Mapping Authority (cited in EPA 2004: xvi [annex]), Addis Ababa is located at 8⁰55-9⁰05 north latitude and 38⁰50-39⁰50 east longitude.

Figure 2.1: Map of Ethiopia



Source: World Fact Book, 2010

The flag of Ethiopia has three colors and are put horizontally: green, yellow and red top to down. The flag has been adopted starting 1895 (CIA World fact book, 2010).

Figure 2.2: Ethiopian Flag



Source: World Fact Book, 2010

As presented on world fact book of CIA (2010), the colour, design and meaning of the flag are presented as follows:

three equal horizontal bands of green (top), yellow, and red, with a yellow pentagram and single yellow rays emanating from the angles between the points on a light blue disk centered on the three bands; green represents hope and the fertility of the land, yellow symbolizes justice and harmony, while red stands for sacrifice and heroism in the defense of the land; the blue of the disk symbolizes peace and the pentagram represents the unity and equality of the nationalities and peoples of Ethiopia. [...] ...the emblem in the center of the current flag was added in 1996.

2.2 Political and administrative system of Ethiopia

Emperor Haile-selassie ruled Ethiopia for 44 years from 1930 to 1974. Haile-selassie was overthrown by the Derg regime in 1974. Derg means committee of military officers who overthrew emperor Haile-selassie from his power. The government followed socialist ideology and a command economy during which tenancy was abolished and peasants were able to own land; private enterprises and surplus urban houses were nationalized. With the intention of increasing productivity of small lands, many cooperatives were established by the government during that time. Derg however wasn't a democrat but a military government and as a result there were numerous conflicts between the government and opposing parties. Guerilla movements, especially in the north part of the country, emerged during this time; after 17 years of civil war, the Derg government was overthrown in 1991 and substituted by Ethiopian Peoples' Revolutionary Democratic Front (EPRDF). EPRDF is coalition of different ethnic groups.

When it came to power, EPRDF invited political parties to participate peacefully and democratically. With the exception of the Oromo Liberation Front (OLF) party, all parties agreed and came to round table discussion; as a result, the constitution was ratified at the end of 1994. Ethiopia conducted four general elections: 1995, 2000, 2005 and 2010. In the first two general elections, opposing parties were not as such strong competitors. But in the third general election, opposing parties got significant seats in the House of Representatives though EPRDF has become ruling party by the majority rule. In the fourth general election, 63 parties and 31 individuals participated in the election process; most of the parties formed coalitions. The 4th election was conducted on May 23/2010; the election process was accomplished peacefully and the electoral board notified [temporarily] that the EPRDF was the election winner.

The government follows a federalism system, which encourages decentralization; as a result, the country is divided in to nine ethnical states and two self-governing administrations. The ethnical states are Tigray, Afar, Amhara, Oromia, Benshangul-gumuz, Gambela, Harari, Somali and Southern Nations, Nationalities, and People's regions. The two self-governing administrations are Addis Ababa and Dire-Dawa.

In contrast to the command economy of Derg regime, EPRDF pursues a market-driven economy, therefore encouraging privatization. In order to pursue such an economic policy, Ethiopia privatized many stated owned enterprises through its privatization agency. In addition, private investors are actively encouraged to participate in different

sectors of the economy except in some areas like telecommunication, electric power and water supply, which are monopolized by the government. Moreover, land is owned by the government; but for the sustainable and productive use of the land, ownership certificate is provided to farmers in rural Ethiopia.

To alleviate poverty, Ethiopia has set different strategies and programmes. Agricultural Development Led Industrialization (ADLI) is a main strategy of the country and is one of the pillars of the Sustainable Development and Poverty Reduction Program (SDPRP) of Ethiopia.

The president and prime minister of the country are Girma Woldegiorgis and Meles Zenawi respectively.

2.3 Demography of Ethiopia

According to census of 2007, the population size and growth rate of the country are about 73.9 million and 2.6% respectively; 84% and 16% of the population live in rural and urban areas (PCC-2008: 8 & 19). The census indicates that the proportion of males and females are 50.5% and 49.5% respectively (pp.13).

In Ethiopia, there are 10 major ethnic groups; while Oromo and Amhara ethnic groups are the major ones, Gamo, Afar and Hadiya are the least ones (pp.16). Refer table 2.1 below.

Table 2.1: major ethnic groups proportions of 2007

Ethnic Group	Population size	%
Oromo	25,488,344	34.5
Amhara	19,867,817	26.9
Somali	4,581,793	6.2
Tigray	4,483,776	6.1
Sidama	2,966,377	4
Guragie	1,867,350	2.5
Welaita	1,707,074	2.3
Hadiya	1,284,366	1.7
Afar	1,276,372	1.7
Gamo	1,107,163	1.5

Source: PCC (2008:16)

In case of religious composition, the proportion of the followers of orthodox, Muslim, protestant, traditional and catholic are 43.5%, 33.9%, 18.6%, 2.6% and 0.7% respectively (PCC, 2008: 17). This implies that the proportions of Christian and Muslim religion followers are 62.8% and 33.9% respectively.

2.4 Socio-economic situation of Ethiopia

The Ethiopian welfare monitoring report of 2004 indicated that, based on the Survey of 1995/96 and the 1999/2000 conducted by the Central Statistical Authority of Ethiopia, about 44% of the population of the country lived under the official poverty line (CSA

2005:2). The Human Development Report (2009:178,179) added that, using the data of the periods 2000 to 2006, about 44.2% of the Ethiopian population were estimated to be living below the poverty line. Both data show a similar poverty status in the country. In fact, the proportion of people below poverty line was reduced from 44% in 1999/2000 to 38.7% in 2004/05 (MoFED 2007:16&17).

In 2007, the GDP of Ethiopia was estimated US \$ 19.40 billion, which was equivalent to PPP US\$ 61.60 billion; in the same year, the GDP per capita was also estimated to be US\$ 245.00, which was equivalent to PPP US\$ 779.00 (UNDP, 2009:197). The world fact book of CIA (2010) indicates that GDP per capita (ppp) as of 2009 was estimated to be US\$ 900. The HDR report of UNDP indicates that 39% of the population was estimated to live under income poverty line by earning US\$ 1.25 per day (pp. 178 & 179). This information indicates a slight improvement in the poverty status of Ethiopia.

Though there is such improvement, the country is one of the poorest countries of the world. For example, based on the human development index (HDI), [using the data of 2007] Ethiopia is ranked 171st out of 182 countries (UNDP 2009:169). The Ministry of Finance and Economic Development has assured that Ethiopia shouldn't be proud of by this improvement, because poverty is still high (MoFED 2007:4). This indicates that Ethiopia should work a lot to improve the living standard of its people.

The main livelihood of the majority of Ethiopians is agriculture. To improve the living standard of Ethiopians, there is need of improving the living condition of the majorities. To go in line with such reasons, the government of Ethiopia has set a main strategy called Agricultural Development Led Industrialization (ADLI). It is one of the pillars of the Sustainable Development and Poverty Reduction Program (SDPRP) of Ethiopia. To implement the poverty reduction program, as stated by MoFED (2008:2), "human capacity, expanding infrastructure to enhance the competitive advantage of the economy, building institutions, decentralizing government, and mobilizing the power of grass root communities including civil society" are the best ways.

There are three main contributors to the GDP in Ethiopia: agriculture, industry and service. As of 2008/9, the shares of agriculture, industry and service sectors were 43%, 13% and 44% respectively; in the same year, the annual growth rates in the agriculture, industry and service sectors were 6.4%, 9.9% and 14% respectively (MoFED, 2009:1). While the growth rate and share of GDP of the agricultural sector declines from time to time, the growth rate and share of GDP of the service sector increase from time to time; but the growth rate and GDP share of the industry sector is not determinable- it fluctuated (pp. 1). In 2000 the GDP shares of agriculture and service sectors were 50% and 39% respectively; but as of 2009, the GDP shares of agriculture and service sectors were 43% and 45% respectively. The GDP contribution of the industry sector in the past ten years was minimal and varied from 5.3% in 2000 to 11.6% in 2004 (pp.1). As of 2009, the labour force occupation in agriculture, industry and service were estimated to be 85%, 5% and 10% respectively (CIA, World fact book).

In the years 2003/04 to 2008/09, on average, the real GDP growth was 11.5%. In the same years, the average growth rates in agriculture, industry and service sectors were 10.8%, 10.1% and 13% respectively (MoFED, 2009:4). In the years 2003/04 to 2007/08, Ethiopia registered double digit GDP growth rate, which varied from 11.2% in 2007/08 to 12.6% in

2004/05; but, may be due to the global financial crisis and lower domestic demand, the GDP growth rate in 2008/09 declined to 9.9% (CSA, 2009).

Though the GDP contribution of the agricultural sector has decreased somewhat, it is nevertheless still the livelihood of the majority of the labour force of Ethiopia. This is the main reason why the government of Ethiopia's has set Agricultural Development Led Industrialization (ADLI) as the main development strategy of the country.

As indicated on Table 2.2, using the data of 2005/06 to 2007/08, the main export products of Ethiopia are coffee, oilseeds, leather and leather products, chehat, pulses and gold, which account for about 85% of all exports revenues. Coffee is the main source of export revenues (NBE, 2008:79). While Europe and Asia are the top export destination areas for Ethiopia, Oceania is the least (PP.85)

Table 2.2 Values of major export items of Ethiopia

Type of products	Export values in Ethiopian birr (000,000)					
	2005/06	%	2006/07	%	2007/08	%
Coffee	354.3	35.54	424.2	35.86	524.5	35.8
Oilseeds	211.4	21.1	187.4	15.8	218.8	14.9
Leather and leather products	75	7.5	892.6	7.6	99.2	6.8
Pulses	37	3.7	70.3	5.9	143.6	9.8
Meat and meat products	18.5	1.9	15.5	1.3	20.9	1.4
Fruits and vegetables	13.2	1.3	16.2	1.4	12.8	0.9
Live animals	27.6	2.8	36.8	3.1	40.9	2.8
Chehat	89.1	8.9	92.8	7.8	108.3	7.4
Gold	64.7	6.5	97.0	8.2	78.8	5.4
Flower	21.8	2.2	63.6	5.4	111.8	7.6
Others	87.8	8.8	91.8	7.7	106.3	7.2

Source: NBE(2008:79)

The report of the bank indicates that capital goods, consumer goods and fuel are the most common imported goods by Ethiopia. Asia and Europe are the common import sources of Ethiopia (pp.84-86). The import-export data show that Ethiopia typically imports from areas where it exports.

As of 2008/9, the number of fixed line and digital phone lines users were 915,058 and 914,264 respectively. In the same year, there were 4,051,703 and 71,059 mobile and internet subscribers (CSA 2010: 11/14). The number of fixed line telephone subscribers increased from 880,088 in 2006/07 to 897,287 in 2007/08; similarly, the number of cell phone subscribers increased from 1,208,498 to 1,954,327 (CSA,2010). Moreover, the number of internet subscribers increased from 31,400 in 2006/07 to 34,100 in 2007/08 (pp. 11/14).

Table 2.3 Telecommunications Statistics

Type of service	2005/06	2006/07	2007/08	2008/09
Fixed Telephone Lines	725,046	880,088	897,287	915,058
Digital Lines	723,023	878,967	896,036	914,264
Mobile Subscribers	866,700	1,208,498	1,954,527	4,051,703
Internet Subscribers	25,724	31,400	34,100	71,059

Source: Ethiopian Telecommunication Corporation, cited on CSA (2010)

In 2004/05, infant mortality and under 5 mortality rate reached 77 and 123 per 1000 respectively (MoFED, 2008: 17, 18). As of 2005/06, maternal mortality reached 673 out of 100,000 (pp. 21, 22). In 2007, the life expectancy of Ethiopia was estimated to be 54.7 years (UNDP, 2009: 173). As of 2009, the life expectancy was estimated to be 55.41 years (CIA, World fact book). This shows that there is improvement in life expectancy at birth. Health budget per person in Ethiopia during 2005/06, 2006/07 and 2007/08 were Ethiopian birr 16.8, 19.5 and 26.7 respectively (NBE, 2008:28). To improve the health condition of its people, Ethiopia is expanding its health infrastructure. For example, the number of hospitals in 2005/06, 2006/07 and 2007/08 were 138, 143 and 149 respectively; about 61% of the hospitals were owned by the government (NBE, 2008:26). Moreover, the number of health centres in 2005/06, 2006/07 and 2007/08 were 635, 690 and 826 respectively; about 70% of them are owned by government.

As of 2006, the proportion of the Ethiopian population who had access to clean water was estimated to be 42% (UNDP, 2009: 178, 179). The population proportion who had access to clean water in 2006/07 and 2007/08 fiscal year was 52.5% and 59.5% respectively (NBE 2007/08: 18). That is, the proportions of people who had access in the three consecutive three years were 42%, 52.5% and 59.5%; access to clean water is therefore increasing over time. Finally, as of 2007/08, the rural and urban populations who had access to clean water were 53.9% and 86.2% respectively (NBE,2002007/08:19).

As of 2009, there were 63 airports; while 17 had paved runways, 46 of them didn't have paved runways (CIA, World fact book, 2010). Ethiopia has only one railway which runs from Addis Ababa to Djibouti; it is 681 kms long ((CIA, World fact book, 2010). As of 2007/08, the Ethiopia road net work reached 27,563 miles; of this about 46% was federal road (NBE, 2009:31). On average, about 66.8% of rural areas were more than five kilometers away from rural roads.

By 2006, the electric amount of Ethiopia reached 2890 GWh (EPPCO, 2007:35); at the same year, the corporation had about 1.07 million customers (pp.37). In 2007/08 fiscal year, 3530.2 GWh was generated; 95.5% and 4.5% were generated through hydropower and thermal power. In the same year, the number of electrified cities and town were 1,166 (NBE, 2008:36). EEPCCO (2009) indicated that in 2004/5, 2005/6, 2006/7, 2007/ and 2008/9 the number of electrified towns and villages were 648, 900, 1620, 3367 and 3367

respectively. As of July 2009, the corporation had 1,830,052 customers throughout the country.

Using 1999 to 2007, the adult literacy rate [age of at least 15 years] was estimated to be roughly 35.9% (UNDP, 2009:173). The adult literacy rate is estimated to be 64.1% (UNDP, 2009). To improve the literacy rate and accomplish the universal primary education [MDGs' goal], the educational budget of the country is increasing. For example, in 2006, 2007, 2008 and 2009, the educational expenditures as compare to total budgets were 17.8%, 24.6%, 22.8% and 23.6% respectively (MOE, 2008/09: 15). Moreover, the educational infrastructure is increasing. For example, in 2008/09, the number of kindergarten, primary, secondary, TVET and higher education schools were 2893, 25212, 1197, 458 and 72 respectively; the number of schools are owned by private and public (MOE, 2008/09: 13). As of 2008/09, the primary gross and net enrolment rations were 94.4% and 83.3% (PP. 5).

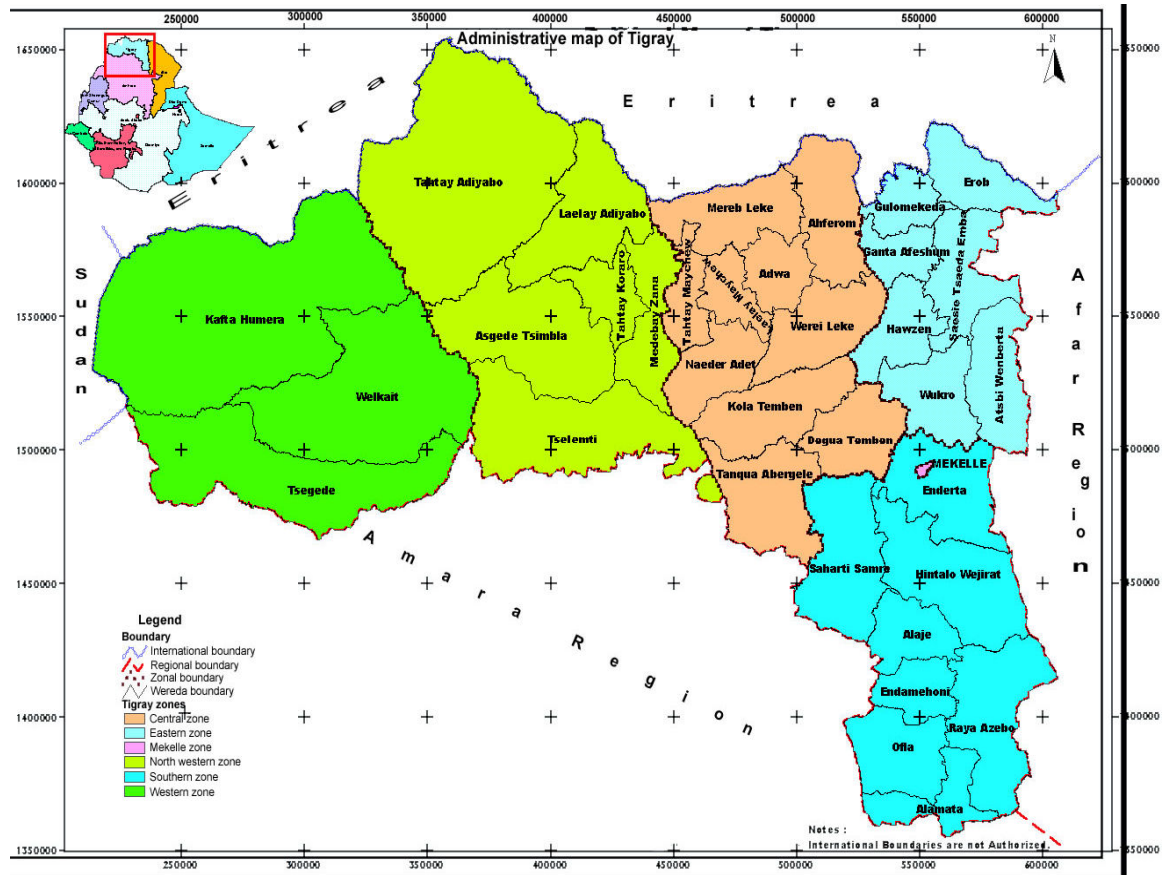
2.5 Forms of enterprises and their roles on employment in Ethiopia

To alleviate poverty, the Ethiopian government subscribes a broad-based approach including expanding and developing the agricultural sector. In order to accomplish this the government encourages private investment also seeking therefore to create job opportunities through the development of a micro and small enterprises strategy. Based on the MSEs strategy, large numbers of MSEs have been established in Ethiopia and these MSEs have created job opportunities that can help to distribute equivalent income for the poor. For example, according to the report of Central Statistical Authority (1997) there were 584,913 and 2,731 informal sector activity operators and small scale manufacturing industries respectively, which created job opportunities for about 738,989 people; the average number of employees and annual salary for the small scale manufacturing industries were two persons and 1,914 Ethiopian birr respectively, which is equivalent to about US\$200. Moreover, according to CSA (2006: 15-18), in 2005/6 there were 39,027 small scale manufacturing industries, which created job opportunities for 129,592 persons. In the 2007/8 fiscal year, there were 43,338 small scale manufacturing firms in Ethiopia; they created job opportunities for 138,951 persons (CSA 2010: 20/55). On average, each small scale manufacturing firm created job opportunities for three persons. As per the definition of Ethiopian statistical agency, firms with at least ten employees are called medium and large firms. As of 2007/08, there were 1930 medium and large firms, which created job opportunities for 133,673 employees (CSA, 2010: 19/48, 29/48). This implied that each firm has created job opportunities for 69 employees.

2.6 Location of Tigray

The Tigray Regional National State is one of the nine national regional states of Ethiopia; it is located in the North part of Ethiopia; it is highlighted in the red block (see Figure 2.2 below).

Figure 2.3 Map of Tigray



Source: Tigray Bureau of Finance and Economic Development, 2007

As per Ethiopian Mapping Authority (cited in EPA 2004: xvi [annex]), the location of the region is $12^{\circ} 15' - 14^{\circ} 50'$ North latitude and $36^{\circ} 27' - 39^{\circ} 59'$ East longitude. The area of the region is about 53,638 square kilometers. The topography of the region consists of high plateau and mountains with much of the land lying between 1,000 and 3,000 metres altitude.

Mekelle is the capital city of Tigray region and is located approximately 783 kilometers north of the capital city of Ethiopia, Addis Ababa. The population of Mekelle is approximately 215,546 (PCC 2008:58). The city is located within Enderta district, which is located in southern zone of Tigray. According to Ethiopian Mapping Authority (cited in EPA 2004: xvii [annex]), Mekelle city is located $13^{\circ}30'$ north latitude and $39^{\circ}28'$ east longitude. The altitude of Mekelle varies from 2150 to 2270 meters above sea level; the agro-ecology of the area is midland with dry climatic condition having erratic annual rainfall that varies between 450-600mm (DPPC, 2006:1).

2.7 Demography of Tigray

According to the census of 2007 the population size of the region is 4,314,456 (PCC, 2008:13). The population growth rate is 2.5%, which is below the growth rate of the country-2.6%. About 19.5% live in urban areas (PCC 2008:8, 11 & 19). As of 2007, the proportions of males and females were 49.2% and 50.8% (PCC, 2008:19). The census indicated that the proportions of the Orthodox, protestant, catholic and Muslim religion followers were 95.6%, 0.1%, 0.4% and 4% respectively (PCC, 2008:111). Moreover, as of 2007, the proportions of Tigray, Amhara and Irob ethnic groups who lived in the region were 96.55%, 1.63% and 0.71% respectively (pp.86, 87). Ethnic groups who live in the region are not limited to the above mentioned three ethnic groups.

2.8 Supply of clean water, health and education services in Tigray

According to the National Bank (2007/8:19) the population proportion of the region who had access to clean water in 2006/7 was 52.8%. The supply of clean water improved to 59.1% in 2007/08 (pp.19). This was similar to the national level clean water supply. As of 2007/08, the rural and urban populations who had access to clean water were 56% and 72% respectively (NBE, 2002007/08:19).

In order to achieve the Millennium Development Goals (MDGs), Ethiopia is working to expand the coverage of its primary school education. In 2005/06 and 2006/07 the primary gross enrollment rates in Tigray were 101.5 and 104.8% respectively; in the same year, the primary net enrollments were 77.5 and 79.1% respectively (NBE, 2007/08: 17). The 2008/09 annual report of Ethiopian ministry of education indicated that there were 1906 primary schools in Tigray (MOE, 2008/09: 98, 99); of these schools, 95% were owned by government; moreover, about 91% of the schools were located in rural Tigray (pp. 98,99).

The life expectancy of Tigray region for males of 2006/07 and 2007/08 was 52 years each; but the life expectancy of females in both years was 54.9 years (NBE, 2007/08: 22). The data shows that the life expectancy of females was higher than of males. As of 2006/07 and 2007/08, the infant mortality rates were 67 out of 1000 for each year (pp. 22). The regional infant mortality rate is below the national infant mortality rate, which were 77 out of 1000 in each year. The health budget per person in 2007/08 was Ethiopian birr 33; this budget was higher than of national budget per person, which was 26.7 Ethiopian birr (NBE, 2007/08:28).

3. Related Literature Review

3.1 Theoretical framework

According to Storey (1994) cited on Indarti and Langenberg (2004:3), firm and employees' income growth factors are classified in to three groups: (1) firm characteristics, (2) individual characteristics, and (3) contextual factors. While the firm characteristics include firm age, firm size and the like, individual characteristics include variables like age, gender, work experience, education, etc.

3.1.1 Firm and individual characteristics

Gibrat's law (Gibrat, 1931), which is known as stochastic model, assumed that initial firm size and age cannot be determinants of firm growth; the probability of proportionate change of firms during given time is similar for all firms regardless of firm size and age (Esteves, 2007:1; Becchetti and Trovato, 2001:1; Rizov and Mathijs, 2003:229; Lotti, Santarelli and Vivarelli, 2007:3). Hart (1998) cited on Laursen, Mahnke and vejrup (1999:1) argued that growths of firm can be stochastic or deterministic; while majority of the firm growths are occurred randomly, capital and research and developments can determine firms' growths; Hart (1998) partly agrees with the Gibrat's law. Though there are theories which explain about firm growth, there are inconsistencies between theories and empirical findings (Hart, 1998 cited on Laursen et al., 1999:1). Moreover, firms' growths are not only determined by observable variables, like location, type of industry, size, or capital; they are also determined by unobservable variables like capacity of management and employees of the firm (Jenson and McGuckin, 1997:44 cited on Laursen et al., 1999:1).

There are three theories of firm growth: theories of firm and entrepreneur, theories of entrepreneurial choice and theories of stages of development (Papadaki and Chami, 2002:4-7). In static theory, managerial ability is a key factor for firm growth; managers with better capacities can be efficient; this can lead to better firm growth (Lucas, 1978 cited on Papadaki et al., 2002:4). But firm expansion can limit efficiency of firm, which can reduce firm growth; hence, managers are required to delegate author authorities to capable workers of the firm (Lucas, 1978 cited on Papadaki et al., 2002:4). In addition to the capacity of the manager and delegation to subordinates, the willingness of managers to take risk during uncertain condition is a factor for firm growth; firms with risk taker leaders can grow better than of firms led by risk averter leaders (Kihstrom and Laffont, 1978 cited on Papadaki et al., 2002:5). The above argument doesn't assume that the capacity of people [managers] could be improved through time; the capacity of people is assumed static. It assumes that capable managers are born. But the firms life cycle of Jovanovic (1982) cited on Papadaki et al.(2002:5), which depends on learning process, assumes that individuals can learn from their practices through time; this assumes that leaders can be made. Experiences can help to boost the productivity and efficiency of a firm. But the growth of older firms is less than of younger firms. This can happen because the experienced managers can predict precisely which can reduce variably; but, because the predicting capacity of less experienced variables is low, the variance between

prediction and the reality can be high which can lead to high change in growth (Jovanovic, 1982 cited on Rizov et al., 2003:229). As a result, the growth rate of older firms is lower than of younger firms. Pakes and Ericson (1998) cited on Rizov et al. (2003:229) assume that efficiency can be realized through human capital formation. But formation of human capital is not easy within short time; it needs long time to bring difference in efficiency (Rizov et al., 2003:229).

Moreover, Jovanovic argues that the growth of surviving younger and small firms is better than of older firms. In the entrepreneurial choice theory, firm growths also depend on the psychological make up of the entrepreneur; those entrepreneurs who are willing to grow can grow better than of unwilling entrepreneurs (Davidson, 1989, 1991 cited on Papadaki et al, 2002:6). Davidson also indicates that small business owners are not willing to grow though there is a room for growth; this implies that large firms can grow better than of small ones (pp. 6). The theories of Churchill and Lewis (1983) cited on Papadaki et al. (2002:7), which is called theories of stage of development, assume that firms grow step by step. In this theory, there are five stages: existence, survival, success, take-off and growth; in the take-off stage, firms can grow when the owner of the firm is able to hire additional workers and delegate authority to subordinates (Papadaki, 2002: 7). In addition, in the take-off stage, there is need of enough financial resource which can help to satisfy demands of customers (pp.7).

Blau and Kahn (2000) stated that there is gender-income gap whether it is in developed or developing countries; theories assume that gender-wage gap can be created due to qualification or employment treatment (Jellal and Christophe, 2009:3).

3.1.2 Contextual factors

Business environment is divided into two: internal and external environment. While the external environment is under direct control of the firm management, the internal environment is beyond the direct control of a given firm management. Here, the contextual factor is related to external environment variables. According to Storey (1994), the contextual factors are like marketing, technology, information access, capital access, social network, legality, government support, etc. Boddy (2008: 93-101) has divided the external environment into competitive and general environment. As the author stated, the competitive environment has direct and immediate pressure on a given firm; but the general environment doesn't have direct and immediate influence on the performance of a given firm. The elements of the competitive environment are like new competitors, substitute products, bargaining power of buyers and suppliers, and rivalry level of existing firms. Moreover, the author indicated that political, economic, socio-cultural, technological, environmental and legal are elements of the general environment that can affect performance of a given firm.

3.2 Empirical findings

Because the thesis investigates how firm and individual level characteristics influence firms' and employees' salary growth, the influences of the contextual factors on firm and employees' salary are not analysed. As a result, empirical findings in relation to contextual factors are not discussed.

3.2.1 Factors that promote or constrain firms' growth

a. Firm characteristics

i. Firm age and growth

The relationship between the age of a firm and its level of growth is reciprocal. Indeed, there are empirical findings which suggest that the relationships between firm age and firm growth can be positive, negative or both. Some authors indicate that firm age and growth rate are negatively correlated. For example, Goedhuys et al. (2009:15) found that younger firms grow better than older ones. Liedholm (2001:11) found that firm age and the growth of firms are inversely related. Gebreeyesus (2007:6 and 7) indicated an inverse relationship between firm age and growth while Liedholm (2001:13) found "...similar findings are reported from Parker's (1994) Kenyan study, Cabal's (1995) Dominican Republic study, as well as McPherson's (1992) study." Their findings suggest that younger firms grow faster than older ones. Based on the study in Ethiopia, the growth of firms less than five years old is two times and four times of the growth of firms between the ages of 6 and 12 years as well as between 13 and 29 years respectively (Gebreeyesus, 2007:6).

On the other hand, there are a number of researchers who find that the age of a firm and its growth rate are positively correlated. For example, Indarti et al. (2004: 4) found that the "...length time in operation may be associated learning curve. Old players most probably have learned much from their experiences than have done by new comers. Kristiansen, Furuholt, and Wahid (2003) found that length time in operation was significantly linked to business success."

Bigsten and Gebreeyesus (2008:831) found no linear relationship between the age of a firm and firm growth. At the early period, there is inverse relationship; in the middle, the relationship is constant [for most periods]; finally, the relationship turns to positive as the firm gets older. Moreover, Indarti et al. (2004: 11) did not find significant relationship between firm age and its growth.

ii. Firm initial size and growth

The initial size of the firm has an inverse relationship with a firm's growth. That is, initially small sized enterprises have better opportunities to grow than initially large established firms (Liedholm 2001:11and12; Goedhuys et al., 2009:15; Esteves, 2007:3; Gebreeyesus, 2007:7 Coad et al.,2008:15). On the other hand, different authors argue that firm size is positively correlated to firm growth. For example, Coad et al (2008:3) states that "firms that enter small often remain small, because they face formidable barriers to growth". Sleuwaegen and Goedhuys (2002) also found a positive relationship between age and size on Ivorian enterprises; they found that large sized firms grow better than the smaller ones. Moreover, Van Biesbek (2005) and McMahan (2001) have argued that firms initially established larger grow better than the smaller ones. Finally, Parker (1994) and McPherson (1992) found positive relationship between firm size and firm growth.

iii. Source of capital and access to credit

The availability of financial resources is crucial for business operation and to the growth of firms. These sources of the capital can be either internal or external. While the internal sources can be one's own savings, the external financial sources includes like financial institutions, traders, individual money lenders, or money from friends, relatives, and families.

Researchers indicate that firms based on external finance grow better than non-external financed firms. For example, the growth of external finance user firms in Australia (McMahon, 2001) and Indonesia (Kristiansen, Furuholt, and Wahid, 2003), is better than the firms which do not use external financial resources. Moreover, based on his study in Brazil, Saeed (2009:140) indicated that access to external finance is an important element for growth, though the internal source of finance is also important. Finally, Gebreeyesus (2007:16) argues that firm growth is positively correlated with external source of finance (trade credit and other informal sources of finance).

Schiffer and Weder (2001) identify factors that constrain bank loans such as “high interest rates, collateral requirement, bank paper work, inadequate credit information to clients, and credit rationing.” In the case of Ethiopia, the major loan problems for small scale manufacturing firms are satisfying collateral requirements, insufficient loan, and high interest rate (CSA, 2003: 33-38).

Compared to medium and large firms, small firms in Ethiopia typically do not have enough financial resources or properties that can be used as collaterals (Saeed, 2009:132). As a result small firms in developing countries do not have enough access to credit from banks (Nichter et al. 2005:21; Nichter et al. 2009:13). The findings of Indarti et al. (2004: 11) indicate that the growth of entrepreneurs whose sources of finance from families is better than those who obtain other sources of finance. Firms with sources of capital from family are better than any other (Indarti et al., 2004: 11). This suggests the importance of external sources of capital for firm growth.

iv. Type of ownership and firm growth

There are a number of different firm ownership styles including proprietary and partnership. Ownership structure has an effect on a firm's growth. Typically, the growth of enterprises owned by single individuals [sole proprietor] is better than owned by many [partnership] (see Coad et al. 2008:12).

b. Individual characteristics

i. The education level of firm leaders and firm growth

Some authors argue that secondary education is better for a firm's growth, whereas others argue that tertiary education is better. The findings show that the role of education level on firm growth can be different from place to place. For example, Alvarez and Crespi (2003) note that small firms owned by highly educated persons do not grow because the owners divert their attention to other issues, like searching and working other jobs. On the

other hand, tertiary education in Latin America has positive contribution for firm growth (Kantis, Angellini, and Koenig, 2004 cited in Nichter et al. 2005:15). In Sub-Saharan Africa countries, firms owned by people who have completed secondary school grow better than of firms owned by people with lower education levels (McPherson 1999; Parker 1995; Mead and Liedholm 1998). This idea is supported by the findings of Indarti et al. (2004: 11) from Indonesia, who found that the performance of firms owned by entrepreneurs with high school education level is better than of any other education level. But in Latin America, high school education level did not assist entrepreneurs to boost their business (Kantis, Angellini, and Koenig, 2004).

ii. Experience/training of firm leaders and firm growth

The growth of a firm owned by entrepreneurs who have related experience is better than the growth of firms owned by less experienced entrepreneurs (Nichter et al., 2005:15; Nichter et al. 2009:7; Gebreeyesus, 2007:14). For example, according to Mead and Liedholm (1998) and Parker (1995) the growth of firms owned by people who have pre-establishment experience was better than firms owned by entrepreneurs who had no pre-establishment experience. Moreover, on-the-job training within the same sector is crucial for the growth of a firm (Nichter et al. 2005:16). According to McPherson (1992) and Parker (1994) the growth of firms with trained owners is better than of untrained proprietors.

Parker (1994) notes that vocationally trained workers had better contribution to the growth of a firm growth than untrained workers. Moreover, Liedholm (2001:13) argues that the capacity gap of owners can be filled by having skilled workers. Gebreeyesus (2007:14) on the other hand found that vocational training was not a significant factor for a firm's growth in Ethiopia.

iii. Gender of firm owners and firm growth

Research indicates that a firm's growth can be affected by the gender status of the entrepreneur. That is, enterprises that are run by males grow better than those run by females (see Liedholm, 2001:12; Gebreeyesus, 2007:7; Coad et al., 2008:12).

Researchers have suggested a number of reasons why female-headed firms grow less. For example, Downing and Daniels (1992) assume that females are risk averters, while Liedholm (2001:12) add that discrimination against females can be the reason for less growth of their firms. Moreover, Singh et al. (2001) note that female headed enterprises are small and pay less salary to their employees; paying less salary implies that skilled workers do not prefer to join such firms. As a result, the female headed firms cannot be productive. Gebreeyesus (2007:14) also argues that the growth of female-headed firms' can be slow because they have double jobs [home and business] that can dilute their efforts in their business. According to ILO (2004) firms owned by women grow slowly than of males because most of their businesses are located in households with less access to market. Moreover, the income generated from such firms is used for household purpose that can slow down growths of firms owned by women (Nichter et al. 2005:17).

iv. Age of entrepreneur and firm growth

Similar to other factors, the relative age of an entrepreneur can influence the growth of their firms. For example, Sinha (1996) has indicated that, firms owned by younger individuals were more successful in India. On the other hand, in Indonesia, entrepreneurs older than 25 years were more successful than younger ones (Kristiansen, Furuholt, and Wahid, 2003). Reynolds et al. (2000) indicate that entrepreneurs with age of 25-44 are found to be more successful than other entrepreneurs, while studies in Indonesia and Ethiopia couldn't find a significant relationship between the age of an entrepreneur and a firm's level of growth (Indarti et al., 2004: 11; Gebreeyesus, 2007:14).

3.2.2 Factors that influence the salary of an employee

There are a number of factors that affect the salary level of an employee. Some of the factors may include firm size, firm age, gender, level of education, training, and experience. These factors are discussed below:

i. Firm size and wage

Different authors indicate that there is positive relationship between firm size and wage; as the firm size increases, wage increases (Söderbom, Teal, and Wambugu, 2002:1 and 15; Moore 1911; Oi and Idson 1999). For example, in African manufacturing firms, findings indicate that firms growth and wage level are positively correlated (Valenchik, 1997; Strobl and Thornton, 2001 and Manda, 2002).

On the other hand, Söderbom et al. (2002:1) and Beker (1962) indicated that a firm's growth is positively correlated with the skill of the employees. This implies that as long as there are skilled employees, there is firm growth; as long as the firm grows, it requires skilled workers, and the skilled employees can get higher salary as compare to less skilled employees (Hamermesh 1980 cited in Muravyev, 2007:2).

ii. Firm age and wage

Söderbom et al. (2002:15) indicated that a change in income correlates positively with a change in a firm's age. Older firms pay higher wages than newly established firms (Brown et al. 2001:9). The survival rate of older firms is better than of new ones. This implies that older firms pay higher salary than new ones. Troske (1998) has indicated that, compared to employees who work in firms with less than five years experience, firms older than 15 years paid wages to their workers about 20% extra. From the above information, the researcher can argue that the wage and firm-age are positively correlated; as the firm-age increase, wage increases.

According to Brown et al. (2001:1), younger firms are more vulnerable to liquidation than older firms. If the firms are liquidated, employees of such firms can be jobless for short or longer periods; as a result, the livelihood of the workers can be harmed. For example, according to Gibbons and Katz(1991) people could not find employment for about 20 weeks after their displacement from their jobs due to redundancy; even when they get employment after the mentioned time, their wages are less than the wage they were paid

before displacement. Therefore, due to such risks people are discouraged to join new firms. Hence, to attract capable workers and compensate potential closings, newly established firms are forced to pay higher wages than older ones (Brown et al. 2001:4). The reverse is true for older firms; the survival rate of older firms' is better than of new ones. Hence, because of job security, employees are more likely to work at such firms even at lower wage (Brown et al. 2001:15). Moreover, older firms pay fringe benefits like pension and insurance, which can compensate the reduction in wage; such benefits attract high-wage workers (Brown et al. 2001:5, 15). The authors indicate that fringe benefits are not common to newly established firms (pp.5). Hence, based on the above arguments, the researcher understands that the firm age and wage are negatively correlated.

Brown et al. (2001:12, 14, 15) indicated that the wage-age relationship is U-shaped. This indicates that, the newly established firms pay higher wages at the very beginning; then after the introduction of fringe benefits, the firm age-wage relationship being inverted; the wage level falls as the age of firms increases; and finally, due to requirement of skilled labor and/or profitability, the older firm pay higher salary for their workers (pp.15).

iii. Gender and wage level

Different studies show that males get better wages than females even if both genders have similar capacity. For example, based on their studies in Kenya and Ghana, Söderbom et al. (2002:12) indicated that female workers are paid less than male workers. Based on their study in Britain, Mumford et al. (2004:5) show that the "female hourly earnings are on average 26.5% below male average hourly earnings." Data of 1999-2004 in Belgium found that the wage level of males is found to be far greater than that of females (Dumont, 2008:15, 16). In Shanghai, Xiao (2001:96) found that male workers get 6.6% more than of females. In general, this implies that gender affects the level of income of employees. But there is also empirical evidence that shows that the wage gap is expressed more in terms of the education level of workers; Jellal et al. (2009:3, 4) has indicated that there is similarity in wages in lower jobs.

Generally, there are some sources of gender-wage earning gap, like the expected productivity level, exclusion of females from 'male' jobs, discontinuous participation of females, and training level. Jellal et al. (2009:3) indicate that firms pay wage to their workers based on the expectation in productivity of their workers. Here it is assumed that males are more productive than females, which leads to wage differences. Moreover, Jellal et al. (2009:3) indicate that the exclusion of "females from male jobs" has increased the supply of females in the labour market, which aggravate the wage gap of females; more females compete for fewer jobs, which can lead them to lower wages. In addition, the "discontinuous participation" of females in work has also contributed for the wage discrimination (Jellal et al., 2009:4). This implies that females may not work continuously due to maternal leave, child care, etc, which firms may dislike.

Furthermore, it is known that training level also affects the wage level of workers. For example, as Mincer (1962) indicates, males invest much more money in on-the-job training than females. Chiswick (2003:8) and Jellal et al. (2009:3 and 4) add that females are not interested to take more training, because the probability of dropping out from labour force is high due to 'child rearing', and domestic work. Because of the likelihood of discontinuity of females, firms may not be willing to give 'firm specific training' for

their female workers. This implies that, under normal circumstances, as a result of the low investment in training, female workers can be less capable which results in them being susceptible to low incomes.

iv. Education and wage level of workers

There is an assumption that education improves the capacity of people, which can lead to better income. Different authors argue that the level of wage increases as the level of education goes up (Söderbom et al. 2002:14; Mumford et al. 2004:9; Dumont, 2008:26). The wage growth of higher educated workers is better than of the lower educated ones; for example, Connolly et al. (2006:13) indicated that the annual within-job wage growths of higher educated females and males are four times and two times respectively to their respective less educated ones.

But the finding of Xiao (2001:98) doesn't support the above ideas; based on her study in Shanghai, she found that education level had a major role in raising the mean wage of employees, but not on wage growth rate. According to her assessment, firms do not consider the education level in increasing wage level of employees at a later stage; the education level has a positive impact on deciding the wage level at the early stage (pp.98). Generally, education has a positive contribution in raising the level of income of employed people.

v. Training and wage

It is generally acknowledged that training adds some capacity to trainees. Hence, as training increases, the working capacity of people increases, which can lead to better income. As there are different types of training, it is better to know the type of training that can increase capacity and therefore income.

Brown et al. (2001:5) found that firm specific-training increases when the survival rate increases; such types of training help to increase the wage level of employees. Training is an important tool to improve productivity and the living standard of countries (Ok and Tergeist, 2002). But all people may not get the same opportunity for training. For example, according to Gershuny (2005) more training is given for more educated workers and who are engaged in complex activities. Mumford et al. (2004:5) add that, during the introduction of new technologies firms give more training to better educated workers. According to Almeida-Santos et al. (2006:2), such training leads to better positions, higher wages and further training; moreover, this reduces employee turnover of more skilled and educated workers. This implies that more educated workers benefit from training.

On the other hand, less skilled and less educated workers do not get as much training and these types of workers are vulnerable to continued low income and an increase probability of unemployment (Keep et al. 2002). As a result of the lack or insufficient training, the less educated workers may not be capable enough to increase their productivity level; because of this, firms may not pay enough money for such workers that can help them to stay long in the same firm. As a result, employee turnover and unemployment of less skilled and less educated persons can increase. This shows that wage growth of less educated workers is not from within-job but it is between jobs (Connolly et al. 2006:1).

The amount of money invested for training and income generated from employment are positively correlated (Mincer 1957, 1958). For example, from her study in Shanghai, Xiao (2001:99) has found a positive relationship between on-the-job training and wage growth. Her finding shows that manufacturing workers get about 0.90% wage increment from every on-the-job training practice. This implies that more educated people invest much money for training and are therefore about to increase their earnings. On-the-job training increases as the level of education increases; but the training level decreases as the age increases (Mincer 1962). This implies that more educated people demand more on-the-job training than less educated ones.

vi. Wage and experience

There are three types of experiences: experience within firm [tenure], sector specific experience, and general experience. While the 'tenure' shows loyalty of a worker for one organisation [firm-specific], the 'sector-specific experience' shows the work experience of workers in the same industry [similar firms], but not limited to specific firm. On the other hand, the 'general experience' refers experience of workers outside of the industry.

According to Connolly et al. (2006:16), "tenure, sector-specific experience and general experiences" have a better impact on wage changes [with-in job] for more educated workers than for less educated ones. Comparatively, the returns for sector specific and general experiences are greater than of experiences to specific firm. Moreover, Manning and Robinson (2004) indicate that the return for tenure is small. Finally, Mumford et al. (2004:9), found that the contribution of work experience on income decreases as age increases. This implies that the earnings increase as working experience increases, but at diminishing rate when workers are getting older.

4. Methodology

4.1 Sample size and sampling technique

The target population of this study are the medium and large scale manufacturing firms located in Tigray, Ethiopia.

4.1.1 Sample size

a. Sample size of firms

In this research, I collected data from 31 out of a total of 43 medium and large enterprises located in Tigray. The remaining twelve firms were excluded because: (1) ten firms were under three years of age, which didn't have historical data, and (2) two firms couldn't provide me with data of their practices.

b. Sample size of employees

About 9226 employees work in the 31 medium and large manufacturing firms. Of these workers, 532 workers were randomly selected as a sample, which is about 6% of the total. In order to collect data that may indicate firm and income growth rates, I selected representative samples from each firm.

4.1.2 Sampling technique

For quantitative research methods, Bryman (2008) advises to use probability method in selecting representative samples; this helps to reduce bias error of the researcher. Moreover, the author argues to cluster the study areas based on some characteristics.

In Tigray there are about 43 medium and large manufacturing enterprises; these firms are with paid up capital of more than 500,000 Ethiopian birr, which is equivalent to about US \$ 45,500.00. Initially, I planned to collect data from all the manufacturing enterprises but data was only collected from 31 firms because either the firm was below three years of age or the firm was unwilling to provide me necessary data. As a result there was no need of selecting a sample from such a small number of firms; I have collected data from all medium and large manufacturing enterprises.

To determine whether or not the income of employees is changing, I selected employees who were employed in the same firm for at least three years (2007-2009). This was done in order to compare the firm and income growth rates throughout the duration of their employment period. The workers with at least three years of internal service are regrouped in two males and females. The sample is selected on all education levels and for both genders for each firm. Moreover, workers with and without external related service years are included. Finally, the representative sample was selected using a lottery method.

4.2 Research method, data type and collection method

a. Research method

The topic deals with two main issues: (1) the growth dynamism of medium and large manufacturing firms' and factors influencing growth; and (2) growth dynamism of employees' income and determinants of income growth in Tigray, Ethiopia. There are four main research questions: two about growth statuses and two about determinant factors for each type of growth. If the researcher used a mixed research method (quantitative and qualitative), his effort could be diluted; lots of activities can be complicated due to many serial activities: (1) data collection and analysis for the qualitative one; (2) collecting and analysis of the quantitative data; (3) synchronizing of both data. Hence, for effectiveness and efficiency purpose, I used only quantitative research method.

b. Data type and collection method

I gathered the list of medium and large manufacturing firms in Tigray from the Tigray bureau of transport, industry and trade; they were about 43 firms. For the aforementioned reasons, I collected secondary data from 31 firms only using a structured questionnaire. The 31 firms are grouped in to 14 sub-sectors and shown on Table 4.1 below.

Table 4.1 Name and size of sub-sectors

Sub-sector	Number of firms	Sub-sector	Number of firms
Cement	1	Alcohol and liquor	3
Industrial engineering	1	Water bottling	1
Pharmaceutical	1	Flour and bread	5
Leather	1	Steel	3
Textile and garment	2	Plastic	2
Geo-textile	2	Marble	1
Printing	4	Gravel, cement products and bricks	4

4.3 Firm's growth measurement tool

There is no uniform measurement of growth; different authors use different parameters. Some of the parameters are: number of employees, sales volume, asset, profitability, return on investment, market share, etc. (Bridges et al. 2003:271-272; Delmar 1997, Davidson et al. 2005, Allison et al. 2006 cited on SBRC 2008:1; Liedholm 2001:8; Goedhuys and Sleuwaegen 2009:4).

If there is no uniformity in measuring growth of firms, concluding which firm is grown or not may not be possible. Hence, to differentiate the growing firms from the non-growing ones, it is must to come with common measurements. Different authors come with some measuring parameters. For example, according to Bridges et al. (2003:272), mostly

growth of enterprises is measured by employment level; Brush and Vanderwerf (1992) cited on SBRC (2008:2) added that employment level and /or sales volume of firms can be used as measurement parameters. Furthermore, Nichter and Goldmark (2009:3) used number of employment to measure growth of firms.

From the perspective of African countries, the use of employment as the measure of growth is very appropriate and socially relevant. It also limits the problems related to turnover and value added measures, which are expressed in monetary units, and may be affected by price changes in different countries (Goedhuys and Sleuwaegen 2009:8).

The above quotation indicates that measuring growth of firms using number of employees is preferable for countries or firms which lack sales and financial data. Moreover, Liedholm (2001:8) argues that using number of employees as unit of measurement for firm's growth is simple because the owners of the enterprises can easily recall the number of employees they had in each period.

But the study deals with medium and large manufacturing firms in Tigray; there are labor intensive as well as capital intensive firms; it is impossible to measure the g For labor intensive firms, it is impossible to measure firms' growth of capital-intensive firms using number of employees. On the other hand, because of inflation, costs of products and assets can be increased from time to time. Hence, using sales volume as measurement unit of firm growth has limitations. Moreover, measuring firm growth using profit level could be good; but getting such data form the firms in Tigray is hardly possible.

Hence, though it is vulnerable to inflation, measuring firms' growth using sales volume is preferable. Hence, the firm growth leveling medium and large manufacturing firms in Tigray is measured using sales volume.

4.4 Method of analysis and model

The analysis is done using two methods: statistical descriptive and significance test using econometrics. The statistical descriptive is done using various statistical tools in STATA version 10.1.

4.4.1 Statistical descriptive

The firm and income growth rates for the 31 firms for 2008 and 2009 are assessed based on their growth from 2007 and 2008 respectively. Moreover, the data of 2007 is used to check the 3 year growth rate (i.e. 2007 to 2009). The growth status of firms and employees' income were then calculated and are provided in Chapter 5.

4.4.2 Econometrics analysis

The thesis deals with growth dynamism and identifying the determinant factors of firms and salary of employees. To do this, I collected three years panel data, which ranges from

2007 to 2009. In doing the analysis, I used static linear panel data model. To proceed to analysis using econometrics, I used the following tests.

a. Model selection test

There are two types of model selection tests in linear panel data analysis: (1) “Testing for the presence of an unobserved effect: RE versus pooled OLS.” (2) “Testing for non-zero correlation between the unobserved effect and the regressor(s): FE versus RE” (Söderbom, 2009:14).

i. Testing for the presence of unobserved effect using the Breusch-Pagan test

To determine whether or not the data should be analysed using the random effect (RE) or pooled ordinary least square (OLS) method, there is need to conduct a Breusch-Pagan test; the stata command for the test is “xttest0”. If the null hypothesis is rejected, this indicates that the random effect is preferred over the pooled OLS. The results of analysis undertaken at this initial stage in the analysis indicated that the random effects was the preferred model (refer annexes 1 and 7).

ii. Testing either to use random effects or fixed effects

To use a fixed effects model there should be an assumption that the individual unobserved characteristics vary and correlate with the explanatory variables (Verbeek, 2000:313-314; Wooldridge, 2002:449-453). Moreover, the explanatory variables are assumed to be exogenous and independent of the error terms.

Random effects can be used if the individual unobserved characteristics and the explanatory variables are uncorrelated (Verbeek, 2000:315; Wooldridge, 2002:449). The authors indicate that the individual unobserved characteristics and idiosyncratic error terms can be correlated, which can create incorrect standard errors though it can be solved by using generalized least square (GLS). Woodridge (2002: 453) warns that the estimates of random effects are inconsistent if the fixed effect is appropriate. Note that the endogeneity test is included in the process of selecting either to use random effects or random effects.

In order to determine whether to use the random effects or fixed effects model, Verbeek (2000:319) and Wooldridge (2002:453) suggest using the Hausman test. In the Hausman test, the null hypothesis is that explanatory variables and the individual unobserved characteristics are uncorrelated. This implies fixed effects will be better model for the analysis if the test is found significant; otherwise, random effect model will be used. Cameron and Trivedin (2009:261) warn however that the default Hausman test is not the perfect test; because the individual unobserved characteristics and idiosyncratic error term may not be i.i.d., there is need of using robust Hausman test. The authors state however that there is no stata command for robust Hausman test; hence, this needs written command for such test. The tests for firm and employees’ income determinant factors are shown on annexes 2 and 8.

A random effect was found appropriate model to determine the significant factors affecting the growth of a firm (see annex 2). In order to determine the employees' income growth factors, the Hausman test indicated that a fixed effects model should be employed. The final regression [test] results for firm and income growth significant tests are presented on Tables 4.2 and 4.3 respectively.

b. Multicollinearity test

Multicollinearity refers how the explanatory variable are correlated each other; if they are highly correlated, it is possible to say that there is multicollinearity. As long as there is multicollinearity, it is difficult to conclude how the explanatory variables affect the dependent variable. In this study multicollinearity was checked using the stata command `'pwcorr depvar indepvar, sig'`. Variables are highly correlated if they are correlated by at least 0.80 with each other. In the test of firm growth, only the 'intexp2' [artificial variable] [squared internal experience in years, intexp2] is highly correlated with 'intexp' [the main variable]; but such collinearity doesn't have a problem. But in case of the income growth determinant factors test, there was no any multicollinearity. The multicollinearity tests for firm and income growth determinant factors are shown on annexes 3 and 9 respectively.

c. Autocorrelation tests

Autocorrelation refers how the current error term can affect the error term of the sequential periods. As a result, the existence of autocorrelation can decrease the efficiency of significance tests (Drukker, 2003:168). Hence, there is need to identify any evidence of autocorrelation in the dataset; and if so, apply corrective measures. The stata command for a serial correlation test is `'xtserial depvar indepvar'`. The null hypothesis assumes that there is no autocorrelation. Accordingly, tests were done; but autocorrelations were not found in both tests. The autocorrelation test for firm and income determinant factors are done and presented on annexes 4 and 10 respectively.

d. Heteroskedasticity

Heteroskedasticity refers to how the error term from analyses varies from one observation to another. In fixed effects, the presence of heteroskedasticity in the dataset was checked using the stata command `'xttest3'`. The null hypothesis assumes that there is no heteroskedasticity. As indicated on annex 11, the test indicated that there was a heteroskedastic problem. But the heteroskedasticity problems in this study were corrected using the 'vce robust' function with random effects or fixed effects models.

f. Normality test

After the last regression with robust option, the fitted values were predicted for both tests. Then, to find the residual value, each predicted value is deducted from each observed value. The normality of the residual is checked using the non-parametric Kernel density. The normal curves for firm and income growth determinant factors are shown on annexes

6 and 12 respectively. Both curves indicate that the distributions of the error terms are normal.

4.4.3 Equations and definitions for firm and employees' salary growth determinant factors

a. Firm growth determinant factors

i. Panel model of using random effects model

$$Y_{it} = \alpha_i + \sum X_{it} \beta + \varepsilon_{it}$$

Where

Y_{it} = employees' salary growth at different times

α_i = constant term for 'i' individuals

X_{it} = the explanatory variables

β_i = coefficient of each explanatory variable

ε_{it} = error terms of individuals at different times

The equation to determine the growth of firm is shown as follows.

$$Firmgrowth_{(it)} = \alpha_0 + \beta_1(int\ exp)_{it} + \beta_2(int\ exp^2)_{it} + \beta_3(initiallagfirm)_{it} + \beta_4(pri\ min\ t\ exp)_{it} + \beta_5(dgr\ int\ exp)_{it} + \varepsilon_{it}$$

ii. Definition of abbreviations

Table 4.2: Definition of abbreviations for firm growth determinant factors

Abbreviation	Definition
firmid	ID number of a firm
year	Operation year
logsales	Sales revenue in log form
salesvol	Sale revenue in Ethiopian birr
firmage	Age of the firm, in years
fagelag1	Age of the firm lagged by one, in years
ageofleader	Age of the respondent
leaderage2	Age of the respondent lagged by one year
intexp	Total internal experience, in years
intexp2	Squared total internal experience, in years
uneducinexp	Internal experience interacted with uneducated workers
priminexp	Internal experience interacted with primary education level workers
seconinexp	Internal experience interacted with secondary education level workers
cerdipinexp	Internal experience interacted with certificate/ diploma holder workers
dgrinexp	Internal experience interacted with first degree and above education level workers
extexp	Previous external related experience, in years
extexp2	Squared previous external related experience, in years
uneducextexp	External experience interacted with uneducated workers
primextexp	External experience interacted with primary education level workers
seconextexp	External experience interacted with secondary education level workers
cerdipextexp	External experience interacted with certificate/ diploma holder workers
degextexp	External experience interacted with first degree and above education level workers
initlargfirm	Using paid up capital, the firm size at the initial time is large
mediumfirm	Using paid up capital, the firm size at the initial time is large medium
solep dum	The legal form of the enterprise is sole proprietorship
plcdum	The legal form of the enterprise is Private limited co
publicdum	The legal form of the enterprise is public
eduneddum	The education level of the leader of the firm is Illiterate/reading and writing
edprimdum	The education level of the leader of the firm is primary (1-8)
edsecdum	The education level of the leader of the firm is high school (9-12)
edcertdipdum	The education level of the leader of the firm is certificate/diploma
eddegrdum	The education level of the leader of the firm is first degree and above
maleleader	The gender of the leader is male
femaleleader	The gender of the leader is female
intexp2lag1	internal experience lagged by one year
leadagelag1	Age of the leader lagged by one year

b. Employees' income growth determinant factors

i. Panel model of using fixed effects model

$$Y_{it} = \alpha_i + \sum X_{it}\beta + \varepsilon_{it}$$

Where

Y_{it} = employees' salary growth at different times

α_i = constant term for 'i' individuals

X_{it} = the explanatory variables

β_i = coefficient of each explanatory variable

ε_{it} = error terms of individuals at different times

The equation to determine the growth of employees' income is shown as follows.

$$EmployeeSalary_{(it)} = \alpha_0 + \beta_1(int\ exp)_{it} + \beta_2(pri\ min\ exp)_{it} + \varepsilon_{it}$$

ii. Definition of abbreviations

Table 4.3: Definition of abbreviations for employees' salary growth determinant factors

Abbreviation	Definition
firmcode	ID number of the firm
empid	ID number of the employee
year	Operation year or panel year
income	Annual gross salary of employee, in Ethiopian birr
logincome	Annual salary in log form
intexp	Internal service years
intexp2	Squared internal service years
extexp	Related external service years of employees
extexp2	Squared related external service years of employees
empedintexp	Interaction of education level and internal experience in years
empuneduc	Illiterate/reading and writing education level
empprimary	Primary education level
empsecond	Secondary education level
empcertidip	Certificate/diploma holder
empdegree	First degree and above
uneducinexp	The interaction of uneducated persons and internal experience
priminexp	The interaction of primary level persons and internal experience
secinexp	The interaction of secondary education levels persons and internal experience
cerdipinexp	The interaction of certificate/diploma holder persons and internal experience
degrinexp	The interaction of first degree and above education level persons and internal experience
soleintexp	Sole proprietorship interacted with internal service years of employees
plcintexp	Private limited company interacted with internal service years of employees
publicintexp	Public enterprise interacted with internal service years of employees
largefintexp	Large firm interacted with internal service years of employees
Intexplag1	internal experience lagged by one year

5. Analysis and discussion

5.1 Results of descriptive statistics

5.1.1 Growth status of medium and large manufacturing firms

To determine whether or not medium and large manufacturing firms are growing in Tigray, I used three years’ panel data: 2007 to 2009. In all instances the sales data of 2007 are used as base data to calculate the growth rates of 2008 and 2009 respectively.

The 31 enterprises are sub-grouped in to 14 sub-sectors; the code of each sub-sector is presented on Table 5.1.

Table 5.1: code of sub-sector

Name of sub-sector	Code of sub-sector	Name of sub-sector	Code of sub-sector
Cement	1 or SS1	Alcohol and liquor	8 or SS8
Industrial engineering	2 or SS2	Water bottling	9 or SS9
Pharmaceutical	3 or SS3	Flour and bread	10 or SS10
Leather	4 or SS4	Steel	11 or SS11
Textile and garment	5 or SS5	Plastic	12 or SS12
Geo-textile	6 or SS6	Marble	13 or SS13
Printing	7 or SS7	Gravel, cement products and bricks	14 or SS14

a. Growth rates of firms in three years [2007-2009]: all firms

The sales volumes of all firms were added for each panel time [2007, 2008 and 2009]. Compared to 2007, the sales volume in 2008 was higher by about 17%. Similarly, compared to 2008, the sales volume increased again by about 14% in 2009. Generally, Figure 5.1 indicates that the sales volume of the medium and large manufacturing enterprises in Tigray are increasing but at a decreasing rate.

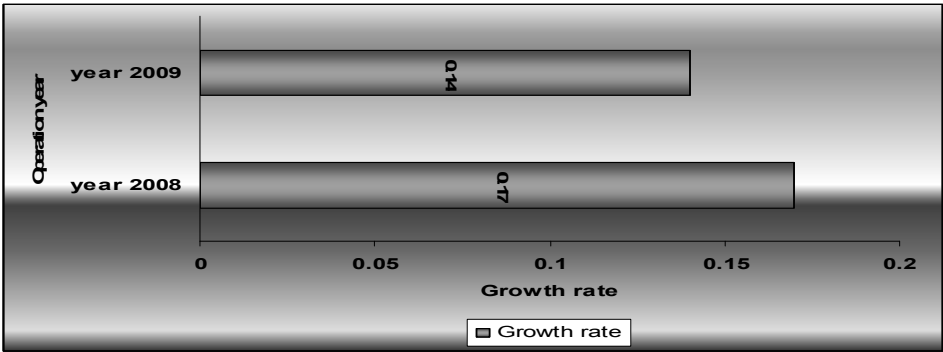


Figure 5.1: Aggregated sales growth rate [2007-2009]

b. Growth rates of firms in three years [2007-2009]: by sub-sectors

i. Using the data of successive years

The sales volume of each firm in each sub-sector was added up for each year (i.e., 2007, 2008 and 2009), and then the successive annual sales growth rate of each sub-sector was calculated by comparing against its immediate previous year's sales volume. The firm growth rates of each sub-sector are shown on Figures 5.2 and 5.3 respectively. Because the growth rates of the sub-sectors 9 and 12 are very high in 2009 and 2008, presenting the growth rates of these sub-sectors together with other sub-sectors in one chart is challenging to observe the different growth rates. As a result the firm growth rates of sub-sectors 9 and 12 are presented separately in Figure 5.3.

To calculate the growth rate of 2008, the sales volume of 2007 is used as a base year. As a result, compared to the sales revenue of the base year, the sales growth rates of water bottling, alcohol and liquor, Industrial engineering, gravel-cement products and bricks, and leather sub-sectors were negative ranging from 80% to 8% below zero in 2008; but the sales growth rates of plastic, geo-textile, steel and pharmaceutical sub-sectors were up by 497%, 128%, 86% and 52% respectively. Roughly 36% of the sub-sectors were declining, whilst an equivalent proportion of the remaining sub-sectors grew by more than 50% in 2008.

The sales growth rate of each sub-sector in 2009 is compared against the sales volume of 2008 and shown in Figures 5.2 and 5.3. The results indicate that sub-sectors like cement, Industrial engineering, printing and alcohol and liquor had the lowest sales growth rate ranging from zero in the cement industry to 5% in the alcohol and liquor industry. In the same year, the sales growth rate of the water bottling industry was more than 20 times that of the previous year. A number of sub-sectors showed good performance in the same year. For example, the sales growth rates of the leather, plastics, flour and bread as well as geo-textile sub-sectors were 109%, 97%, 86% and 85% respectively.

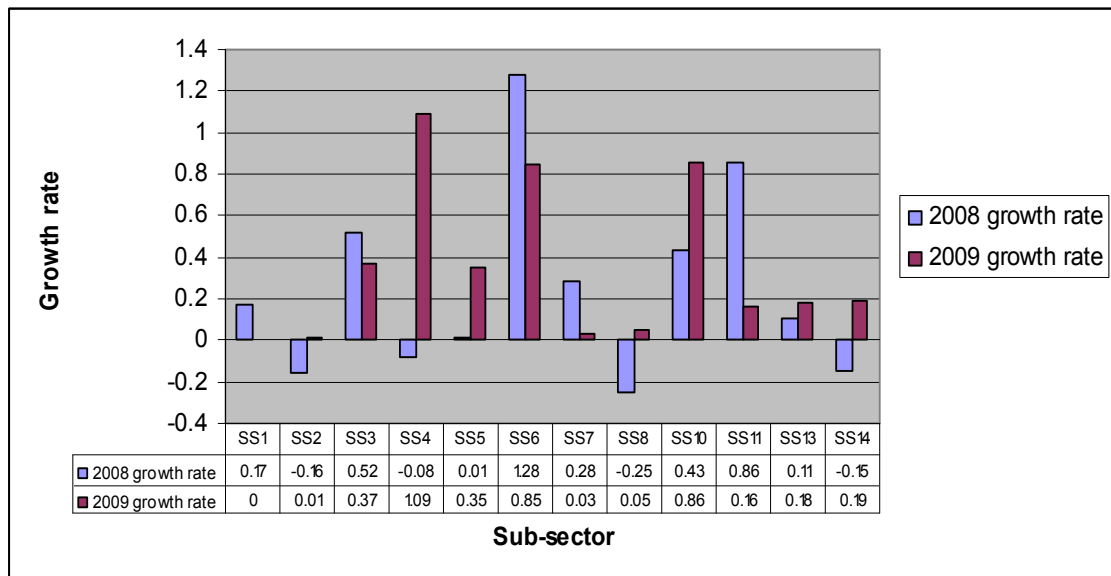


Figure 5.2: Sales growth of firms in 2008 and 2009 by sub-sector

Both Figures 5.2 and 5.3 indicate that the growth rates of sub sectors like Industrial engineering as well as alcohol and liquor were low but the sales growth rate of plastic, geo-textile, flour and bread and pharmaceuticals sub-sectors were remarkable high over this period.

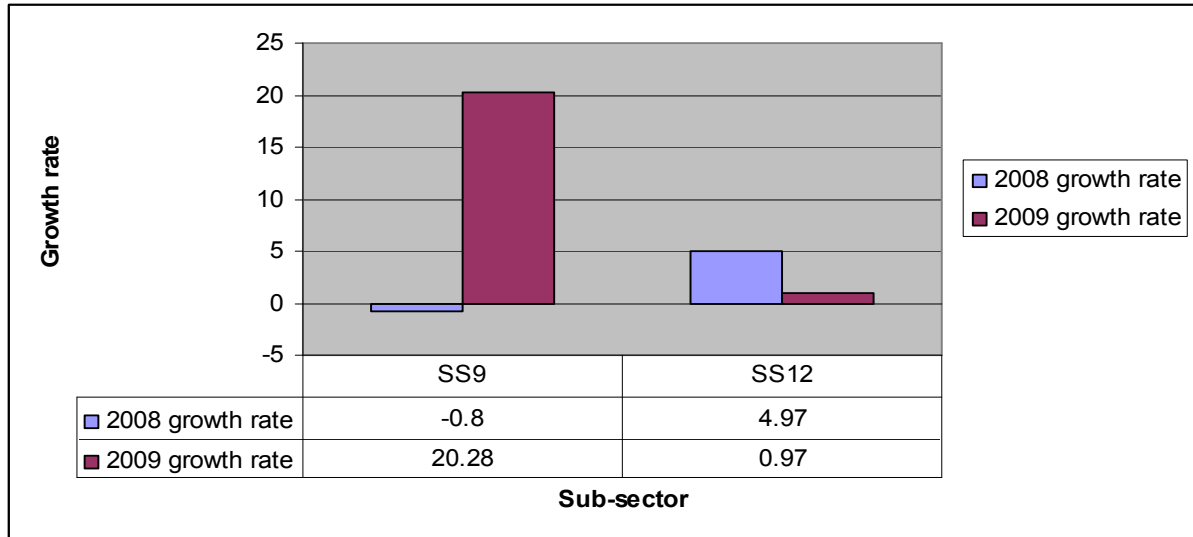


Figure5. 3: Sales growth of firms in 2008 and 2009 by sub-sector

ii. Using the data of two ends [2007 and 2009]

The change of the sales volume from 2007 to 2009 is calculated for each sub-sector. The results are shown on Figure 5.4.

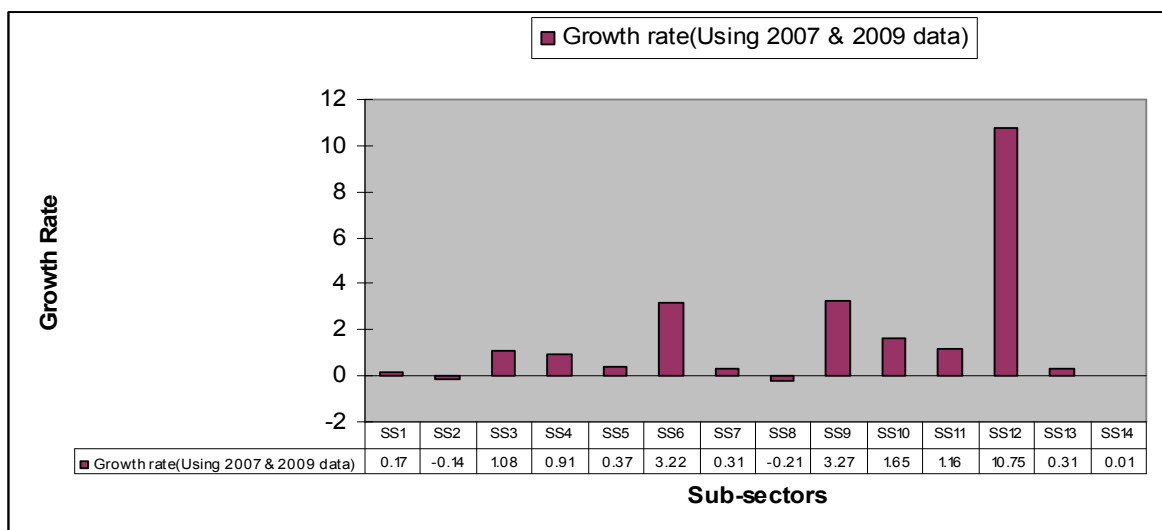


Figure 5.4 Growth rate of 2009 compared to 2007 [by sub-sector]

The results indicate that, compared to 2007, the sales volume of the alcohol and liquor and Industrial engineering were declined by 21% and 14% respectively. On the other hand, sub-sectors like plastic, water bottling, and geo-textile grew substantially in some instances.

To conclude, the growth of medium and large manufacturing enterprises in Tigray are increasing at a decreasing rate. As of 2008, while the growth of water bottling, alcohol and liquor, Industrial engineering, gravel-cement products and bricks, and leather sub-sectors were negative, the growth rates of plastic, geo-textile, steel and pharmaceutical sub-sectors were positive. That is, 36% of the sub-sectors were declining, whilst an equivalent proportion of the remaining sub-sectors grew by more than 50%. Moreover, as of 2009, while the growth of sub-sectors like cement, Industrial engineering, printing and alcohol and liquor was lowest that range from zero in the cement industry to 5% in the alcohol and liquor industry, the growth of leather, plastics, flour and bread as well as geo-textile sub-sectors is remarkable. On average, while the growth of sub sectors like Industrial engineering as well as alcohol and liquor are low, the growth of plastic, geo-textile, flour and bread and pharmaceuticals sub-sectors were remarkable high over this period. By comparing the sales data of 2007 and 2009, the sales volume of the Industrial engineering and alcohol and liquor were declined by 21% and 14% respectively.

5.1.2 Growth determinant factors of medium and large manufacturing firms

Different variables can affect the growth level of firms. The impact of a firm's age, the initial firm size of a firm, the level of education of the leader of the firm, the ownership type of the firm, and the internal service years of the leader are some of the influential factors. Each of these factors is investigated in the analysis that follows using descriptive statistics and significance tests. The data used in this section include the sales volumes of each firm in 2007 to 2009. The beginning data (e.g. 2007) is intended to reflect the sales volume at the initial period of each firm; the current date is intended to reflect the current sales volume at firm (i.e., as of December 2009).

a. Firm age and firm growth rate

The 31 manufacturing firms are grouped in to four age groups; they are: (a) ≤ 5 years; >5 but ≤ 10 years; >10 but ≤ 15 years; > 15 years. In each calendar year, firms with similar age groups are identified and grouped together; then the growth rate for each age group is done for 2008 and 2009. In all instances, the sales data of 2007 and 2008 are used as base years in calculating the growth rates of 2008 and 2009 respectively.

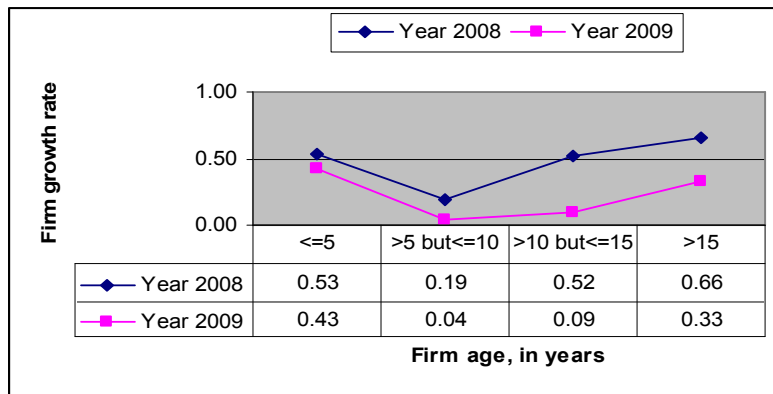


Figure 5.5 firm growth rates by age group for 2008 and 2009.

Figure 5.5 indicates that, on average, the sales growth rate at the first five years of operation of a firm is higher than in later years; from the 6th to 10th operation years the sales growth rate decreases. Starting with the 11th operation year however, the sales growth rate increases again. It is important to note that there was no linear trend between the age of firm and its growth rate. Initially firms experience growth but after a while this growth is stunted somewhat. Older firms continue to experience growth in all respects. Similar to Bigsten and Gebreyesus (2008:831), the results of this study indicate that there is no unique relationship between firm age and its growth rate; initially they correlate negatively and then positively when the age increases.

b. Initial firm size and firm growth rate

Whilst Ethiopia does distinguish between micro, small and medium enterprises using paid up capital, there is no clear distinction between medium and large enterprises. In order to differentiate between medium and large enterprises, I have used the median capital as a bench marker. Accordingly, the median capital of all firms is 4,800,000 birr (equivalent to US Dollars 436,364.00). Firms with initial capital of less or equal to the median are classified as medium manufacturing firms; firms are classified as large if their initial paid-up capital is more than 4,800,000 birr. Using this method 16 firms were assigned as medium firms; and the remaining 15 firms were classified as large.

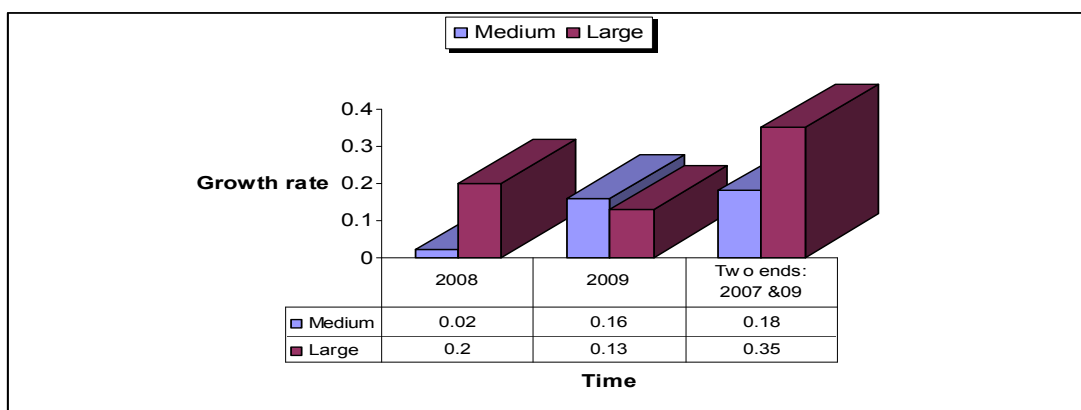


Figure 5.6: Firm growth rate by firm size

Figure 5.6 indicates that the growth rate of large firms in 2008 is about ten times the growth rate of medium firms. But that trend changed in 2009 where the growth rate of medium firms is higher by about 3%. Based on this analysis it can be concluded that the growth rate of large firms is about two times that of the growth rate of medium firms. From the result, it is possible to conclude that firm growth rate correlates positively to the firm size. This finding is similar to Coad et al (2008:3), Sleuwaegen and Goedhuys (2002), Van Biesbek (2005) and McMahon (2001), Parker (1994) and McPherson (1992) who argue that there is positive relationship between firm growth rate and firm size.

c. Level of education and firm growth rate

Using the education level of the leaders [president of the company], the 31 firms were grouped in to five categories: (a) illiterate; (b) primary education; (c) high school; (d) certificate/ diploma; (e) first degree and above. The sales volume of each group was then added up for each year [2007 to 2009]. The firm growth rates of 2008 and 2009 were then compared against the data of 2007 and 2008 respectively; the gross growth rate is also computed by comparing the data of the two ends [2007 and 2009].

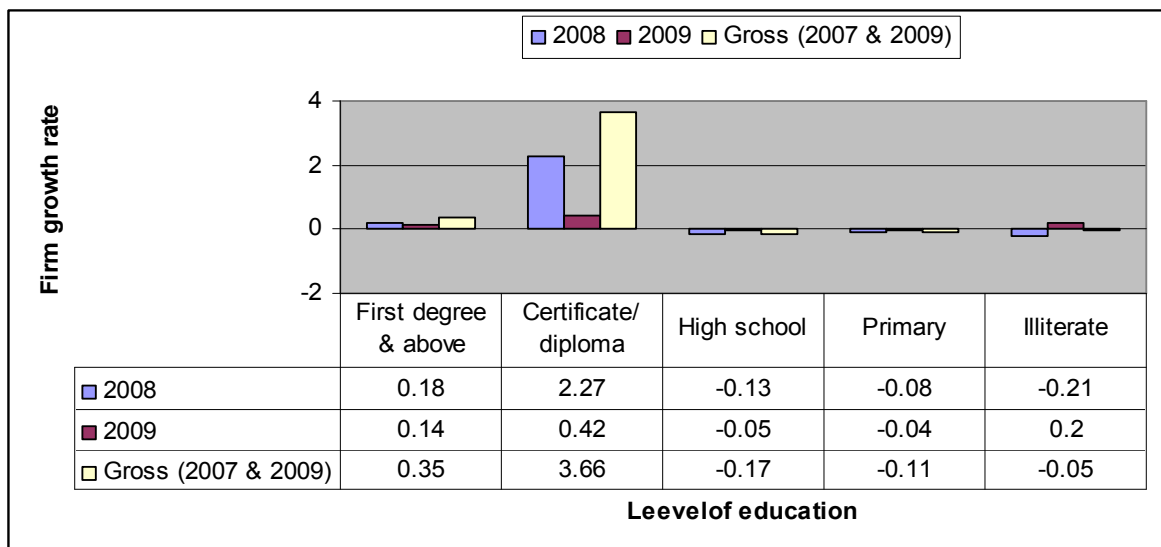


Figure 5.7 Level of education and growth of firm

As Figure 5.7 indicates, the sales growth rates of firms are influenced by the education level of the leaders of the firms. For example, the growth rates of firms which are led by leaders who have tertiary education is positive; but the growth rate of firms led by leaders with a high school education is negative. The results also indicate that the growth rate of firms led by certificate/ diploma holders are better than of leaders with a degree. No relationship was found between the growth rate of firm led by people with education level of high school and below. Note that there was no change in education level with in the three years; the growth rates shown on Figure 5.7 are done assuming other variables are kept constant.

d. Legal form (ownership status) of firm and firm growth rate

Firms are grouped based on legal form of enterprises; legality refers to whether or not the firm is sole proprietorship, private limited company or public. The sales volume of each

group is added for each year; then by using the 2007 and 2008 data as a base, the growth rates of 2008 and 2009 are computed respectively. Gross growth rate is also computed using the 2007 and 2009 sales data.

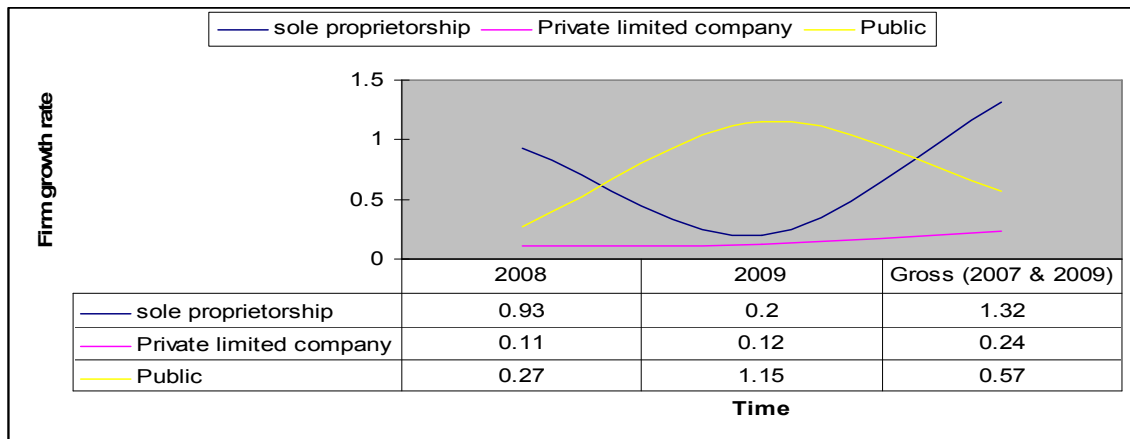


Figure 5.8 Legal form/ ownership status of firms and firm growth

As you can see from Figure 5.8, in 2008 the growth rate of sole proprietorship was better than other legal forms. But in 2009, the growth rate of public firm was better than others. Using the 2007 and 2009 sales data, the sole proprietorship form provides the best growth rate. This is similar to the findings of Coad et al. (2008:12) who argue that the growth of enterprises owned by single individuals [sole proprietors] is better than of others.

e. Internal experience of leaders and firm growth

Based on the experience of the firms' leader, the firms are grouped in to four groups: ≤ 5 years; > 5 but ≤ 10 years; > 10 but ≤ 15 years; > 15 years. The firm growth rates of firms are computed for 2008 and 2009 using the data of 2007 and 2008 respectively; the change of the firm growth level is also computed by comparing against the data of 2007 and 2009 respectively.

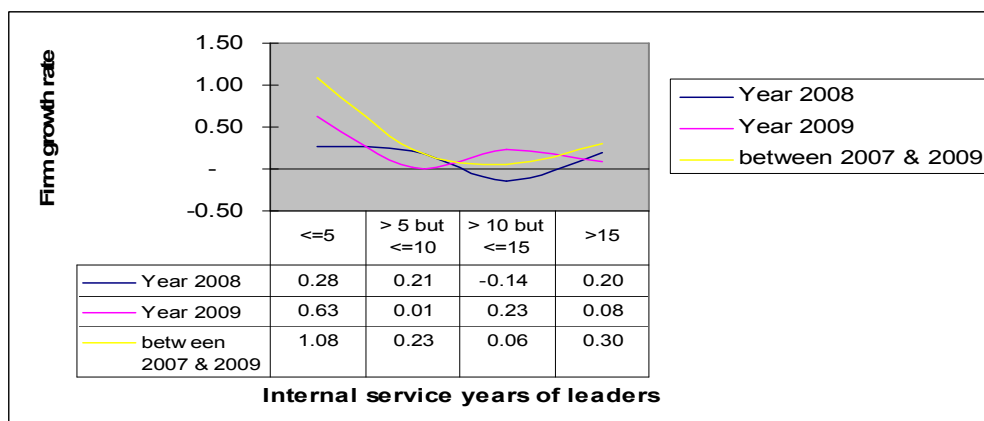


Figure 5.9: Experience of leaders and firm growth rates

Figure 5.9 indicates that the growth rate of firms led by leaders who have less than five years experience is *better* than firms led by leaders who have more than five years

experience. In 2008, the growth rate decreased when the internal service years of the leaders reached 15 years; then the firm growth rate revives when the internal service years of leaders become more than 15 years. But the growth rate of firms in 2009 has irregularities. Using the data of 2007 and 2009, the above chart indicates that the firm growth rate declines when the experience of leaders reaches 15 years; thereafter, the internal service years of leaders and firm growth rates are positively correlated.

To summarize, the relationship between firm age and firm growth is U-shaped; at the initial time, firm growth is high; then it declines. But when the firm becomes older the firm growth increases. Moreover, the growth rate of large firm is higher than of medium firms. The growth rate of firms led by leaders with certificate/diploma and above is better than of firms led by other education levels; but firms led by certificate/diploma holder leaders grow better than of firms led by degree holders. In addition, the growth rates of firms led by leaders with internal service years of utmost five years and more than 15 years are better than of leaders with internal service years of in-between. That is, internal service years of utmost five years and above 15 years are positively correlated with firm growth. Finally, the growth rate of sole proprietorships is better than of other forms of firms.

5.1.3 Employees' salary level and growth status

The salary levels and salary growth determinant factors of the 31 selected firms was done using STATA version 10.1. In this thesis, the term 'income' is equivalent to 'salary'. Please note that one US Dollar is equivalent to approximately 11 Ethiopian birr. The annual income represents annual gross salary of each employee. If any one wants to know the net income of employees, he/she can divide the annual income by 12 months and deduct the personal income tax; the income tax is calculated using the following tax rates shown on Table 5.2 below.

Table 5.2 Personal income tax rate

Employment income (per month)		Tax Rate (in %)	Deduction in Eth birr
Over Eth birr	To Eth birr		
0	150	Exempted threshold	
151	650	10	15
651	1400	15	47.5
1401	2350	20	117.5
2351	3550	25	235
3551	5000	30	412.5
Over 5000		35	662

Source: Ethiopian Chamber of commerce (ECC) (2005:3)

Using data from 2007 to 2009, the annual average salary level of employees is analysed for the workers of all firms as well as on each sub-sector.

a. Mean, minimum and maximum salaries: all employees and all firms

Table 5.3: Average annual salary of all employees (in birr)

Time	Mean annual income	SD of annual income	Minimum annual income	Maximum annual income
Average salary of 2007	11,916	10,084	1,822	75,176
Average Salary of 2008	14,710	11,940	2,300	90,616
Average Salary of 2009	18,137	15,187	2,520	120,576
Average salary of three yrs	14,921	12,829	1,822	120,576

Note: SD refers to standard deviation

Table 5.3 indicates that the average annual salary of one employee for the three years (2007-2009) is 14,921 birr. The annual salary standard deviation is 12,829. This indicates that, on average, the annual salary of each employee deviates by 12,829 birr from the mean annual salary (14,921) – this large deviation indicates that there is a high variation in salary rates of employees in Tigray.

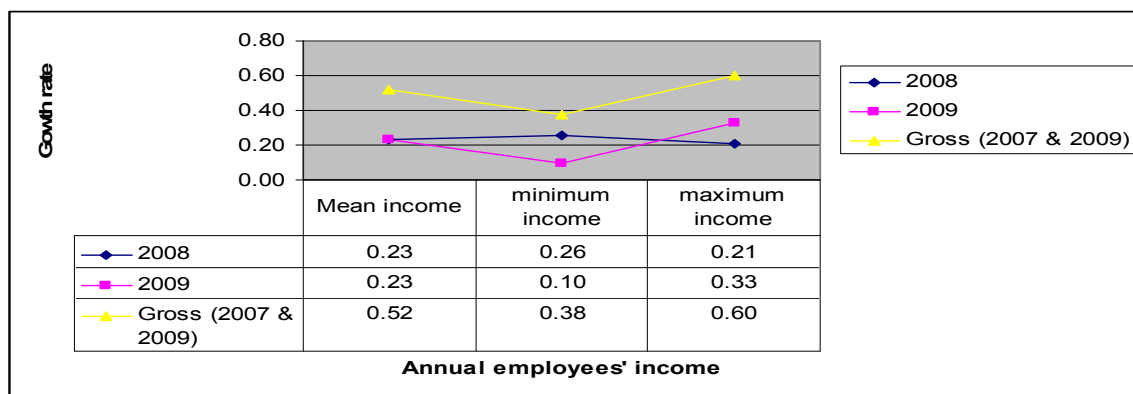


Figure 5.10: Annual salary growth rates

Referring to Table 5.3, it is evident that the average annual salary for the employees in 2007, 2008 and 2009 is 11916, 14710 and 18137 birr respectively. Figure 5.11 indicates the annual salary of each worker increased by 23% each in 2008 and 2009 respectively. Compared to 2007, the annual salary of each employee in 2009 is higher by about 52%. The annual minimum salaries for the years 2007, 2008 and 2009 are 1822, 2300 and 2520 birr respectively. Compared to 2007, the minimum wage increased by roughly 26% and 10% (in 2008 and 2009 respectively). Compared to 2007, the minimum annual wage is increased by about 38% in 2009. The maximum salaries in 2007, 2008 and 2009 are 75176, 90616 and 120576 birr respectively; the annual salary growth rates in 2008 and 2009 are 21% and 33% respectively. Compared to 2007, the maximum annual salary increased by about 60% to 2009. As Figure 5.10 indicates, it is possible to conclude that

the annual salary growth rate of the higher income group is greater than that of lower income group.

b. Salary growth rate for higher and lower income group employees

The median annual salary reported over this period is 10592 birr. In this study, employees with an annual income of less than or equal to the median are considered as low income; otherwise, they are classified as high income.

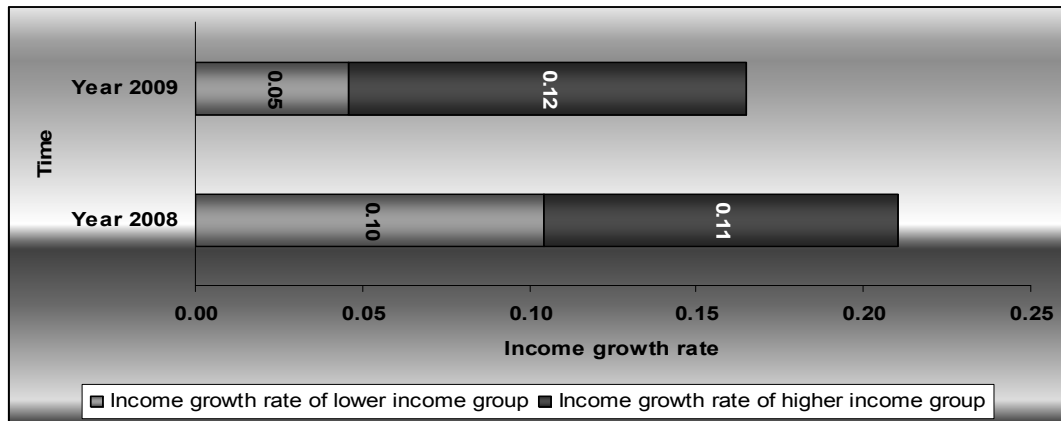


Figure 5.11: Annual salary growth rate by income group

The annual salary growth rate for the low income group is 10% (in 2008) and 5% (in 2009). The annual salary growth rates of the high income group for 2008 and 2009 are 11% and 12% respectively. Figure 5.11 indicates that, on average, the income growth rate of the high income group increases over time; but the reverse is true for lower income group. Moreover, the annual income growth rate for the high income group is greater than that of the low income group. This shows that high income employees are better beneficiaries than of low income employees in terms of mean salary and salary growth rate.

c. Comparison between firm and salary growth rates

i. Aggregate growth rates comparison using all the three years' [2007-2009] data

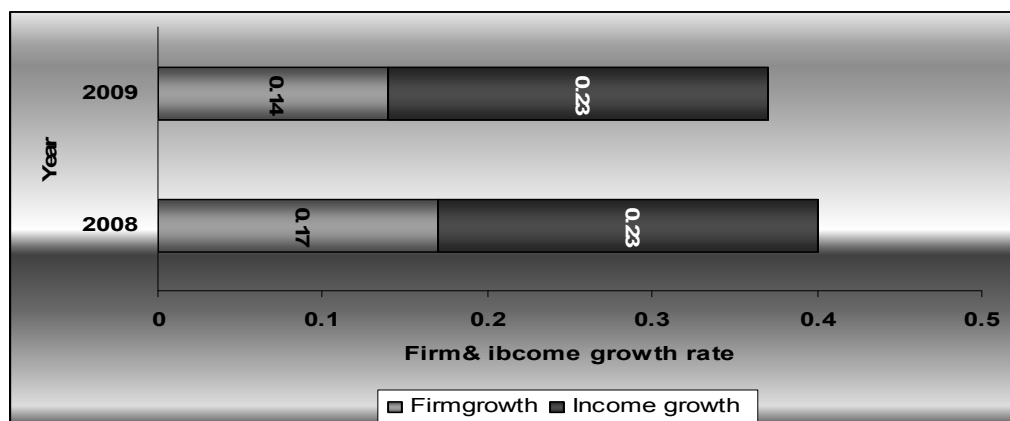


Figure 5.12: Comparison of firm and employees income growth rates: aggregate

As Figure 5.12 indicates, the growth rates of all firms are 17% (in 2008) and 14% (in 2009). Moreover, the annual salary growth rates for all employees in 2008 and 2009 are 23% each. Though there is growth in firm and employees income, the employees income growth rate is higher than of the firm growth rate. But, while the firm growth increases at decreasing rate, the employees income growth is remained constant. Based on these results, it is possible to conclude that the income growth rate is higher than of firm growth rate.

ii. Sub-sector wise growth rates comparison using all the three years' [2007-2009] data

Compared to the sales data of 2007, the growth rates of the water bottling, alcohol and liquor, Industrial engineering, gravel-cement products and bricks, and leather sub-sectors were negative in 2008; but, in the same period, the sales growth rates of plastic, geo-textile, steel, pharmaceuticals and, textile and garment sub-sectors are remarkably high over this same period

In order to investigate whether or not the incomes of employees move parallel to the sub-sectors growth rate, firms with the negative and positive growth rates are considered.

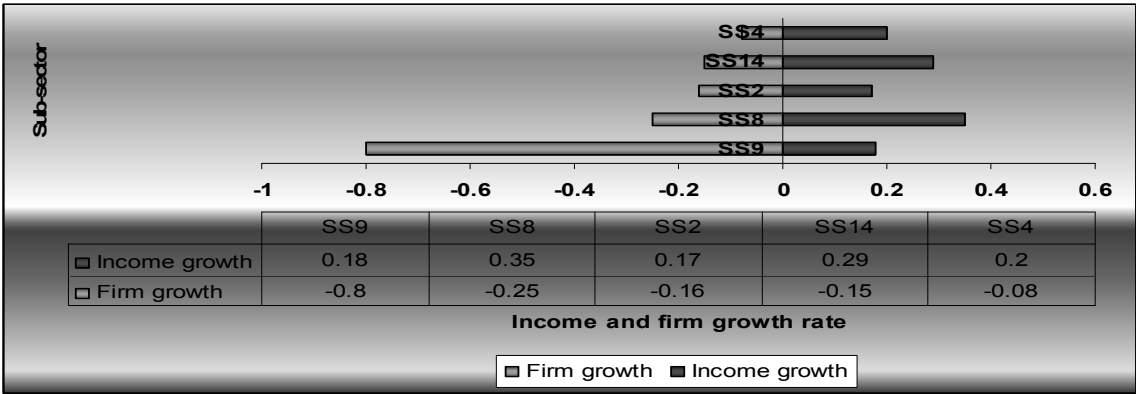


Figure 5.13: Comparisons of sub-sectors and income growth rates of 2008 [declining in 2008]

When compared to 2007, the growth of these five sub-sector firms is negative in 2008; but the employees' income growth for that period is positive (ranging from 17% to 35%). Whilst the firm growth rates for water bottling sub-sector is the worst (-80%), the income growth of the employees did not decrease. This indicates that the income of employees does not necessarily decrease even though the firms' growth may be declining.

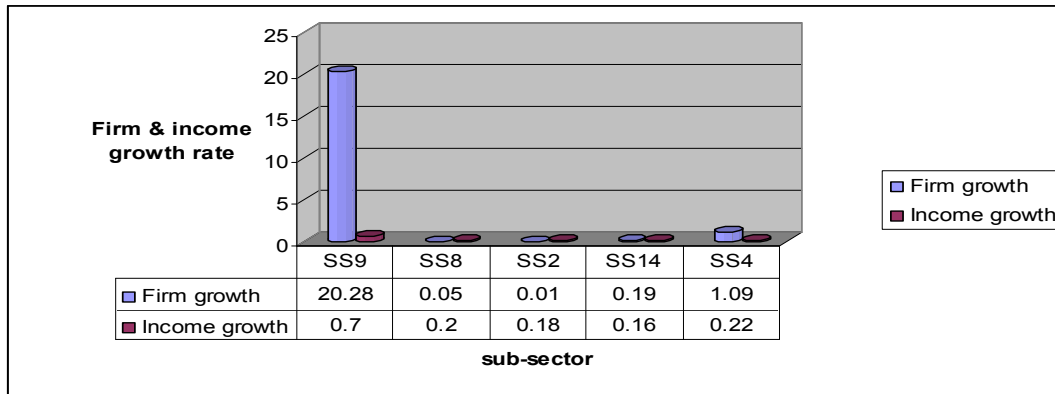


Figure 5.14: Comparisons of sub-sectors and income growth rates of 2009 [declining in 2008]

The sub-sectors which experienced negative growth in 2008 have recorded remarkable growth in 2009. For example, the firm growths of the water bottling and leather sub-sectors are about 2028% and 109% respectively. The employees' income growths of these five sub-sectors have grown parallel to the growth of the sub-sectors. For example, the income growth of the employees of the water bottling is about 70%, while the sub-sector growth rate is about 20 times. On the other hand, while the firm growth of alcohol and liquor sub-sector is still low [5%], the income growth rate of the employees is about 20%.

This indicates that the income of employees' increases even when the firm growth rates are low; when there is better firm growth, there is parallel income growth. Firms may pay salary to their employees' equivalent to other firms thereby to retain their workers; otherwise, employee turnover could increase which can aggravate inefficiency of firms.

The firm and income growth rates for the firms which were growing in 2008 are shown on Figures 5.15 and 5.16 respectively. Figure 5.15 compares the firms' growth in 2008 and 2009. The result indicates that, with the exception of the flour and bread sub-sector, the firm growth rates in 2008 are better than of 2009. Similarly, Figure 5.16 indicates that the income growth rates of 2008 are better than of 2009, except for pharmaceuticals and flour and bread sub-sectors. From this result, it is possible to conclude that the income growth rate increases when the firm growth increases.

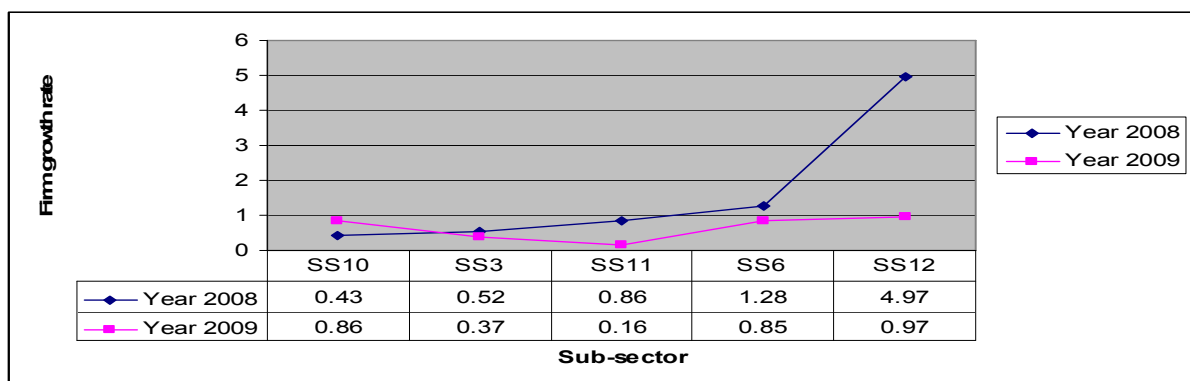


Figure 5.15: Firm growth rates comparison in 2008 and 2009 [growing sub-sectors during 2008]

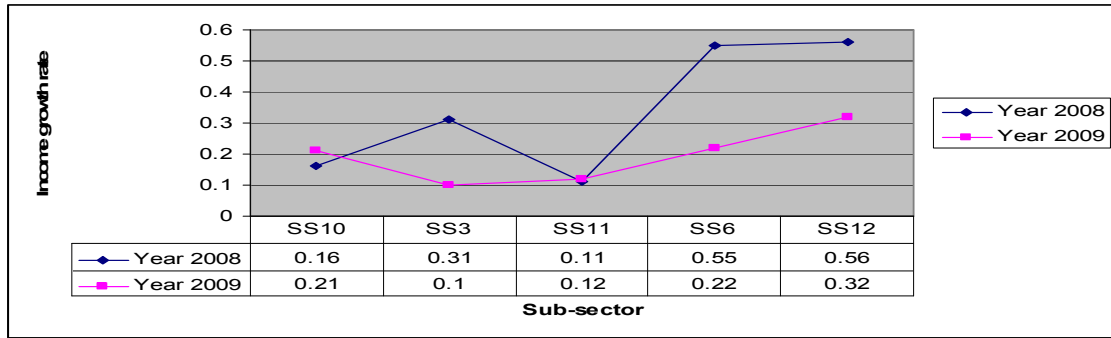


Figure 5.16: Income growth rates comparison in 2008 and 2009 [growing sub-sectors during 2008]

In summary, there is high variation between the maximum and minimum salary of employees. The salary growth rate of the higher income group is higher than of the lower income group; while the salary growth rate of lower income group increases at decreasing rate, the salary of higher income group increases at increasing rate. In addition, the salary growth rate is higher than of the firm growth rate. While the growth rate of some sub-sectors range between 80% and 8% below zero, the salary growth rate was between 17% and 35%; though firm growth falls, the income growth rate increases. When the firm growth increases, the income growth also increases; but salary growth increases even when the firm growth is less or declining.

5.1.4 Annual salary level and growth determinant factors

a. Annual salary growth by gender: yearly basis

Table 5.4 indicates that the mean annual salary of female employees is lower than that of male employees; the annual incomes of both genders however increase over time. On average, the minimum and maximum annual salaries for male workers are higher than of female workers.

Table 5.4: Annual of salary employees by gender

Gender of employees	Calendar Year	Average annual income	SD of annual income	Minimum annual income	Maximum annual income
Males	2007	14168	11750	2400	75176
	2008	17270	13734	2400	90616
	2009	21575	17314	3000	120576
	Aggregate (2007 to 2009)	17671	14752	2400	120576
Females	2007	8594	5463	1822	34524
	2008	10935	7156	2300	42687
	2009	13067	9289	2520	60660
	Aggregate (2007 to 2009)	10865	7678	1822	60660

Note: SD refers standard deviation

The three years' mean annual salary of male employees is 63% higher than that of the female workers. The mean annual salaries of male employees are about 1.65, 1.58 and 1.65 times of the female employees in 2007, 2008 and 2009 respectively. The salary gap decreased in 2008 but increased again in 2009; the gender-income gap is still higher.

Compared to 2007 and 2008, the annual salary growth rates for male and female employees are 22% and 27% respectively; but in 2009, the annual salary growth rates for male and female employees are 25% and 20% respectively. The result indicates that the male employees' income growth rate increases at an increasing rate; but the female employees' income growth rate declines. Generally, the income of male employees' is higher than of the females. This finding is similar to the findings of Söderbom et al. (2002:12), Mumford et al. (2004:5), Dumont (2008:15, 16) and Xiao (2001:96).

b. Annual salary level by gender: all [three] years

Using the three years data, the average annual salary of male and female employees is calculated. Table 5.5 indicates that the average annual salary of male employees is higher than of females' by about 38.5%. Moreover, the maximum salary of male employees' is about 200% to that of female employees. This shows that male employees are better beneficiaries in the medium and large manufacturing firms in Tigray than of female employees.

Table 5.5 salary comparison by gender for all [three] years, in Ethiopian birr

Gender of employees	Average annual income	SD of annual income	Minimum annual income	Maximum annual income
Male	17671	14752	2400	120576
Female	10865	7678	1822	60660

c. Ratio of males' annual salary to females' salary: by level of education and experience

For more clarification, I have compared the annual salary of male and female workers who have similar education levels, external experiences, and internal experiences. Then, the annual salary of male employees is compared against the annual salary of female employees. The results are shown on Table 5.6 below.

Table 5.6 Ratio of males' annual salary to females' salary

Employees' level of education	Intexp≤5; Extexp=0	Intexp >5 but ≤10; Extexp=0	Intexp >10; Extexp=0
Uneducated	1.21	1.84	2.15
Primary	1.60	1.32	1.51
Secondary	1.41	1.54	2.29
Certificate/ diploma	1.75	1.34	1.49
Degree	1.27	1.29	3.23

Table 5.6 shows that the annual salary of male employees' is higher than of females'. For example, except for primary and certificate/diploma holders [in internal experience of between five and ten], the gender-income gap of workers increased when the internal experience increased. The data shows that the salary of male employees is higher than of females' salary by at least by 21%; moreover, the gender-salary gap in tertiary education is the highest when the internal experience is more ten years.

d. Income comparison by gender, education level and sub-sector

To investigate if sub-sector is a reason for gender-income gap, further analysis is done. Accordingly, the average annual incomes of employees are compared among some [sample] sub-sectors and education levels. But note that external and internal experiences of the employees are kept constant; external experience (extexp) is assumed zero, and the internal experience (intexp) is utmost five years; these experiences are taken as a sample for comparison purposes. The analysis results stated on Table 5.7 below show that male employees get higher salary than of females in all [sample] sub-sectors. The gender-income gap in alcohol and liquor sub-sector seems narrow; but it is higher in leather, geo-textile, water bottling, and steel sub-sectors. This shows that sub-sectors seem somewhat a reason for gender-income gap. On the other hand, the salaries of male and female employees vary from one sub-sector to another one. For uneducated employees, among the sample sub-sectors, while printing sub-sector pays higher salary, the alcohol and liquor sub-sector pays lower salary for both genders. Employees with primary education level and work in the flour and bread industry get higher salary; but those who work in textile and garment get lower salary. The salary level of employees with secondary education level varies by gender; while the leather and alcohol and liquor sub-sectors pay higher and lower salaries for male employees respectively, geo-textile as well as gravel, cement products and bricks sub-sectors pay higher and lower salaries for their female employees. But, male and female employees with certificate/diploma education level get higher salaries when they work at leather and gravel, cement products and bricks sub-sectors.

Table 5.7: Gender-income gap comparison by education level and sub-sector

Sub-sectors	Extexp=0 Intexp<=5 Education level=1		Extexp=0 Intexp<=5 Education level=2		Extexp=0 Intexp<=5 Education level=3		Extexp=0 Intexp<=5 Education level=4	
	Annual gross salary, in birrr		Annual gross salary, in birrr		Annual gross salary, in birrr		Annual gross salary, in birrr	
	0	1	0	1	0	1	0	1
4					9421	4971	14879	6611
5			5921	4545	7097	5128		
6					9241	5424	14157	7446
7	5855	4817					5161	4245
8	2650	2313			5269	5360		
9							8582	4450
10	4659	3626	9839	6467			14144	8679
11			7688	4584				
14	5295	3254			8667	4683		

Note: 0= male; 1= female;

e. Education level and salary growth rate

The workers are grouped by level of education; then the mean annual income of each group is calculated and presented in Table 5.8.

Table 5.8: Employees' annual income by education level and year [in Ethiopian birr]; yearly basis

Level of education	2007	2008	2009
Uneducated	7425	9044	11664
Primary(1-8)	8002	9562	11365
Secondary (9-12)	9569	11741	13884
Certificate/ diploma	13861	16093	19084
First degree and above	34548	36275	40315

The above table indicates that, on average, the annual salary growth rate of all education level workers increase at increasing rate from time to time, except that of primary and secondary education level workers, which increases at decreasing rate. By comparing the annual salary of 2007 and 2009, on average, the annual salary growth rate decreases when the education level increases. For example, as compare to 2007 salary, while salary of uneducated workers increased by 57% in 2009, the annual salary of degree holder employees increased by 17%. On the other hand, the annual salary gap between education levels increases when the education level increases. For example, in 2007, while the salary of primary education level workers was higher by 8% than of the salary of uneducated employee, the salary of degree holder was higher than of certificate/diploma holder employee by 149%. In general, while salary growth rate of lower education level is higher than of higher educated workers, the gap of the mean annual salary of employees increases when the education level increases.

f. Employees' annual income by education level and year: all three years

Table 5.9 indicates that the mean annual income of employees increases when their education level increases. For example, the income of a worker with primary education level is 2.6% higher than of uneducated workers. A worker with secondary education level gets an income of 20.5% higher than of primary education holder. A certificate/diploma holder worker gets 40.9% higher income than of a worker with secondary education level; a worker with education level of first degree and above gets income of 130.7% higher than of a worker with certificate/diploma. This finding is similar to the findings of Söderbom et al. (2002:14), Mumford et al. (2004:9) and Dumont (2008:26), who argue that the wage level of employees increases when the education level increases

Table 5.9: Employees' annual income by education level and year [in Ethiopian birr]: all three years

Level of education	Average annual income	SD of annual income	Minimum annual income	Maximum annual income
Uneducated	9378	6545	1950	35868
Primary(1-8)	9623	5961	1822	49872
Secondary (9-12)	11598	7291	2400	55044
Certificate/diploma	16341	10581	2400	84000
First degree and above	37695	20554	7200	120576

g. Income, experience and education: external experience is variable

External experience can have a positive impact on salary levels, especially at the time of hiring.

Table 5.10: Income, external experience and level of education

External experience, in years	Mean annual income for different education levels				
	Illiterate/reading and writing	primary	secondary	Certificate /diploma	1 st degree and above
0	9284	9039	10721	14424	37092
>0 but ≤5	9880	13399	15362	17324	35124
>5 but ≤10	-	16210	19606	26853	46046
>10 but ≤10	-	-	20421	37955	-
≥15	11380	-	23818	23562	35236

As Table 5.10 indicates, with the exception for external service years of more than 15 years, the average income grows as the external service year increases. Even in similar external service years, the income of employees' increases as the education level increases. The analysis is done assuming other conditions are constant.

Table 5.11: Income, internal experience and education

Internal experience, in years	Mean annual income for different education levels				
	Illiterate/reading and writing	Primary	Secondary	Certificate /diploma	1 st degree and above
<=5	4112	6828	7706	11056	23793
>5 but <=10	11107	9696	12993	18996	38210
>10 but <=10	12491	14225	25660	18720	47004
>=15	26748	15802	15990	27672	30210

Table 5.11 indicates that the average annual income of employees' increases as their internal experience increases. This is workable for all education level workers, except for secondary and first degree and above education level employees who have internal experience of more than 15 years.

h. Income, experience and education: internal experience is variable

For more clarification, the annual salary workers who have similar education levels, external experiences, and internal experiences are compared. Then, the annual salary of male employees is compared against the annual salary of female employees. The results are shown on Table 5.12 below.

Table 5.12 employees' income, external experience and level of education

Employees' level of education	Intexp<=5; Extexp=0	Intexp >5 but <=10; Extexp=0	Intexp >10; Extexp=0
	Average income in Eth birr	Average income in Eth birr	Average income in Eth birr
Uneducated	4030	10887	12951
Primary	6505	8660	14286
Secondary	6966	11612	14863
Certificate/ diploma	8525	15668	18249
Degree	19040	36854	43501

Table 5.12 indicates that the employees' annual income increases when the education level increases, except for primary education with internal experience of between five and ten years; moreover, the income level increases when the internal experience increases.

i. The age of a firm and the salary of its employees

Using five years interval, the manufacturing firms are grouped into four time classifications.

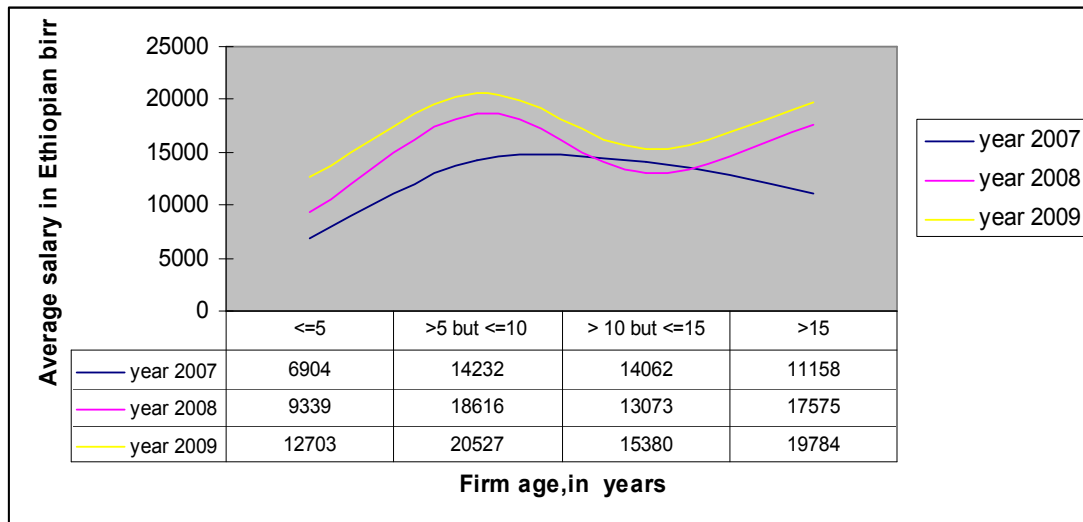


Figure 5.17: Firm age and average annual income

Figure 5.17 shows that the salary paid by firms whose age is less than five years is least; income growth rates of the employees who work in firms with age of five to ten are the highest. Using the data of 2008 and 2009, the salary paid by firms with age of 10 to 15 is lesser than of firms with age of five to ten years though it was expected to increase. The data of the two years indicate that the average salary of employees’ revives again when the firm age becomes more than 15 years. But the data of 2007 indicates that the average salary decreases when the firm age becomes above 10 years. The data of 2007 indicates that the relationship between firm age and salary of employees seems inverted U-shape.

Generally, Figure 5.19 indicates that the average salary paid by firms whose age of more than 15 years is higher than of the firms whose age is less than five years, This is similar to the findings of Söderbom et al. (2002:15), Brown et al. (2001:9), and Troske (1998) who argue that older firms pay better salary than of younger firms.

j. Firm size and income of employees [using capital]

Table 5.13: Comparison of income, and income and firm growth rates: by firm size

Firm size	Average annual income per employee			Income growth rate			Firm growth rate		
	2007	2008	2009	2008	2009	Two ends (2007 and 2009)	2008	2009	Two ends: 2007 and 2009
Large	11344	14264	17871	0.26	0.25	0.58	0.20	0.13	0.35
Medium	13318	15805	18789	0.19	0.19	0.41	0.02	0.16	0.18

Based on their initial capital, firms are divided into two: medium and large. The annual income of the employees who work in each firm is averaged for each year for 2007 to 2009. Table 5.13 indicates that, on average, the medium firms pay higher salaries than of large firms; but the income growth rate of the employees' of large firms' is higher than of the medium firms. Moreover, while the employee income growth rate of large firm is decreasing, it is somewhat constant for medium firms. Moreover, the growth rates of the firm and income are compared. Accordingly, the result indicates that the income growth rates are higher than of the firm growth rates.

To summarize, the annual salary of male employees' is higher than of females. While the salary growth rate of male employees' increases at increasing rate, the salary growth rate of females' decreases. Moreover, as the education level of employees' increases, the salary level of employees' increases; the annual salary of employees' increases when the experience of workers increases. The average annual salary paid by firms with age of utmost five years is least of all; firms whose age of between five and ten pay the highest salary. On average, medium firms pay higher salary than of large firms; but salary growth rate of large firms' is higher than of medium firms.

5.2 Econometric results of firm and employees' income determinant factors

This part deals with identification of the growth determinant factors for firm and employees' salary. The section discusses the firm growth determinant factors initially and then discusses employees' income determinant factors.

5.2.1 Determinant factors of firm growth

As stated on the literature and statistical descriptive statistics, there are many factors that can affect the growth of firms. But, in case of Tigray, not all influential factors are found significant. The factors like internal experience, firm size, and some education levels interacted with internal experiences are significant; they are detailed as follows.

Table 5.14: Econometric results for firm growth determinant factors

		Robust				
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
logsales						
intexp	.4258953	.1461076	2.91	0.004	.1395296	.712261
intexp2	-.0242301	.00807	-3.00	0.003	-.040047	-.0084131
initlargfirm	2.009142	.5296875	3.79	0.000	.9709735	3.04731
edsec dum	-.6380167	.7495491	-0.85	0.395	-2.107106	.8310725
primintexp	-.3880546	.0741122	-5.24	0.000	-.5333119	-.2427973
dgrintexp	.1150317	.0327421	3.51	0.000	.0508584	.1792051
cerdipextexp	-.0777857	.0510649	-1.52	0.128	-.1778711	.0222997
_cons	13.75883	.6700461	20.53	0.000	12.44557	15.0721

a. Internal experience and firm growth

Table 5.14 indicates that firms grow at about 43% for each additional internal service year of the leader. On average however, the firm growth rate increases when the internal service years of leaders reaches nine years [=0.426/ (-0.024*2)]; after the nine internal service years of leaders, the firm growth rate declines.

b. Firm size and growth

The size of a firm was found to be significantly and positively correlated to firm growth (see Table 5.14). Indeed, the growth rate of large firms was found to be roughly two times the growth rate of medium firms. Based on this analysis it is possible to conclude that firm growth rate correlates positively to the firm size. This finding is similar to Coad et al (2008:3), Sleuwaegen and Goedhuys (2002), Van Biesbek (2005) and McMahon (2001), Parker (1994) and McPherson (1992) who argue that there is positive relationship between firm growth rate and firm size.

c. Education and firm growth

Education level is not found influential to firm growth; but some education levels, which interacted with internal experiences, are found to be significantly influential. For example, the internal experience of firm leaders is significantly and positively correlated to firm growth. Table 5.14 shows that, on average, a firm can grow by about 4% (=0.43-0.39) per year when it is led by a leader with primary education. Results indicate that a firm can grow by about 55% (= 0.43+0.12) when it is led by degree holders. This indicates that education level and firm growths are positively correlated. This finding is loosely related

to the findings of the authors Kantis, Angellini and Koeng (2004) who also argue that tertiary education is better in facilitating firm growth.

Based on these results it is possible to conclude that experience and firm size are highly influential for firm growth. Moreover, primary and degree education levels are also important determinants for a firm's growth. Other factors were not as important.

5.2.2 Determinant factors of employees' income growth

There are a number of factors that can affect the growth of firms. In the case of Tigray, not all influential factors speculated were found to be significant however. Factors like internal experience and primary education level were found to be significant; they are detailed as follows.

Table 5.15: Econometric results for employees' income growth determinant factors

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
logincome						
intexp	.2107068	.005682	37.08	0.000	.1995448	.2218688
priminexp	-.0230684	.0076147	-3.03	0.003	-.038027	-.0081098
_cons	7.836352	.040896	191.62	0.000	7.756014	7.91669

In the study only two variables were found to affect employees' income growth; they are internal experience and primary education when interacted with internal experience.

a. Internal experience and employees' income growth

Internal experience is highly significantly and positively correlated to the annual salary growth rate of employees. Table 5.15 shows that, on average, the annual salary of employees can increase by about 21% for each additional internal service year.

b. Education and salary growth

Table 5.15 indicates that primary education interacted with internal service years is found highly and positively significant. For example, the test indicates that the annual salary growth rate of primary education level workers is about 19% (=0.21-0.02).

Generally, internal experience is found to be the most important tool to increase the salary of workers who work in the medium and large manufacturing enterprises in Tigray.

6. Limitations of the study

The analysis result shows that there is wage gap between male and female employees; the male employees get higher salary than of females. Experiences and education levels are not the main reasons for the income gap. To some extent, sub-sectors can be reason for gender-income gap. Moreover, the analysis result shows that there is salary difference among males as well as among females in the sample sub-sectors; sub-sectors are somewhat a reason for salary difference. But the type of job could be the reason for the salary difference of the employees. Moreover, type of profession can be a reason for the gender-income gap. Hence, the main reason for the gender-income gap and the salary difference even in the same gender is not investigated fully. As a result, concerned bodies may not get concrete and enough information about the income gap of employees.

Scholars recommend to measure growth of firms using assets, employment, market share, profits, sales, etc. Accordingly, I have measured the growth of medium and large manufacturing firms in Tigray using sales volume. But sales volume can be affected by inflation or deflation; that is, because of inflation, the selling price per unit can be increased. As a result, sales volume of firms can be increased. Hence, the growth level of firms could be exaggerated to some extent.

7. Conclusion

The paper deals with two main themes: (1) employees' salary and growth factors; (2) firm growth status and growth factors.

7.1 Employees' salary and growth factors

In 2007, the average annual income of employees' who work at the medium and large manufacturing enterprises in Tigray was Ethiopian (Eth) birr 11916; overall these salary levels grew by 23% each year and reached an annual income of Eth birr 18,137 in 2009. Such income growth can increase the purchasing power of the workers and their respective household thereby helping to alleviate poverty in Tigray.

In 2007, the average income was about 6.54 times of the minimum salary; moreover, the maximum salary was about 41 times of the minimum salary. This shows that there is a large salary gap between the low and high income group employees; the income gap was also aggravated in 2009. In addition, while the income growth rate of the lower income workers' decreased, the income growth rate of higher salaried workers increased. This indicates that the higher income workers are more beneficiaries than of lower income workers. This suggests that the lower income employees are female workers as well as lower education level workers.

On average, the income growth rate of employees' is higher when the firm growth rate is higher; but the reverse is true when the firm growth rate is lower. This indicates that the firm growth status can affect the employees' income growth. Hence, both the management and workers of the medium and large manufacturing enterprises in Tigray are supposed to work in harmony for mutual benefits; when the firm grows, the employees may share the benefits. To increase income of employees and alleviate poverty, there may be needs of extending supports to such firms, perhaps through government intervention.

The results of the study indicate that the mean salary of male employees' was higher than that of female employees. Moreover, the income growth rate of male employees' was higher than females. This indicates that male workers benefit more in the medium and large manufacturing firms in Tigray than females. This may require further investigation to determine the reason for this situation.

Finally, as the level of education increases, the average income increase; moreover, the average income of employees increases when the internal service year's increases. This implies that the level of education and internal service years are important factors for firm growth. That is, to increase the income level of employees, there is need of improving the education level of employees. This may imply that education is a tool to alleviate poverty through income growth. Moreover, internal experience is also crucial way to increase salary of employees. This implies that loyalty of employees to a given firm can improve their incomes. This can also facilitate the growth of firms; that is, retaining of capable employees can be effective and efficient in their daily activities that can improve the growth of firms.

7.2 Firm growth levels and growth factors

On average, the firm growth rate of 2008 is higher than of 2009; that is, the growth of medium and large manufacturing firms increases at decreasing rate. As indicated above, employees' income growth goes parallel to firm growth. This implies that the income growth rate of employees of younger and older firms is better. This may imply that, from poverty alleviation program point of view, it can be preferable if the government and other concerned bodies can prioritise their support to such firms.

The firm growth rate of large firms is better than of medium firms. Similar to the above argument, it can be possible to conclude that the contribution of large firms in alleviating poverty through equivalent income distribution is significant. Firm growth is highly linked with the tertiary education level of firm leaders. This implies that, for better firm growth and by implication, poverty alleviation, it may be necessary for firms to be led by tertiary education level leaders. This may imply that the education level of leaders be improved.

The firm growth rate of sole proprietorship is better than of other firms. This implies that the government should try to encourage the establishment of firms which are owned by single individuals. This may indicate that individual owners can be tools for poverty alleviation in Tigray. Individuals can be efficient and effective because they are the immediate recipients of the fruits of their operation.

The loyalty of firm leaders to a specific firm is also an important tool for the growth of the firm. As the internal service years increase, the firm growth increases; this may occur because the capacity of leaders increases when they stay longer. But longer internal service may not necessarily result in an increase in productivity. Boredom and other reasons may occur which result in leaders not being effective and efficient when they stay for long periods. This can also affect the growth rate of firms and further research should seek to investigate this assumption in an Ethiopian context.

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Appendices

Annex-1 Test to use either pooled OLS or Random Effects (RE): firm growth determinant factors

```
. xtreg    logsales firmage ageofleader  leaderage2 extexp  extexp2 intexp  intexp2
initlargfirm solepdum plcdum publicdum maleleader  eduneddum  edprimdum edsecdum
edcertdipdum eddegrdum unedintexp  primintexp  secintexp  cerdipintexp drgrintexp
uneduextexp primextexp seconextexp cerdipextexp degrextexp fagelag1 leaderagelag1
intexplag1, re
```

logsales	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
firmage	.0566265	.1625824	0.35	0.728	-.2620292	.3752821
leaderage2	-.0094574	.004597	-2.06	0.040	-.0184674	-.0004474
extexp2	.0014732	.0124908	0.12	0.906	-.0230083	.0259548
intexp2	-.0191556	.0091016	-2.10	0.035	-.0369943	-.0013168
initlargfirm	2.210744	.8696662	2.54	0.011	.5062297	3.915259
solepdum	-.1588076	1.009909	-0.16	0.875	-2.138194	1.820578
publicdum	.2414493	2.317211	0.10	0.917	-4.3002	4.783099
maleleader	1.583047	2.268726	0.70	0.485	-2.863573	6.029668
edsecdum	2.443023	3.652967	0.67	0.504	-4.71666	9.602706
eddegrdum	-.0262111	1.645787	-0.02	0.987	-3.251895	3.199473
unedintexp	1.737231	.9490381	1.83	0.067	-.1228493	3.597312
primintexp	1.530334	.9690988	1.58	0.114	-.3690651	3.429732
secintexp	1.665494	.8647811	1.93	0.054	-.0294462	3.360434
cerdipintexp	1.710189	.8291275	2.06	0.039	.085129	3.335249
drgrintexp	1.744279	.8161639	2.14	0.033	.1446275	3.343931
uneduextexp	-.239673	.413147	-0.58	0.562	-1.049426	.5700803
primextexp	-.0879078	.3720955	-0.24	0.813	-.8172015	.6413859
seconextexp	-.2179063	.4105068	-0.53	0.596	-1.022485	.5866722
cerdipextexp	-.0828109	.2898779	-0.29	0.775	-.6509611	.4853393
degrextexp	-.0237044	.2646124	-0.09	0.929	-.5423352	.4949263
leaderagel~1	.9032562	.4208396	2.15	0.032	.0784258	1.728087
intexplag1	-1.279767	.8083637	-1.58	0.113	-2.864131	.3045964
_cons	-9.378264	10.02032	-0.94	0.349	-29.01773	10.2612
sigma_u	1.6800189					
sigma_e	.54023287					
rho	.90628708	(fraction of variance due to u_i)				

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
logsales[firmid,t] = Xb + u[firmid] + e[firmid,t]
```

Estimated results:

	Var	sd = sqrt(Var)
logsales	4.168417	2.04167
e	.2918516	.5402329
u	2.822463	1.680019

Test: Var(u) = 0

```
chi2(1) = 45.64
Prob > chi2 = 0.0000
```

The test has indicated that a random effect is efficient in estimating the panel data than of the pooled OLS.

Annex 2 Tests to choose either random effects (RE) or fixed effects (FE): firm growth determinant factors

a. Using the default Hausman test

```
. xtreg    logsales firmage ageofleader  leaderage2  extexp  extexp2  intexp  intexp2
initlargfirm solepdum plcdum publicdum maleleader  eduneddum  edprimdum edsecdum
edcertdipdum eddegrdum unedintexp  primintexp  secintexp  cerdipintexp  drgrintexp
uneducextepx primextexp seconextexp  cerdipextexp  degrextexp  fagelag1  leaderagelag1
intexplag1,fe
```

logsales	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
firmage	-.8948293	.4568556	-1.96	0.056	-1.812451	.0227923
ageofleader	(dropped)					
leaderage2	-.0031995	.0063135	-0.51	0.615	-.0158806	.0094817
extexp	(dropped)					
extexp2	(dropped)					
intexp	13.49226	6.522119	2.07	0.044	.3921996	26.59232
intexp2	-.0164174	.0094861	-1.73	0.090	-.0354707	.0026359
initlargfirm	(dropped)					
solepdum	(dropped)					
plcdum	(dropped)					
publicdum	(dropped)					
maleleader	(dropped)					
eduneddum	(dropped)					
edprimdum	(dropped)					
edsecdum	(dropped)					
edcertdipdum	-2.693974	2.339108	-1.15	0.255	-7.39221	2.004263
eddegrdum	(dropped)					
unedintexp	.2115868	.5551266	0.38	0.705	-.9034177	1.326591
primintexp	(dropped)					
secintexp	.2026567	.4180104	0.48	0.630	-.636942	1.042255
cerdipintexp	.5438958	.4513826	1.20	0.234	-.3627329	1.450525
drgrintexp	.3429541	.439688	0.78	0.439	-.5401852	1.226093
uneducextepx	(dropped)					
primextexp	(dropped)					
seconextexp	(dropped)					
cerdipextexp	(dropped)					
degrextexp	-.2449627	.2598038	-0.94	0.350	-.7667941	.2768686
fagelag1	(dropped)					
leaderagel~1	2.037418	1.03283	1.97	0.054	-.0370819	4.111917
intexplag1	-14.16518	7.130743	-1.99	0.052	-28.4877	.1573352
_cons	-70.33133	41.80051	-1.68	0.099	-154.2901	13.62746
sigma_u	13.924735					
sigma_e	.54023287					
rho	.99849708	(fraction of variance due to u_i)				

```
F test that all u_i=0:      F(30, 50) =      12.50      Prob > F = 0.0000
```

```
. est store fe
```

```
. xtreg  logsales firmage ageofleader  leaderage2 extexp  extexp2 intexp  intexp2
initlargfirm solepdum plcdum publicdum maleleader  eduneddum  edprimdum edsecdum
edcertdipdum eddegrdum unedintexp primintexp secintexp  cerdipintexp drgrintexp
uneduextexp primextexp seconextexp cerdipextexp degrextexp fagelag1 leaderagelag1
intexplag1, re
```

logsales	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
firmage	.0566265	.1625824	0.35	0.728	-.2620292	.3752821
leaderage2	-.0094574	.004597	-2.06	0.040	-.0184674	-.0004474
extexp2	.0014732	.0124908	0.12	0.906	-.0230083	.0259548
intexp2	-.0191556	.0091016	-2.10	0.035	-.0369943	-.0013168
initlargfirm	2.210744	.8696662	2.54	0.011	.5062297	3.915259
solepdum	-.1588076	1.009909	-0.16	0.875	-2.138194	1.820578
publicdum	.2414493	2.317211	0.10	0.917	-4.3002	4.783099
maleleader	1.583047	2.268726	0.70	0.485	-2.863573	6.029668
edsecdum	2.443023	3.652967	0.67	0.504	-4.71666	9.602706
eddegrdum	-.0262111	1.645787	-0.02	0.987	-3.251895	3.199473
unedintexp	1.737231	.9490381	1.83	0.067	-.1228493	3.597312
primintexp	1.530334	.9690988	1.58	0.114	-.3690651	3.429732
secintexp	1.665494	.8647811	1.93	0.054	-.0294462	3.360434
cerdipintexp	1.710189	.8291275	2.06	0.039	.085129	3.335249
drgrintexp	1.744279	.8161639	2.14	0.033	.1446275	3.343931
uneduextexp	-.239673	.413147	-0.58	0.562	-1.049426	.5700803
primextexp	-.0879078	.3720955	-0.24	0.813	-.8172015	.6413859
seconextexp	-.2179063	.4105068	-0.53	0.596	-1.022485	.5866722
cerdipextexp	-.0828109	.2898779	-0.29	0.775	-.6509611	.4853393
degrextexp	-.0237044	.2646124	-0.09	0.929	-.5423352	.4949263
leaderagel~1	.9032562	.4208396	2.15	0.032	.0784258	1.728087
intexplag1	-1.279767	.8083637	-1.58	0.113	-2.864131	.3045964
_cons	-9.378264	10.02032	-0.94	0.349	-29.01773	10.2612
sigma_u	1.6800189					
sigma_e	.54023287					
rho	.90628708	(fraction of variance due to u_i)				

```
. est store re
```

```
. hausman fe re
```

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
firmage	-.8948293	.0566265	-.9514557	.4269473
leaderage2	-.0031995	-.0094574	.0062579	.0043276
intexp2	-.0164174	-.0191556	.0027382	.0026734
unedintexp	.2115868	1.737231	-1.525644	.
secintexp	.2026567	1.665494	-1.462837	.
cerdipintexp	.5438958	1.710189	-1.166293	.
drgrintexp	.3429541	1.744279	-1.401325	.
degrextexp	-.2449627	-.0237044	-.2212583	.
leaderagel~1	2.037418	.9032562	1.134162	.9432028
intexplag1	-14.16518	-1.279767	-12.88542	7.084775

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(9) = (b-B)' [(V_b-V_B)^(-1)] (b-B)
= 5.48
Prob>chi2 = 0.7905
(V_b-V_B is not positive definite)

The test shows that the null hypothesis is not rejected. This implies that random effect is appropriate model for analysis of this linear balanced panel data.

b. Robust Hausman test

```
. * Robust Hausman test using method of Wooldridge (2002)

. quietly xtreg logsales $xlist, re

. scalar theta = e(theta)

. global yandxforhausman      logsales firmage ageofleader  leaderage2 extexp
extexp2 intexp      intexp2 initlargfirm solepdm plcdum publicdm maleleader
eduneddm edprimdm edsecdm edcertdipdm eddegrdm unedintexp primintexp
secintexp  cerdipintexp drgrintexp uneduextexp primextexp seconextexp
cerdipextexp degrextexp fagelag1 leaderagelag1 intexplag1

. sort firmid

. foreach x of varlist $yandxforhausman{
2. by firmid: egen mean`x' = mean(`x')
3. generate md`x' = `x' - mean`x'
4. generate red`x' = `x' - theta*mean`x'
5. }

. quietly regress      redlogsales redfirmage redageofleader  redleaderage2
redextexp redextexp2 redintexp redintexp2 redinitlargfirm redsolepdm redplcdum
redpublicdm redmaleleader rededuneddm rededprimdm rededsecdm rededcertdipdm
rededdegrdm      redunedintexp redprimintexp redsecintexp redcerdipintexp
reddrgrintexp      reduneduextexp redprimextexp redseconextexp redcerdipextexp
reddegrextexp redfagelag1 redleaderagelag1 redintexplag1      mdfirmage mdageofleader
mdleaderage2 mdextexp mdextexp2 mdintexp mdintexp2 mdinitlargfirm mdsolepdm
mdplcdum mdpublicdm mdmaleleader mdeduneddm mdedprimdm mdedsecdm
mdedcertdipdm mdeddegrdm mdunedintexp mdprimintexp mdsecintexp mdcerdipintexp
mddrgrintexp mduneduextexp mdprimextexp mdseconextexp mdcerdipextexp mddegrextexp
mdfagelag1 mdleaderagelag1 mdintexplag1

. test mdfirmage mdageofleader mdleaderage2 mdextexp mdextexp2 mdintexp
mdintexp2 mdinitlargfirm mdsolepdm mdplcdum mdpublicdm mdmaleleader mdeduneddm
mdedprimdm mdedsecdm mdedcertdipdm mdeddegrdm mdunedintexp mdprimintexp
mdsecintexp mdcerdipintexp mddrgrintexp mduneduextexp mdprimextexp
mdseconextexp mdcerdipextexp mddegrextexp mdfagelag1 mdleaderagelag1 mdintexplag1

      F( 11,      60) =      1.32
      Prob > F =      0.2340
```

Because the alternative hypothesis is rejected, this test also advises to use random effects model.

Annex 3 Multicollinearity test: firm growth determinant Factors

Before testing for heteroskedasticity and autocorrelation, there is need of testing for multicollinearity; the collinearity is controlled by dropping one of the highly collinear variables.

```

pccorr   logsales      intexp  intexp2  initlargfirm      edsecum      primintexp
drgrintexp  cerdipextexp ,sig
-----+-----
      | logsales  intexp  intexp2  initla~m  edsecum  primin~p  drgrin~p
-----+-----
logsales | 1.0000
      |
      | intexp | 0.1175  1.0000
      |      | 0.2619
      |
      | intexp2 | 0.1064  0.9741  1.0000
      |      | 0.3103  0.0000
initlargfirm | 0.5518  0.0912  0.1060  1.0000
      |      | 0.0000  0.3844  0.3118
      |
      | edsecum | -0.0899  0.2069  0.1881  0.0946  1.0000
      |      | 0.3912  0.0466  0.0709  0.3670
      |
      | primintexp | -0.2749 -0.0550 -0.0920 -0.1744 -0.0973  1.0000
      |      | 0.0077  0.6004  0.3802  0.0946  0.3536
      |
      | drgrintexp | 0.5017  0.4031  0.3874  0.1103 -0.3845 -0.1282  1.0000
      |      | 0.0000  0.0001  0.0001  0.2924  0.0001  0.2206
      |
      | cerdipextexp | -0.3238 -0.2632 -0.2445 -0.1041 -0.2212 -0.0738 -0.2916
      |      | 0.0015  0.0108  0.0182  0.3205  0.0331  0.4821  0.0046
      |
      | ce~xtepx
-----+-----
cerdipextexp | 1.0000
  
```

Only the artificial variable, intexp is highly correlated to its artificial variable; because it is artificial, this doesn't bring any problem.

Annex 4 Autocorrelation Test: firm growth determinant factors

Then after, I have checked if there is autocorrelation, using the stata command 'xtserial'. The null hypothesis assumes that there is no autocorrelation.

```
. xtserial  logsales  extexp  intexp  intexp2  initlargfirm  edsecum
xtserial  logsales      intexp  intexp2  initlargfirm      edsecum
primintexp  drgrintexp      cerdipextexp
```

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

```
F( 1, 30) = 0.890
Prob > F = 0.3529
```

Because the alternative hypothesis is rejected, the test shows that there is no autocorrelation.

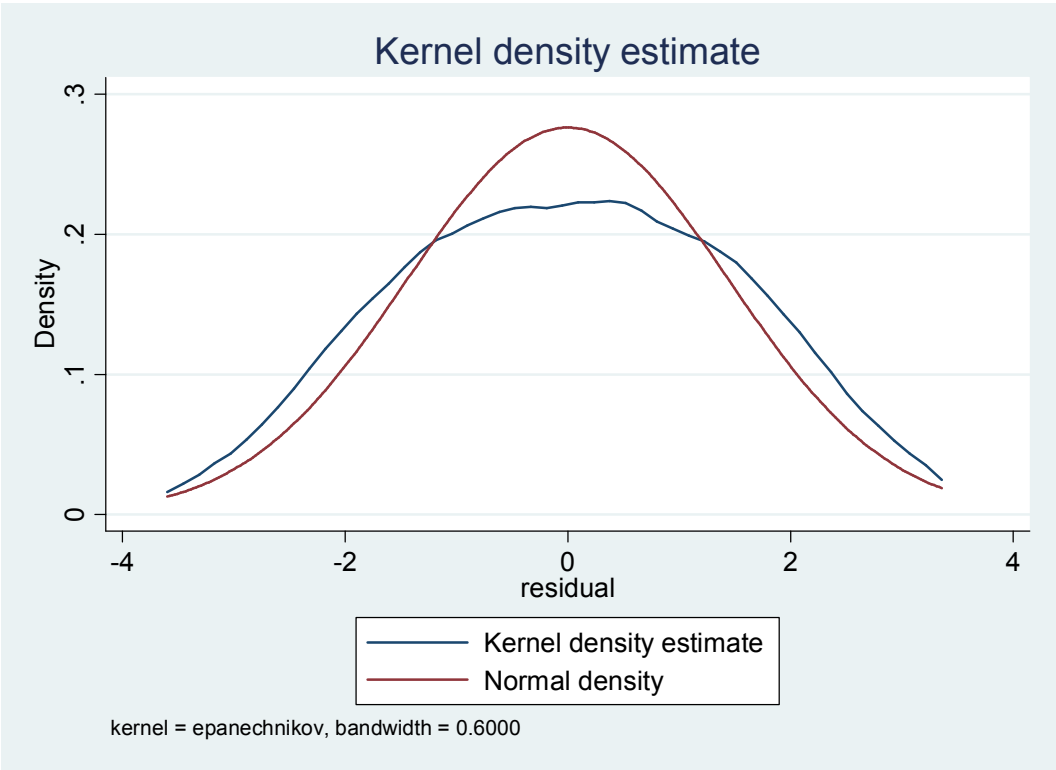
Annex 5 final regression test (robust): firm growth determinant factors

```
. xtreg  logsales      intexp  intexp2  initlargfirm      edsecdum
primintexp  drgrintexp      cerdipextexp  ,re vce(robust)
```

(Std. Err. adjusted for clustering on firmid)

	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
logsales						
intexp	.4258953	.1461076	2.91	0.004	.1395296	.712261
intexp2	-.0242301	.00807	-3.00	0.003	-.040047	-.0084131
initlargfirm	2.009142	.5296875	3.79	0.000	.9709735	3.04731
edsecdum	-.6380167	.7495491	-0.85	0.395	-2.107106	.8310725
primintexp	-.3880546	.0741122	-5.24	0.000	-.5333119	-.2427973
dgrintexp	.1150317	.0327421	3.51	0.000	.0508584	.1792051
cerdipextexp	-.0777857	.0510649	-1.52	0.128	-.1778711	.0222997
_cons	13.75883	.6700461	20.53	0.000	12.44557	15.0721
sigma_u	1.3766958					
sigma_e	.5494788					
rho	.86258672	(fraction of variance due to u_i)				

Annex 6 Kernel density of firm growth determinant factors



Annex-7 Test to use either pooled OLS or Random Effects (RE): employees' income growth determinant factors.

```
xtreg logincome extexp intexp empuneduc empprimary empsecond empcertidip empdegree
uneducinexp priminexp secinexp cerdipinexp degrinexp Intexplag1 extexp2 intexp2
soleintexp plcintexp publicintexp largefintexp, re
```

logincome	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
extexp	.153502	.0151512	10.13	0.000	.1238062	.1831978
intexp	.2196223	.0253578	8.66	0.000	.169922	.2693226
empprimary	.4870705	.1387155	3.51	0.000	.2151932	.7589478
empsecond	.514665	.127886	4.02	0.000	.264013	.7653169
empcertidip	.6473369	.1290066	5.02	0.000	.3944887	.9001852
empdegree	.7090168	.1457685	4.86	0.000	.4233158	.9947177
priminexp	-.0479248	.0152012	-3.15	0.002	-.0777185	-.0181311
secinexp	-.0191938	.0142494	-1.35	0.178	-.0471222	.0087346
cerdipinexp	-.0185625	.014166	-1.31	0.190	-.0463273	.0092023
degrinexp	-.0020106	.0158595	-0.13	0.899	-.0330946	.0290734
extexp2	-.0048042	.0007585	-6.33	0.000	-.0062908	-.0033177
intexp2	-.0051423	.0007643	-6.73	0.000	-.0066402	-.0036443
soleintexp	.0479082	.0192838	2.48	0.013	.0101126	.0857038
plcintexp	.0379941	.0177393	2.14	0.032	.0032258	.0727625
largefintexp	-.0027439	.0058827	-0.47	0.641	-.0142739	.008786
_cons	7.338205	.1198807	61.21	0.000	7.103243	7.573167
sigma_u	.42409718					
sigma_e	.14853029					
rho	.89074245	(fraction of variance due to u_i)				

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
logincome[empid,t] = Xb + u[empid] + e[empid,t]
```

Estimated results:

	Var	sd = sqrt(Var)
logincome	.4919519	.7013928
e	.0220612	.1485303
u	.1798584	.4240972

Test: Var(u) = 0

chi2(1) = 1050.76
 Prob > chi2 = 0.0000

Annex 8 Tests to choose either random effects (RE) or fixed effects (FE): employees' income growth determinant factors.

a. Using the default Hausman test

```
. xtreg logincome extexp intexp empuneduc empprimary empsecond empcertidip
empdegree uneducinexp priminexp secinexp cerdipinexp degrinexp Intexplag1 extexp2
intexp2 soleintexp plcintexp publicintexp largefintexp,fe
```

logincome	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
extexp	.8256281	3.276182	0.25	0.801	-5.602982	7.254238
intexp	(dropped)					
empuneduc	(dropped)					
empprimary	.419895	.1499979	2.80	0.005	.1255652	.7142248
empsecond	.1152959	.0956936	1.20	0.229	-.0724767	.3030684
empcertidip	.0340534	.0727109	0.47	0.640	-.1086219	.1767287
empdegree	(dropped)					
uneducinexp	.2837863	.0598025	4.75	0.000	.1664402	.4011323
priminexp	.2384442	.0584393	4.08	0.000	.1237732	.3531152
secinexp	.2790819	.0574903	4.85	0.000	.1662729	.3918908
cerdipinexp	.2859589	.0579432	4.94	0.000	.1722613	.3996565
degrinexp	.2943556	.0583552	5.04	0.000	.1798496	.4088617
Intexplag1	(dropped)					
extexp2	-.0517591	.1819138	-0.28	0.776	-.408715	.3051967
intexp2	-.0072828	.0008628	-8.44	0.000	-.0089759	-.0055898
soleintexp	-.018457	.0562989	-0.33	0.743	-.1289282	.0920141
plcintexp	.0462681	.054565	0.85	0.397	-.0608009	.153337
publicintexp	(dropped)					
largefintexp	.0081857	.0122947	0.67	0.506	-.0159393	.0323106
_cons	7.068193	1.3572	5.21	0.000	4.40506	9.731326
sigma_u	1.550708					
sigma_e	.14853029					
rho	.99090916	(fraction of variance due to u_i)				
F test that all u_i=0:		F(531, 1050) =	26.55	Prob > F = 0.0000		

```
. est store fe
```

```
. xtreg logincome extexp intexp empuneduc empprimary empsecond empcertidip
empdegree uneducinexp priminexp secinexp cerdipinexp degrinexp Intexplag1 extexp2
intexp2 soleintexp plcintexp publicintexp largefintexp, re
```

logincome	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
extexp	.153502	.0151512	10.13	0.000	.1238062	.1831978
intexp	.2196223	.0253578	8.66	0.000	.169922	.2693226
empprimary	.4870705	.1387155	3.51	0.000	.2151932	.7589478
empsecond	.514665	.127886	4.02	0.000	.264013	.7653169
empcertidip	.6473369	.1290066	5.02	0.000	.3944887	.9001852
empdegree	.7090168	.1457685	4.86	0.000	.4233158	.9947177
priminexp	-.0479248	.0152012	-3.15	0.002	-.0777185	-.0181311
secinexp	-.0191938	.0142494	-1.35	0.178	-.0471222	.0087346
cerdipinexp	-.0185625	.014166	-1.31	0.190	-.0463273	.0092023
degrinexp	-.0020106	.0158595	-0.13	0.899	-.0330946	.0290734
extexp2	-.0048042	.0007585	-6.33	0.000	-.0062908	-.0033177
intexp2	-.0051423	.0007643	-6.73	0.000	-.0066402	-.0036443
soleintexp	.0479082	.0192838	2.48	0.013	.0101126	.0857038
plcintexp	.0379941	.0177393	2.14	0.032	.0032258	.0727625
largefintexp	-.0027439	.0058827	-0.47	0.641	-.0142739	.008786
_cons	7.338205	.1198807	61.21	0.000	7.103243	7.573167
sigma_u	.42409718					
sigma_e	.14853029					
rho	.89074245	(fraction of variance due to u_i)				

```
. est store re
```

```
. hausman fe re
```

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
extexp	.8256281	.153502	.672126	3.276147
empprimary	.419895	.4870705	-.0671755	.0570736
empsecond	.1152959	.514665	-.3993691	.
empcertidip	.0340534	.6473369	-.6132835	.
priminexp	.2384442	-.0479248	.286369	.0564276
secinexp	.2790819	-.0191938	.2982757	.0556964
cerdipinexp	.2859589	-.0185625	.3045214	.0561848
degrinexp	.2943556	-.0020106	.2963663	.0561588
extexp2	-.0517591	-.0048042	-.0469549	.1819122
intexp2	-.0072828	-.0051423	-.0021406	.0004004
soleintexp	-.018457	.0479082	-.0663652	.0528933
plcintexp	.0462681	.0379941	.0082739	.051601
largefintexp	.0081857	-.0027439	.0109296	.0107959

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(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 51.93
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

b. Robust Hausman test

```
. * Robust Hausman test using method of Wooldridge (2002)

. quietly xtreg logincome $xlist, re

. scalar theta = e(theta)

. global yandxforhausman logincome extexp intexp empuneduc empprimary empsecond
empcertidip empdegree uneducinexp priminexp secinexp cerdipinexp degrinexp
Intexplag1 extexp2 intexp2 soleintexp plcintexp publicintexp largefintexp

. sort empid

. foreach x of varlist $yandxforhausman{
  2. by empid: egen mean`x' = mean(`x')
  3. generate md`x' = `x' - mean`x'
  4. generate red`x' = `x' - theta*mean`x'
  5. }

. quietly regress redlogincome redextexp redintexp redempuneduc redempprimary
redempsecond redempcertidip redempdegree reduneducinexp redpriminexp redsecinexp
redcerdipinexp reddegrinexp redIntexplag1 redextexp2 redintexp2 redsoleintexp
redplcintexp redpublicintexp redlargefintexp mdextexp mdintexp mdempuneduc
mdempprimary mdempsecond mdempcertidip mdempdegree mduneducinexp mdpriminexp
mdsecinexp mdcerdipinexp mddegrinexp mdIntexplag1 mdextexp2 mdintexp2 mdsoleintexp
mdplcintexp mdpublicintexp mdlargefintexp

. test mdextexp mdintexp mdempuneduc mdempprimary mdempsecond mdempcertidip
mdempdegree mduneducinexp mdpriminexp mdsecinexp mdcerdipinexp mddegrinexp
mdIntexplag1 mdextexp2 mdintexp2 mdsoleintexp mdplcintexp mdpublicintexp
mdlargefintexp

      F( 14, 1566) =    26.18
      Prob > F =    0.0000
```

Annex 9 Multicollinearity test: employees' income growth determinant factors.

```

pwcorr logincome intexp priminexp ,sig
-----+-----
      | loginc~e  intexp primin~p
logincome | 1.0000
      |
      |
      | intexp | 0.4504  1.0000
      |       | 0.0000
      |
      | priminexp | -0.1259  0.2452  1.0000
      |       | 0.0000  0.0000

```

The annex shows that there is no collinearity between variables.

Annex 10 Autocorrelation Test: employees' income growth determinant factors.

```
xtserial logincome intexp prminexp
```

```
Wooldridge test for autocorrelation in panel data
```

```
H0: no first-order autocorrelation
```

```
F( 1, 531) = 3.036
```

```
Prob > F = 0.0820
```

Because the null hypothesis assumes that there is no autocorrelation, the result indicates that there is no autocorrelation.

Annex 11 Heteroskedasticity Test: employees' income growth determinant factors.

```

xtreg logincome intexp priminexp ,fe
-----+-----
logincome |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----+-----
intexp    |   .2107068   .0048813    43.17  0.000   .2011286   .220285
priminexp |  -.0230684   .0069916    -3.30  0.001  -.0367873  -.0093495
_cons     |   7.836352   .0349491   224.22  0.000   7.767775   7.904929
-----+-----
sigma_u   |   .70725506
sigma_e   |   .1541414
rho       |   .95465465   (fraction of variance due to u_i)
-----+-----
F test that all u_i=0:      F(531, 1062) =      43.88      Prob > F = 0.0000

. xttest3

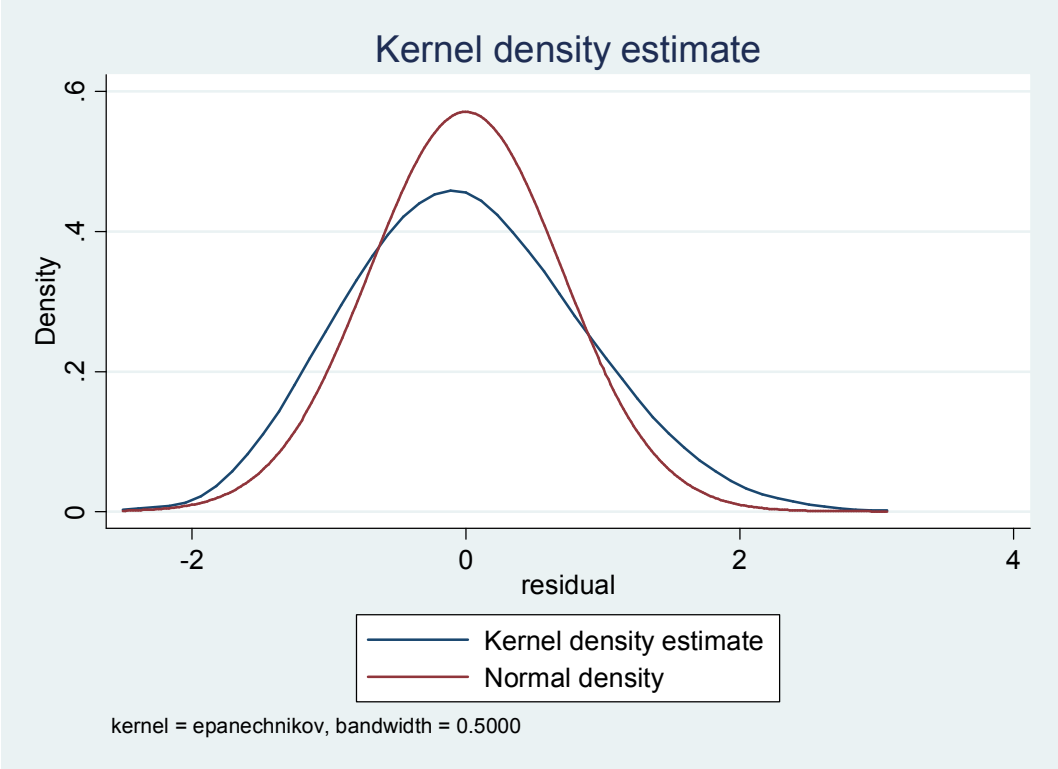
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i
chi2 (532) =      8.2e+06
Prob>chi2 =      0.0000

```

The result shows that there is heteroskedasticity.

Annex 12 Kernel Density of employees' income growth determinant



Annex-13: Questionnaire for Firms/Owners

Purpose of the study

It is known that the number of medium and large scale manufacturing firms in Tigray is increasing from time to time; but knowing only the number is not enough. Hence, this study is designed to know the growth status of such firms; whether or not they are growing from time to time. In addition, the study will investigate the firms' growth determinant factors; factors that can promote or constrain the growth of such firms. Then the data will be analyzed and used by concerned government and non-government bodies for decision making purpose. The result of this study is expected to facilitate the growth status of the medium and large scale manufacturing firms in Tigray and the country as well.

Anonymity and confidentiality

For anonymity purpose, there is no need of writing your name on the questionnaire; but for checkup and control purpose, if possible, on the request of your permission, there is need of your signature at the end of the questionnaire. The data gathered from you will be kept confidential; neither will it be used for other purpose nor transferred to other third party. Please be sure that you will not be faced any difficulty due to this research.

Completeness and Validity of the data

The validity of the research result depends on the validity and completeness of the data gathered from you. Hence, you are kindly requested to provide correct and complete answer for all questions detailed on this questionnaire.

Thank you in advance for your kind cooperation.

Full name of the enterprise:

1.2 Code of the enterprise (for internal use): _____

1.3 Address of the enterprise:

Zone: _____; Woreda(District): _____

Kebelle (Sub-district): _____; Specific location _____;

Telephone: _____

Date of commencement of the operation (month and year)	1.4	1 <input type="text"/>
How was the enterprise established? Own Started = 1 Inherited = 2 Bought = 3	1.5	2 <input type="text"/>
1.6 Type of Sub-sector Cement (1) Water bottling (9) Industrial engineering (2) Flour and bread (10) Pharmaceutical (3) Steel (11) Leather (4) Plastic (12) Textile and garment(5) Marble (13) Geo-textile (6) Gravel, cement products and bricks (14) Printing (7) Other/specify _____ (15) Alcohol and liquor (8)	1.6	3 <input type="text"/>
What is the form of the organization? Sole proprietorship = 1 Private limited company =2 Other (specify): _____ = 3	1.7	4 <input type="text"/>
What is the ownership of working premise/ building? Privately owned = 1 Family = 3 Rented = 2 Other (specify): _____ = 4	1.8	5 <input type="text"/>
1.9 Gender of the respondent male =0 female =1	1.9	6 <input type="text"/>
1.10 What was the age of the respondent as of December 2009?	1.10	7 <input type="text"/>
What is the status of the respondent in the enterprise? Owner = 1 Unpaid Family member = 2 Hired Manager = 3 Other (specify) _____ = 4	1.11	8 <input type="text"/>
1.12 If the respondent is hired manager, starting what period has he/she been managing it?	1.12	9 <input type="text"/>

	Mont h	Year
What is the education level of the owner/respondent at different operation years? <i>Fill the level of education using the following codes</i>	1.13	10
Illiterate = 1	2007	2008
Reading and Writing (informally) = 2		2009
Primary (1-8) = 3		
High school (9-12) = 4		
Diploma = 5		
First Degree and above = 6		
Other (specify): = 7		
H1.14 Did the respondent additional training relevant to his/her activity/firm in the past three years? Yes =0 No = 1	1.14	11
		<input type="text"/>

1.15 If the answer for question 1.14 is 'yes', how many times and when did he/she take the training?

Year	Duration of the training (in days)
2007	
2008	
2009	

1.16 Did the respondent have any related business experience before establishment of the current enterprise? Yes =0 No = 1	1.16 12 <input type="text"/>
1.17 If the answer for question 1.2.8 is 'yes', how many years did he/she work?	1.17 13 <input type="text"/>
1.18 What was the amount of paid up capital during establishment period?	1.18 14 <input type="text"/>

1.19 Number of employees: 2007 to 2009

Year	Number of employees
2007	
2008	
2009	

1.20 Sales volume in Ethiopian birr: 2007-2009

Year	Sales volume in Ethiopian birr
2007	
2008	
2009	

1. Enumerator:

Name _____ Date: _____

Time: _____ Signature _____

2. Supervisor: Signature _____ ; Time: _____ Date: _____

Annex 14: Questionnaire for Employees

Purpose of the study

Nowadays, medium and large scale manufacturing firms are creating more job opportunities in Tigray. Hence, this study is designed to know the wage/salary level of employees of these firms. In addition, the study will investigate the wage/salary growth determinant factors; factors that can increase or decrease the wage level of employees. Then the data will be analyzed and used by concerned government and non-government bodies for decision making purpose. The result of this study is expected to facilitate the benefits of the employees of such firms.

Anonymity and confidentiality

For anonymity purpose, there is no need of writing your name on the questionnaire; but for checkup and control purpose, if possible, on the request of your permission, there is need of your signature at the end of the questionnaire. The data gathered from you will be kept confidential; neither will it be used for other purpose nor transferred to other third party. Please be sure that you will not be faced any difficulty due to this research.

Completeness and Validity of the data

The validity of the research result depends on the validity and completeness of the data gathered from you. Hence, you are kindly requested to provide correct and complete answer for all questions detailed on this questionnaire.

Thank you in advance for your kind cooperation.

2.1 Full name of the enterprise:

2.2 Code of the firm (for internal use): _____

2.3 Name of the employee:

2.4 Gender (male =0; female = 1)	2.2.1 <div style="text-align: center;">1 <input type="text"/></div>								
2.5 Years of related experience before he/she joined to the current enterprise?	2.2.2 <div style="text-align: center;">2 <input type="text"/><input type="text"/></div>								
2.6 Education level of the employee at different operation years? <i>Fill the level of education using the following codes</i> Illiterate = 1 Reading and Writing (informally) = 2 Primary (1-8) = 3 High school (9-12) = 4 Diploma = 5 First Degree and above = 6 Other (specify): _____ = 7	2.2.3 <div style="text-align: center;">3 <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>2007</td><td>2008</td><td>2009</td></tr><tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td></tr></table></div>	2007	2008	2009	<input type="text"/>	<input type="text"/>	<input type="text"/>		
2007	2008	2009							
<input type="text"/>	<input type="text"/>	<input type="text"/>							
2.7 Did the employee take training relevant to his/her job in the past three years? Yes =0 No = 1	2.2.4 <div style="text-align: center;">4 <input type="text"/></div>								
2.8 If the answer for question 2.7 is 'yes', how many times and when did he/she take the training? <table border="1" style="width: 100%;"><thead><tr><th>Year</th><th>Duration of the training (in days)</th></tr></thead><tbody><tr><td>2007</td><td><input type="text"/></td></tr><tr><td>2008</td><td><input type="text"/></td></tr><tr><td>2009</td><td><input type="text"/></td></tr></tbody></table>	Year	Duration of the training (in days)	2007	<input type="text"/>	2008	<input type="text"/>	2009	<input type="text"/>	
Year	Duration of the training (in days)								
2007	<input type="text"/>								
2008	<input type="text"/>								
2009	<input type="text"/>								

2.9 Annual salary of the employee

Hired month and year	Initial monthly salary	Time of change of salary at different times: month and year	Monthly salary, in Ethiopian birr (new)	Annual salary of the employee in:		
				2007	2008	2009
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note: Monthly salary is to be converted to annual salary by considering the change of monthly salary.

We certify that the above information is complete and correct as per our knowledge

1. Enumerator:

Name _____ Date: _____

Time: _____ Signature _____

2. Supervisor: Signature _____; Ti