THE STRUCTURE AND OUTCOMES OF URBAN LABOR MARKETS IN AFRICA

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To my parents, my brothers, my sisters and true friends who provided me with the encouragement and support that I needed, ... and above all, to the poor men and women in Africa who are trying to make ends meet against all odds.

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ABSTRACT

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The purpose of this study is threefold as represented by its three separate parts. In the first part, it highlights major characteristics of labor markets and institutions in Africa. In the second, it investigates effects of these labor market institutions in the process of wage determination; and in the third, it investigates the separate influences of these institutions on gender wage gaps, where it also measures part of the gaps that may be due to discriminating treatments in the labor market against women. The analysis mainly focuses on the two most populous African countries: Ethiopia and Nigeria.

Part I shows that African labor markets are characterized by a dominant public sector, high and increasing levels of informality and unemployment; minor to significant restrictions on forming independent unions, as well as gender disparity in labor force participation rates, education and wages. It also suggests that despite the prevalence of such common labor market characteristics, there are also significant differences within Africa, and that in the manufacturing sector, there is a substantial degree of occupational job segregation where women are over-represented in low paying occupations.

In part II, the study finds that generally labor market institutions have significant wage effects, and the effects vary across countries and groups of firms within a country.

For example, it shows that union firms pay an average premium of 33 percent over nonunion wages in Ethiopia, and about 62 percent in Nigeria; while there are no such significant union wage effects in the public sector sub-samples in both countries. The study further shows that in both countries, foreign firms pay better than domestic firms, and public firms on average pay less than private firms.

Part III shows that women on average get about 73 percent of men's wages in Ethiopia and about 58 percent in Nigeria; and again institutions have significant influences on gender wage gaps. Using the Oaxaca-Blinder and Cotton-Neumark procedures, the study finds that the '*unexplained*' component and discrimination due to *women's disadvantage* are also more pronounced in Nigeria where there is more restrictive attitude towards women's economic role.

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LIST OF ACRONYMS

ADB	African Development Bank
MDGs	Millennium Development Goals
NLC	Nigerian Labor Congress
UK	United Kingdom
LDC	Less Developed Country
ICFTU	International Confederation of Free Trade Unions
SSA	Sub-Saharan Africa
ETB	Ethiopian Birr (National currency)
ILO	International Labor Office
OB	Oaxaca-Blinder decomposition procedure
OLS	Ordinary Least Square
GDP	Gross Domestic Product
UNECA	United Nations Economic Commission for Africa
USA	United States of America
LEE	Linked Employer-Employee data
USD	United States Dollar
OECD	Organization of Economic Cooperation and Development
EMU	European Monetary Union
KILM	Key Indicators of Labor Market
LABPROJ	ILO database on estimates and projections of economically active population
ILOLEX	ILO database of International Labor Standards
UNCTAD	United Nations Conference on Trade and Development
ODA	Official Development Assistance
AETU	All Ethiopia Trade Unions
CETU	Confederation of Ethiopian Trade Unions
ISSP	International Social Survey Program
UNESCO	United Nations Education Scientific and Cultural Organization
AEWA	All Ethiopia Women's Association
GNP	Gross National Product
OPEC	Organization of Petroleum Exporting Countries
EIU	Economist Intelligence Unit

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PART I.

LABOR MARKET CHARACTERISTICS AND ECONOMIC STRUCTURE IN SUB-SAHARAN AFRICA

CHAPTER 1

INTRODUCTION

Development performance of most Sub Saharan Africa (SSA) countries has been very disappointing for most of the last two decades. The average growth rate of real GDP in Africa between 1991-1999, for example, was just close to 1.8 percent. In fact, per capita real GDP has been declining for Africa as a whole, and in most of the countries the drop has been very dramatic (See Appendix IA).

An important question to ask would therefore be 'what are the major reasons for such a disappointing performance?'. Empirical evidence cites a number of interrelated causes for this outcome including: weak economic infrastructure in each country, negative trends in the terms of trade for the region's major primary product exports, frequent internal and cross border conflicts, as well as lack of effective and transparent governance (Collier and Gunning, 1998; Dollar et.al, 2001. Empirical findings to date show that efficiency of labor markets is a very important factor for the success of policy reforms and economic growth (Forteza and Rama, 2001; Hasan, 2001; Rama, 2003). One way through which labor market characteristics and institutions may affect economic growth is by influencing outcomes such as the level of wages, returns to human capital and inequality. Institutions that influence labor market outcomes include labor unions, strict labor regulations and minimum wages, a high level of segmentation and high level

of informality, as well as high levels of gender disparity in labor force participation rates, access to various levels of education and wages. In subsequent parts of this study, we will focus on a detailed discussion of two of such labor market outcomes: the process of wage determination, and gender disparity in wages.

Gender disparity in particular is a very serious issue in Africa since generally traditional norms and practices significantly increase women's vulnerability to economic hardships in the region. As in most other developing countries, roles assigned to African men and women at social, or traditional and household levels are largely culturally pre-determined and traditional values are set in a manner that favor men at the expense of women (UNECA, 1994; World Bank, 1995).

However, despite the prevalence of such common labor market characteristics in Africa, there are also quite significant differences in terms of the roles of these characteristics. These different labor market institutions and characteristics will thus have different economy-wide labor market outcomes.

There are different mechanisms through which institutions affect labor market outcomes. For example, in countries where labor markets exhibit stronger regulatory constraints, and collective bargaining arrangements (labor unions) that limit the ability of firms to adjust their level of employment and wages in response to the changing market conditions, average wages will be higher, but employment may be at a sub-optimal level. Moreover, there may also be a relatively limited inter-sectoral as well as interregional mobility of labor. The same is true for minimum wage legislations. Minimum wage legislations set a 'floor' wage rate below which employers should not pay their workers and thus such legislations naturally raise wages of unskilled workers at the lower portion

of wage distribution. In an economy with a relative abundance of unskilled labor, the prevalence of such legislations that set minimum wages well above what the employers would have liked to pay will result into a higher level of unemployment [usually of the unskilled labor force] compared with a situation where wages are determined by supply and demand factors. If firms can hire and fire with a relative ease, growing firms can attract workers from industries and regions that are experiencing job losses. By contrast, when minimum wage rates are set at a level higher than what the level of productivity warrants, industries may end up experiencing weak demand for labor, thus lowering employment level and growth in the economy.

The discussions on labor market characteristics and outcomes in this part of the study thus have important policy implications. As mentioned earlier, the African economy currently suffers from a very slow growth accompanied by a high population growth rate. As a result, Africans on average have been poorer and poorer in per capita terms. The dominant primary sector is not also performing well in terms of providing sufficient income and employment opportunity to most Africans. Therefore, in the medium to long term, a structural transformation of the African economies towards an efficient, labor intensive industrial sector which is able to produce outputs that are competitive in international markets is needed for the region's economy to grow sufficiently. It is therefore important to closely look at the major features of the urban industrial labor markets is in order to design appropriate policy interventions. In parts II and III, the study will focus on the urban labor markets.

The remaining section of part I is organized as follows: Chapter 2 will briefly discuss the economic and labor force structure in Africa. It specifically bundles African

labor market characteristics and institutions into three major groups, and discusses the details in each group. Chapter 3 summarizes the important points of the discussion in part I and concludes.

CHAPTER 2.

ECONOMIC AND LABOR FORCE STRUCTURES IN AFRICA

The general structure of African economies, as one might expect, is somewhat similar to other developing countries in that the primary sector plays by far the most important role in terms of its contributions to total employment and Gross Domestic Product (GDP). The service sector is another important economic activity in Africa, and its contribution to employment and GDP in the region has been increasing during the last few decades. The contribution of the industrial sector in general and that of manufacturing in particular (within industry) is, however, still very low and growing at a slower rate.

Historical evidences suggest that the process of economic development generally requires mobility of productive factors, particularly labor and capital to their most productive use. When this occurs, the growth process and structural change leads to an expansion of the modern sector, which in turn employs more people and continues to improve in its efficiency. On the other hand, the contribution of the primary sector diminishes with economic development. However, despite its recent relative decline for the region as a whole, the agricultural sector in Africa still has the lion's share in terms of its contribution to GDP and employment reflecting the slow pace in the transformation of the economic structures in the region (see Table 1-1 below and Appendix 1-1). In terms of labor force absorption, available data shows that the agriculture and services sectors

respectively provided employment for 62 percent and 23 percent of the African total labor force during the late 1990s.

Table 1-1. Labor force by sector (percentages)

Country/ Region	Agriculture			Industry			Services		
	1980	1990	1996	1980	1990	1996	1980	1990	1996
Cameroon	73	70	49	8	9	15	19	21	36
Etiopía	89	86	72	2	2	12	9	12	16
Ghana	61	59	52	13	13	19	25	28	29
Kenya	82	80	75	6	7	9	11	13	16
Mozambique	84	83	81	7	8	10	8	9	9
Nigeria	54	43	64	8	7	13	38	50	23
South Africa	17	14	..	35	32	..	48	54	..
Tanzania	86	84	79	4	5	7	10	11	14
Africa	**69**	**63**	**62**	**10**	**11**	**15**	**21**	**26**	**23**
East Asia & the Pacific	67	54	48	17	18	20	15	13	17
Middle East & N. Africa	..	27	..	..	25	..	..	48	..
OECD	9	6	5	33	30	28	56	64	67
USA	4	3	3	31	26	24	66	71	73

Sources: The African Development Bank database, 2002; World Development Indicators, 2004

A well functioning labor market benefits the worker, the employer and the economy as a whole by putting workers where they contribute the most in the production of goods and services demanded for consumption by other people. Also, as pointed out earlier, economic growth and the success of any economic policy is highly influenced by the flexibility of labor markets (Forteza and Rama, 2001; Hasan, 2001; Rama, 2003). A well functioning and flexible labor market, by appropriately rewarding for skill differences, also creates incentives for investment on human capital such as on education and training. There are at least three mechanisms through which labor markets affect the allocative efficiency of an economy. These are: (i) by matching the supply of and demand

for labor (i.e. workers and employers) through the going wage rates; (ii) by matching 'skills' with 'skill requirements' of jobs across sectors and across job categories through relative wages (i.e. by allocating workers to where they fit the most); and (iii) by providing information about the benefit of human capital development and creating incentives for education and training (i.e. by rewarding more to labor with more education and training thus affecting allocation of resources towards more human capital development). Policy makers in Africa should therefore work to ensure that their labor markets fulfill the above three allocative mechanisms.

2.1. Major Characteristics Of Urban Labor Markets In Africa

African urban labor markets are generally characterized by some common features such as a dominant public sector in formal sector employment and wage determination, strict labor market regulations, high unemployment rates, high and growing informal sector activities as well as high level of gender gaps. It is believed that these characteristics might have generally rendered the African urban labor market inefficient in reallocating labor between firms and jobs[1]. Care should be taken in terms of generalizations, however. Since Africa is a very diverse continent with significant cross country differences with respect to the existing institutions, the role of women in the society and their traditional status, it is expected that there are corresponding cross-country differences in most of these labor market characteristics.

[1] For example, Van Biesebroeck (2002) has investigated the extent to which labor markets in several African countries are efficient in reallocation of labor between firms and finds that the reallocation process there indeed is less efficient compared with those in the US.

For convenience and clarity of discussions, we can group these major African labor-market characteristics that are common to most of the economies into three broad categories namely: (i) those characteristics related to labor market segmentation, (ii) characteristics related to labor market-glut with low skill, and (iii)) characteristics related to labor standards, regulations and institutions. The following section briefly discusses these characteristics within each group.

2.1.1. Characteristics Related to Labor Market Segmentation

2.1.1.1. The prevalence and dominance of a large public sector: In most of SSA countries, the public sector dominates the production, distribution and employment activities in the economy. In fact, this sector has played a very important role in expanding employment in the post-colonial African urban labor market (Heller and Taite, 1983; Knight and Sabot, 1988). The public sector currently employs a very large share of the formal sector work force in Africa. For example, in Cote d'Ivoire (in 1997), even though only 5 percent of the total labor force is believed to have been engaged in wage employment in the formal economy, about 43 percent of those wage employees work in the public sector (UNECA, 2002). Similarly in Ethiopia, public enterprises accounted for 94 percent of employment in the manufacturing sector in 1991/92 (Tadesse, 1995), though, due to privatization and increases in private sector investment, this share is expected to have declined significantly.

It is important to note that in an effort to improve competition and efficiency in the business environment, there have been numerous privatization activities in most parts of Africa since the late 1980s as one major component of structural adjustment policies.

In fact, in most of the countries, a significant number of previously state owned manufacturing and service providing enterprises have already been transferred to either fully private hands or joint ventures. Despite all such efforts, however, it appears that the public sector in Africa still continues to be dominant in terms of total formal sector employment, share of modern manufacturing activities and delivery of utility services such as water, telecom and power.

There are different ways through which the existence of such a large public sector affects efficiency of the labor market and economic growth. For example, in most cases, wage setting in the public sector is not market driven, but rather public sector wages are set using administrative decisions, which may distort economy-wide labor allocation. The public sector may end up overpaying low-skilled labor and underpaying highly skilled labor. As a result, public enterprises in Africa tend to have a different wage structure than the private sector. For example, according to a World Bank study, for some highly technical labor which is in a very short supply in Africa, public enterprises pay far below the private sector. As shown in the table 1-2 below, an engineer in the African private sector earns more than twice his public sector counterpart in most of the countries, but even as much as eight times in some countries like Zambia. The study attributes such a high pay gap between civil service and private sector employees to shortages of technical staff in the region (World Bank, 1995). Consistent with this result, a preliminary analysis of available matched employer-employee (LEE) data sets from Nigeria and Ethiopia also shows that workers in the public sector earn respectively an average of 28 percent and 9

percent less than their private sector counterparts after observable human capital and firm level characteristics are controlled for[2].

Table 1-2. Comparative Incomes of Public and Private Sector engineers in selected African countries (USD per month) in 1993

	Cameroon	Kenya	Nigeria	Tanzania	Uganda	Zambia
Public Salary	377	170	154	70	99	70
Private Salary	777	465	334	350	360	600
Private/Public	2.1	2.7	2.2	5.0	3.6	8.6

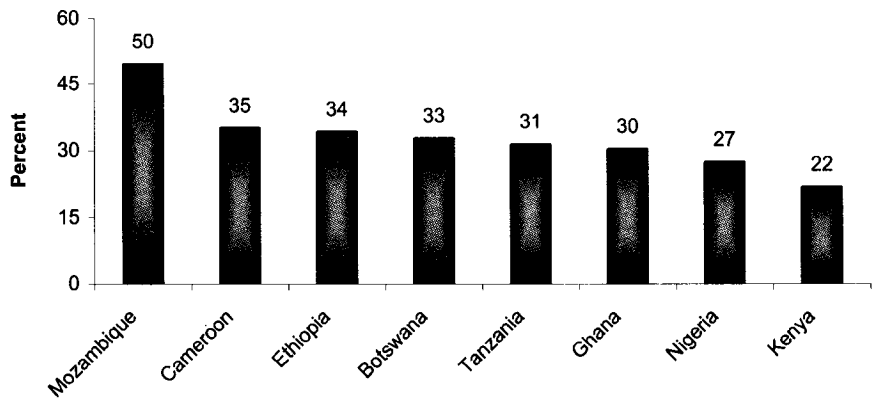
Note: Comparisons are for salaries and allowances of graduate engineers with three to four years of practical experience. Conversion to dollars at January 1994 exchange rates, after CFA devaluation.
Source: World Bank, 1995

Moreover, evidence suggest that most government offices in Africa are overstaffed, and compared with the average productivity of workers employed there, public sector jobs are generally costly despite the low pay[3]. Thus a large public sector is very likely to create a significant strain on the fiscal position of the government. The wage bill in the public sector thus amounts to a very significant proportion of the government's total recurrent expenditure in most African countries. It absorbs, for example, from more than 20 percent in Kenya to close to 50 percent in Mozambique (see figure 1-1 below). Similarly, total central government wage bill as a percentage of GDP is also enormous in most of African countries. It was, for example, around 9 percent in both Botswana (1997) and Kenya (1999); and close to 6 percent in Ethiopia and Ghana (1997). These figures are almost comparable with the figures from the OCED countries

[2] See part II for details
[3] Data from the Ethiopian Manufacturing establishments survey, for example, reveals that overstaffing is more serious in the public enterprises where the average reported excess labor is about 17 percent compared with only 7 percent for private firms.

where the public sector provides more social services and is believed to be more efficient and developed. For example, total compensation costs as a percentage of GDP (for the year 1999) were 8 percent for Germany, 6 percent for Italy , 9 percent for Ireland, and less than 3 percent for the Netherlands (World Bank, 2002). One implication of such a significant fiscal burden of a large public sector in Africa clearly is that it takes resources away from other priority expenditure areas and thus negatively affects economic growth.

Figure 1-1.
Total Govt. wage bill (percent of Recurrent Budget) - 2001



Source: World Bank, Africa Regional database

Moreover, a large public sector also undermines the overall economic performance through its low productivity. The public sector in Africa is underperforming mainly due to lack of managerial and technical skills, old technology and equipment, rampant corruption, and particularly lack of appropriate incentives[4].

[4] According to the World Bank, low productivity of the public sector in SSA has more often been the result of inadequate incentives than of incapable workers (World Bank, 1995).

2.1.1.2. Significant gender disparity in education, occupation and labor force participation: There are significant pro-male gender gaps in Africa in terms of labor force participation, access to promotion into higher occupational hierarchies, and access to education. All of these gaps re-enforce the effect from each other. In the following paragraphs, we will discuss each of them briefly and separately.

Labor force participation: In SSA, women's labor force participation is in general relatively high compared, for example, to those in the middle east and north African countries where religious structures and traditional norms often discourage women from participating in economic activities outside the household and in some cases even from attending school. But, African women generally represent a very small proportion of formal employees in the region and a very high proportion of self employed and unpaid family labor (see Table 1-4), and the bulk of their labor force participation is in agricultural and informal sector activities. Labor force participation of African women in the urban formal sector is very low in general and compared with that of men in particular.

There are significant cross-country differences in labor force participation rates of African women, however. For example, female labor force participation rate in Nigeria (at 49 percent) is much lower than that in Ethiopia (which is 59 percent). Labor force participation on Nigerian women is even much lower compared with that of Nigerian men. This can be seen from the low female/male ratio of participation in economic activities (in 1995) which was 56 percent in Nigeria compared with 69 percent in Ethiopia (see Table 1-3).

Table 1-3. Labor force participation rates for 15-64 age group in 1995 (percent) and selected women's comparable status indicators in 2000.

Country/ Region	Labor force participation rates				Literacy gender parity index (2000)	Labor force gender parity index	
	Total	Male (M)	Female (F)	F/M ratio		1990	2000
Egypt	..	82	37	45	0.8	0.4	0.4
Ethiopia	73	86	59	69	0.8	0.7	0.7
Morocco	..	83	44	53	0.8	0.5	0.5
Mozambique	88	91	84	92	0.6	0.9	0.9
Tanzania	86	89	84	94	1.0	1.0	1.0
Uganda	87	92	82	89	0.9	0.9	0.9
South Africa	52	59	44	75	1.0	0.6	0.6
Nigeria	67	88	49	56	0.9	0.5	0.6
Sub Saharan Africa	..	87	62	71	0.9	0.7	0.7
OECD/EMU	..	79	57	72	..	0.7	0.7
USA	..	82	70	85	..	0.8	0.9
E. Asia & Pacific	..	88	75	85	1.0	..	..
M. East & N. Africa	..	81	32	40	0.9	..	..

Source: ILO, (2000). LABPROJ data repository, Key Indicators of Labor Market (KILM), World Development Indicators (2002, 2004)

Definitions:
Literacy gender parity index: is the ratio of the female literacy rate to the male rate, for the age group of 15-24 years.
Labor force gender parity index: is the ratio of the percentage of women who are economically active to the percentage of men who are. The ILO defines the economically active population as all those who supply labor for the production of goods and services during a specified period.

Occupation: Occupational segregation by sex is an enduring aspects of the African labor markets. As in most other countries in the world, women in Africa tend to systematically concentrate in low paying and low status occupations, and this certainly contributes to their average wages being lower than their men counterparts[5]. Women in Africa are generally overrepresented in the agricultural sector, and underrepresented in

[5] This situation is believed to exist at all levels of development, political systems and cultural settings in various degrees, and the seriousness of occupational segregation as a form of discrimination is recognized

the manufacturing sector. Also within the manufacturing sector, women are mostly employed in unskilled and low paying segments of industries and occupations. The share of women in managerial and decision making positions in Africa are generally very low as they rarely succeed to break through the so called 'glass ceiling' that separates them from top-level management (World Bank, 1995; also see part II below).

There are again cross-country differences in the relative position of women compared to men in terms of access to higher levels of occupations. Evidence suggest that the share of women as a percentage of men in higher level occupational categories in general is low, but it is much lower in Nigeria than in Ethiopia. For example, the ratio of women in administrative and managerial categories in Nigeria in the late 1990s was just about 6 percent compared with around 11 percent in Ethiopia (World Bank, African Development Indicators, 2004).

Our survey data sets also show that in both Nigeria and Ethiopia, women are overrepresented in low skilled and low paying occupations, while very few of them are working in management and skilled production occupational categories, indicating that there are significant gender differences in occupational distribution (see Figure 1-2).

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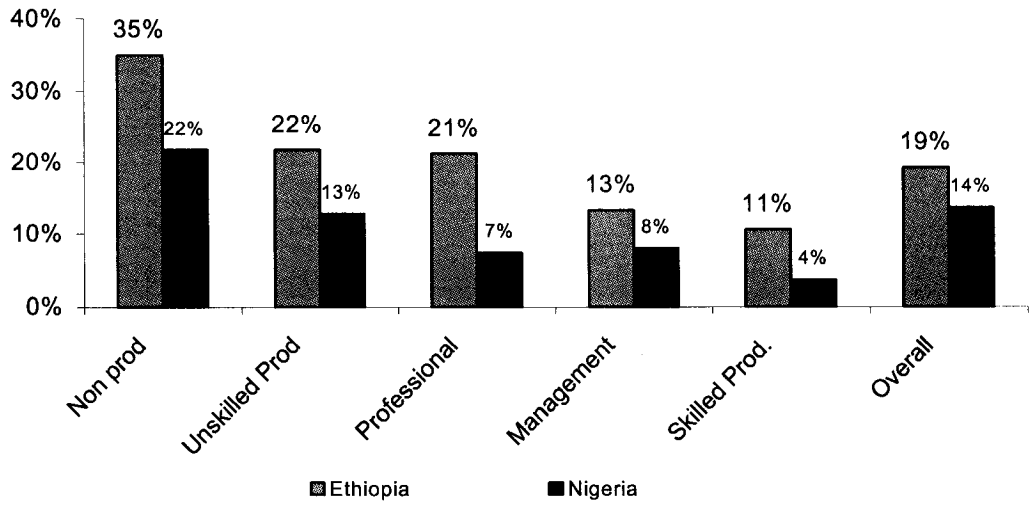
in ILO convention No. 111 on equality of opportunity in employment. See also Khandker, 1992; Robinson, 1998; Blau and Beller, 1988; Groschen, 1991).

Figure 1-2
Share of women in sampled enterprises by occupational category (2001/2)*



Source: Computed by the Author using the relevant firm survey data sets

* The overall share of women (last column) represents observations with occupational categories.

Education: African girls are less likely to go to school than boys, and for those girls who are enrolled, they are even more likely to drop out before completing higher levels of education (World Bank, 2001). The average gross primary school enrollment for girls in Africa was around 80 percent in 2000, while that of boys was about 92 percent during the same period (World Bank, 2001). However, the figures for girls' enrollment are still very low by the standards of developed economies and developing countries in other regions (World Bank, 2002). Thus, the male-female primary school enrollment gaps are substantial in Africa. We see similar gaps in higher level school enrollments as well: For example, the average gross secondary school enrollment for African girls in 1998 (latest year where data is available) was around 27 percent compared with an average of around 30 percent for boys (World Bank, 2002). As shown in table 1-4 below, the result

of all these is that the educational gap between men and women in most African countries increases with the level of schooling, and is especially high at the university level.

Table 1-4. Men-Women school enrollment gaps & female labor force indicators, (in the year 2001)

Country	School enrollment gap *			Women as % of total				Female labor Force: Agr / Total
	Primary	Secon dary	Post Sec.	Labor force	employees	Self Empl.	Unpaid family	
Ethiopia	62	55	25	40	5	28	65	86
Mozambique	76	62	31	49	..	..	82	96
Tanzania	102	83	24	49	..	..	88	91
Nigeria	..	..	38	37	..	60	..	2
Uganda	85	60	49	48	7	39	54	88
S. Sahara Africa	..	..	63	42	..	..	..	..
OECD	100	102	110	43	..	..	..	3
USA	101	102	130	46	..	6	0.1	1
E. Asia & Pac.	100	..	72	48	..	..	..	..
Middle East & North Africa	96	89	69	..	..	..	..	..

* Defined as Females as percentage of Males. Thus a lower number represents a higher gap.
Source: UNCTAD (2002); In some missing cases, computed by the Author using World Development Indicators (2004) data.

The low level of education achievement and lower labor force participation rates of African women have thus generally resulted into lower gender parity measures for most of the countries in the region, but there are again cross-country differences again (see table 1-3). The comparative data shown earlier in Table 1-3 and Figure 1-2, for example, show that there is probably more limits on women realizing their full potential in Nigeria than in Ethiopia due to differences in availability of opportunities for women relative to men between the two countries in most fields of activities. For example, in an article that tried to demonstrate a link between the economic and social features of countries, their female relative labor force participation rates, and the performance of women in international sports competitions, Klein (2004) reported that the relative labor

force participation rate of women was a significant determinant of the number and type of medals won by a country's women in the 2000 Sydney Summer Olympics. The same variable was also found to be an important determinant of the likelihood of qualifying for the 1999 Women's Soccer World Cup and performance in that competition. His findings thus concluded that societies in which women have greater economic opportunities are the ones that enable athletically talented women to reach their full potential. The article therefore tends to support the fact that Ethiopian women's dominance in long distance running and other athletics in the world of Olympics (while there are close to none in Nigeria) may be a reflection of more opportunities for women in Ethiopia than those in Nigeria.

2.1.1.3. Significant gender disparity in remuneration: In addition to the significant gender gaps in access to formal sector employment, certain high level occupations and education as discussed above, studies confirm that there are also significant gender wage gaps in Africa among those who are employed. In part II, we will see that these remain even after controlling for differences in human capital variables.

This is true for almost all occupational categories as shown in table 1-5. We see from the table that the last two occupational categories where women are concentrated the most have also the lowest average wages, and that in almost all occupational categories, women get lower average wages than their male colleagues(except professional and non-production occupational categories in Ethiopia). Moreover, and somewhat surprisingly, the gap is more pronounced at higher level jobs. For example women in the management occupational category get about 50 percent of the average for

men in the same occupational category in both countries. Similarly, in the professional category, women in Nigeria get just a little more than 50 percent of the average for men in that category; while in Ethiopia they get a little more than the average for men. In the non-production category also, women's average pay in Ethiopia is equivalent to that of men. For the whole sample, Ethiopian women get on average about 73 percent of that of men, and Nigerian women get a little more than half of what their male counterparts on average receive[6].

Table 1-5. Average hourly wages by gender and occupation (in local currency**) and women's average wage as % of men's

	Ethiopia Average wages				**Nigeria** Average wages			
Occupation	Men (wm)	Women (wf)	All sample	wf/wm*	Men (wm)	Women (wf)	All sample	wf/wm*
Management	31.8	15.6	29.4	49%	1588.1	656.6	1527.0	41%
Professionals	7.9	8.0	7.9	101%	1160.7	619.0	1105.4	53%
Skilled Production	3.8	2.5	3.7	65%	583.1	400.2	571.7	69%
Unskilled Production	2.9	2.6	2.8	91%	720.6	462.3	679.8	64%
Non Production	2.9	3.0	2.9	101%	478.0	353.1	430.6	74%
Total	5.7	4.1	5.3	73%	792.4	410.6	720.4	52%

Source: Calculated by the author using the appropriate survey datasets

* wf/wm is the share of women's average wages as a percentage of men's

** Average wages per hour are in ETB for Ethiopia and in Naira for Nigeria.

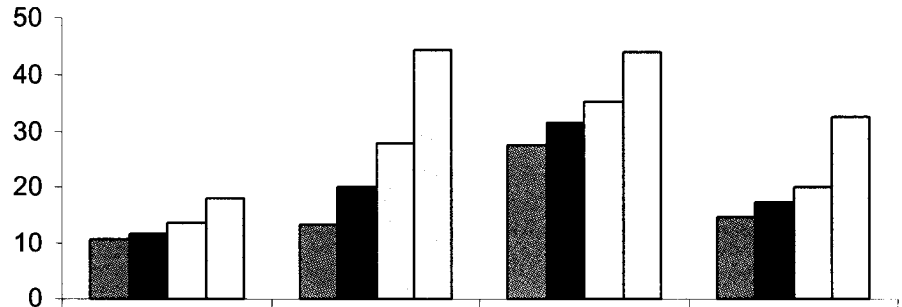
2.1.2. Characteristics Related to Labor-glut With Low Skill

2.1.2.1. High level of rural-urban migration: With a declining household income from agricultural activities, individuals' need for better employment opportunities and better

[6] A detailed analysis of the effect of such occupational differences on wage rates and gender wage inequality will be dealt with separately in parts II and III. Indeed, we will see that the effects of such

lifestyles, rural-urban migration has been quite high in most of Sub-Saharan Africa during the last two decades. As a result, the rate of population growth in some of the region's urban areas has been twice as high as that of the national average (see Figure 1-3 below and Appendix 1-2). The rate of growth of formal sector employment could barely keep up with that of the labor force in general and was well behind the rate of growth of the urban labor force in particular. The high rural-urban migration has also been a source of cheap, unskilled labor for the urban formal sector, but given the lagging rate of employment creation in the urban areas, it has led to a significant increase in the unemployment rate of the urban labor force.

Figure 1-3.
Share of Urban Population in Africa, 1980 – 2001



	Ethiopia	Mozambique	Nigeria	Tanzania
1980	10.8	13.4	27.4	14.6
1985	11.8	20	31.5	17.3
1990	13.6	27.7	35.4	20.3
2001	18.1	44.4	43.8	32.5

Source: Based on data extracted from African Development Bank database, 2002.

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occupational differences on wages and gender outcomes in our empirical investigation are substantial.

2.1.2.2. High and increasing levels of [skilled] professionals' emigration: It is believed that there is a serious skill constraint in the African urban labor markets[7]. This shortage of 'well trained' manpower in Africa is also exacerbated by a large and increasing emigration of skilled labor to foreign countries. Particularly, combined with the rural-urban migration discussed above, this phenomenon has lowered the share of 'skilled' labor force in the African urban labor markets.

Studies indicate that a significant number of African skilled labor force leaves the region from the most critically needed sectors and professions. According to some estimates, at least 60 percent of doctors trained in Ghana in the 1980s have already left the country; and close to 30 percent of the University of Cape Town's [contactable] doctoral graduates are living overseas; while 1,500 of Zimbabwe's 3,000 trained social workers left for the United Kingdom during the last 10 years only. It is also estimated that between 1960-1975 an estimated 27 thousand African professionals left for industrialized countries (Gumusai, 2003; UNECA, 2001). During the period between 1975 and 1984, the number of educated African emigrants averaged about 40,000, and reached close to 60,000 by 1987. It is also estimated that since the beginning of the 1990s alone, an estimated average of more than 23,000 well educated academic professionals leave Africa each year for better working and living conditions; and the region has also lost close to 60,000 middle and high level managers between 1985 and 1990 only (Buckley, 2001; UNECA, 2001).

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[7] Our manufacturing firm level survey data sets also report that close to half of managers of sampled establishments from both Ethiopia and Nigeria perceive *'skill constraints'* as serious obstacles for their business growth and operations.

Paradoxically, it is estimated that in order to fill the gap created by the skill shortages mainly due to a combination of lack of training opportunities and out-migration of trained manpower, Africa annually spends about $4 billion of its aid money to employ about 100,000 expatriates (Buckley, 2001; Gumusai, 2003). This amounts to more than a quarter of the Official Development Assistance (ODA) directed to the region[8]. Most of the skills being brought by these expatriates could have been provided by the African professionals themselves who are leaving the region. In as far as the incoming expatriates are by far more expensive than the local African professionals, such a huge expenditure on expatriates is definitely a drain on economic development.

The rural-urban and international migration issues discussed above affect the wage determination and discrimination outcomes in different ways. On the one hand, rural-urban migration increases the supply of unskilled labor in urban areas thus potentially depressing urban wage rates for unskilled workers. On the other hand, migration of skilled labor to abroad adds to the shortage of skilled manpower and probably bids their wages up. The combined effect of these two outcomes would then be to enlarge the skilled-unskilled labor wage differential through a significant reduction of the share of skilled labor force in the African urban labor market. In as far as women in the African urban labor market are overrepresented in the unskilled occupational categories than men, this translates the skilled-unskilled wage differentials into higher male-female gender wage gaps.

[8] Total ODA to Africa in 1991 was, for example, around 16.2 billion US dollars.

2.1.2.3. High level of urban unemployment: Due to the high prevalence of subsistence activities as well as casual and unpaid family/household labor, accurately measuring unemployment in developing countries in general and in Africa in particular is difficult[9]. Also, since there is not much incentive for the unemployed to register (as there are no things like unemployment benefits in most of Africa), getting reliable data on the level of unemployment in the region is currently a very tough job. In general, however, unemployment rates in Africa's urban sector are believed to be high[10] (see Appendix 1-1A). Various sources of labor market information report that youth unemployment rates (for the age group of 15-24) are even higher. For example, youth unemployment rate in South Africa in 2000 is reported to have been as high as 56 percent (ILO 2002). Similarly, the share of unemployed youth to total number of unemployed labor force in Ethiopia (for the year 1999) was about 84.4 percent (for women this figure was 91.2 percent and for men it stood at 79.1 percent); and in Namibia, the share of unemployed youth to total number of unemployed labor force in 1997 was around 37.1 percent (with 40.9 percent for women and 33.4 percent for men) (ILO, 2002). The implication is that there is excess supply of unskilled labor in the African urban labor market, and thus there is a long line of queuing for jobs. The matching of workers to jobs would therefore tend to be done through connections than being left to be determined by market forces, thus leading to further labor market distortions. Quite likely, a high rate of unemployment of

[9] The standard definition of an unemployed person is "some one who would like to work at the prevailing, current wage rate. It generally refers to "the proportion of those people who are out of a job and are actively looking for work" out of the total 15-64 years age group.

[10] Perhaps the most important, but less visible problem in Africa, especially in rural areas, is 'under-employment'; that is, even those who are employed could have put more time and effort if they had the opportunity.

the type mentioned above also creates a personal disincentive to invest on education, and leads to hopelessness and loss of motivation to find a job in the formal economy.

2.1.2.4. High and increasing level of informality in economic activities: Generally, in most of SSA, a very small proportion of the total labor force is employed in the urban formal sector, while the informal sector is very large in terms of employment and total output (see Appendix 1-1B). The estimated size of informal sector in terms of current employment and job creation is much higher in Africa than in other regions (see table 1-6 below). It is estimated that the informal sector in Africa contributes to close to 80 percent of total non-agricultural employment, 60 percent of total urban employment and more than 90 percent of new jobs. Studies also indicate that the percentage of the labor force working in the urban formal sector of these countries has even been declining since the beginning of the 1990s, while the informal economy has been expanding (Van der Hoeven and Van der Geest, 1999; Saget, 2001).

Table 1-6. Estimated size of the informal sector (in percent)

Informal Sector as a share of total … (in %)	Latin America and the Caribbean	Africa	Asia
Non-agricultural employment	57	78	45-85
Urban employment	40	61	40-60
New jobs	83	93	NA

Source: Chen, 2002 (Original source Charmes, 2000)

There are again wide cross-country variations in the average share of informal sector employment in SSA. For example, in Cote d'Ivoire (in 1997), only around 5 percent of the labor force was engaged in wage employment in the formal economy;

while the remaining 95 percent of the people were working in the informal economy. In South Africa, the share of informal employment (as a percentage of total non-agricultural employment), is estimated at around 51 percent for both men and women; and 58 percent for women only. The informal sector in Ethiopia is also very significant, estimated to employ about 51 percent of the economically active Ethiopians (Fluitman, 2001; UNECA, 2002)[11].

Due to unequal access to formal employment opportunities and relatively lower accumulated human capital, women in Africa tend to concentrate more in informal sector economic activities. Particularly since the late 1980s, as opportunities in the formal sector became narrower due to disappointing economic performance in Africa, participation in informal sector activities in general is believed to have widened. Related to this, the immediate outcomes of structural adjustment policies are also believed to have contributed to the increasing informalization of women's work in the region. As women generally had predominated in the lower echelons of the social services sector (where the budget cuts were the heaviest), and in the less professional and technical-support services of enterprises, they were more heavily affected by retrenchment programs than men, and most of these women naturally had to relocate to the informal sector[12]. The ILO estimates also show that for the whole of SSA (excluding South Africa), self employed women as a

[11] Just as its share in total employment, the informal economy in Africa contributes to an average of about 40 percent of the region's total GDP (see Appendix 1-1C).

[12] For example, in Benin women accounted for 26 percent of the retrenched workers, although they were only 6 percent of the formal sector workers in the country (United Nations, Africa Recovery Briefing Paper No. 11). Similarly, in Nigeria, almost one-third of the 1 million industrial workers who were retrenched under the country's structural adjustment program between 1980-83 were women, even though women were only 20 percent of the country's employed labor force (Bello, M.V., 1991).

share of total non-agricultural women workers has more than doubled from about 44 percent in 1980 to 90 percent in 1990 (ILO, 2002).

Empirical evidence indicates that the informal economy is also characterized by lower earnings in general, and higher gender earnings gaps against women in particular than the formal economy (World Bank, 1995). This is also a further indication of labor market segmentation in SSA as it suggests that not only do women have an unequal access to formal employment opportunities, but also in addition to a higher incidence of informality than their male counterparts, they also get compensated at a much lower rate than men in the informal economy itself.

2.1.1.5. High labor force participation rates of children: Africa has the highest proportion of working children. It is generally estimated that about 29 percent of children in SSA are economically active compared to only 4 percent in the Middle East, and 19 percent in Asia (ILO 2002)[13]. Moreover, in almost all cases children's participation concentrates in informal sector activities. The implication is that human capital development in the region in terms of formal education and the future availability of skilled labor force is seriously jeopardized.

[13] The labor force participation of children between 10-14 years of age, as a percentage of same age group in 1998 for selected countries was as follows: Ethiopia 41 percent, Ghana 13 percent, Kenya 40 percent, Mozambique 33 percent, Nigeria 25 percent compared with 0 percent for high-income countries (World Bank, World Development Indicators, 2000).

Table 1-7. Labor force, children 10-14 (% of age group)

Country/Region	2000	2001	2002	2003
Egypt	9.3	8.8	8.3	7.8
Etiopía	41.1	40.9	40.6	40.4
Morocco	0.6	0.6	0.5	0.3
Mozambique	32.4	32.1	31.9	31.6
Nigeria	23.9	23.5	23.2	22.8
South Africa	0.0	0.0	0.0	0.0
Tanzania	36.9	36.4	35.9	35.3
Sub-Saharan Africa	29.0	28.7	28.5	28.2
Middle East & North Africa	4.4	4.2	3.8	3.5
East Asia & Pacific	8.2	7.5	6.4	5.1
High income: OECD	0.0	0.0	0.0	0.0
United States	0.0	0.0	0.0	0.0

Source: World Bank, World Development Indicators, 2004

2.1.3. Labor Standards, Regulations and Labor Market Institutions

2.1.3.1. Labor Market Standards and regulations in Africa: African labor markets generally are characterized by weak labor market regulations and standards with some exceptions. As the world is becoming more and more 'globalized', development practitioners and policy makers are becoming equally more and more convinced that the outcomes of labor market regulations can go even beyond the domestic economy[14]. As goods and services are becoming more and more traded, it is natural that labor standards of the exporting country (for example whether child labor and harsh working conditions were involved) should be a concern for the importing country both from ethical as well as competitiveness point of view. The International Labor Organization (ILO) coordinates

[14] Globalization comprises of a continuous trend of trade and financial markets liberalization. As a result of this phenomena, we clearly see nowadays that some previously non-traded services are becoming virtually traded (e.g. data entry, programming, etc.) as they can be sub-contracted out to workers overseas due to an ever improving computer technology.

the implementation of labor standards that ensure basic working conditions in different sectors of the world economy.

According to the ILO registry, most of the African countries have ratified, at different times, its various conventions regarding what are called the *'core labor'* standards and *'human rights'* conventions (see foot note for details. For the contents of each convention and information for other countries, see ILOLEX database, ILO)[15]. There are also African countries in the region that did not ratify some of the conventions until very recently. For example, Tanzania did not ratify neither of the conventions on discrimination until almost a year ago. The same thing for Nigeria regarding one of the conventions on discrimination (convention 111) in that it did not ratify it until very recently, while it ratified the equal remuneration convention (convention 100) well back in 1974. It is indeed more likely that women in countries who did not ratify these conventions until recently may find themselves in a relatively subordinate position in the labor market and face relatively more unfair treatment or discrimination in many sectors.

Table 1-8 below shows summarized comparative information about the ratified ILO conventions that are associated with the system of industrial relations, formations of trade unions, and the level of wage rigidity for selected countries.

[15] There are five (5) major components of these 'core labor standards' as defined by the ILO. These are: (a) Prohibition of slavery/compulsory labor, (b) Elimination of discrimination, (c) Prohibition of exploitative child labor, (d) Freedom of association, that is, the right for employees to form unions and for employers to form employers' organizations; and (e) the right to collective bargaining, that is the right of unions and employers' organizations to negotiate on working conditions and wages on behalf of workers and employers respectively.

Table 1-8. Ratification year of selected ILO conventions by country

Country	Group I		Group II		Group III		Group IV	
	Conv. 87	Conv. 98	Conv. 29	Conv. 105	Conv. 100	Conv. 111	Conv. 138	Conv. 182
Ethiopía	1963	1963	2003	1999	1999	1966	1999	2003
Nigeria	1960	1960	1960	1960	1974	2002	2002	2002
Tanzania	2000	1962	1962	1962	2002	2002	1998	2001
Germany	1957	1956	1956	1959	1956	1961	1976	2002
UK	1949	1950	1931	1957	1971	1999	2000	2000
USA	..	..	..	1991	..	..	..	1999

Source: ILOLEX Database of International Labor Standards, ILO. See below for information on each group.

Group I – Freedom of association and collective bargaining

Conv '87=Freedom of association and protection of the right to organize, 1948
Conv '98=Right to organize and collective bargaining convention, 1949

Group II – Elimination of forced and compulsory labour
Conv '29= Convention concerning Forced of compulsory Labour, 1930
Conv '105= Abolition of Forced Labour Convention, 1957

Group III – Elimination of discrimination in respect of employment and occupation
Conv '100=Equal Remuneration Convention, 1951
Conv '111=No Discrimination in Employment and Occupation Convention, 1958

Group IV – Abolition of child labour
Conv '138=Minimum Age Convention, 1973
Conv '182=Worst Forms of Child Labor convention, 1999

Just as the dates when the countries ratified the various conventions of the ILO core labor standards are different, the extent to which labor market regulations and standards are complied with also varies from one country to another[16]. A 1996 study by the Organization for Economic Cooperation and Development (OECD) divided a large number of countries (both developed and developing) into four (4) groups depending on the extent to which two of the above core labor standards (i.e. freedom of association and collective bargaining) are guaranteed by law in each country. The classification, as

presented in the table below, shows a stark variation not only between developed and developing countries, but among the developing and African countries as well.

Table 1-9. Labor Standards in Selected Countries, 1970-94

Group Number	***Definition***	***Countries****
Group 1	Freedom of association, on the whole, is guaranteed by law and practice.	All OECD countries, except the Republic of Korea, Mexico, and Turkey. In addition, Bahamas, Barbados, Israel, Malta, and Suriname
Group 2	Some restrictions exist, but it is possible to establish independent workers' organizations and union confederations.	Argentina, Brazil, Chile, Ecuador, **Ethiopia**, Fiji, Hong Kong, India, Jamaica, Mexico, **Niger**, Papua New Guinea, Peru, **South Africa**, Republica Bolivariana de Venezuela, and **Zambia.**
Group 3	Restrictions on freedom of association are significant, that is, stringent registration requirements exist, and political interference or acts of antiunion discrimination make it very difficult to form independent workers' organizations of union confederations.	Algeria, Bangladesh, Bolivia, Taiwan (China), Colombia, **Ghana**, Guatemala, Honduras, **Kenya**, **Mali**, Malaysia, Morocco, **Nigeria**, Pakistan, Philippines, Sri Lanka, Thailand, Tunisia, Turkey, and **Zimbabwe**.
Group 4	Freedom of association is practically nonexistent	**Cameroon**, China, Egypt, Indonesia, Iran, Kuwait, Syria, and **Tanzania.**

Source: OECD (1996)
* Sub Saharan African countries in **bold** face characters.

According to the study, information contained in the above groupings include the easiness of forming independent labor unions, and whether there exists political interference that restricts forming labor unions. Table 1-9 shows that African countries themselves show significant variations in terms of access to collective bargaining and

[16] There hasn't been any study showing strong evidence regarding differences in economic performance solely due to differences in labor standards. This is expected due to the difficulty of isolating these effects from other determinants of economic performance.

freedom of association. For example, we see that **Ethiopia, Niger and South Africa** are categorized into the second group and thus are believed to have a relatively less restriction in establishing independent unions than in **Nigeria, Kenya and Zimbabwe** which are categorized in the third group (though the level of independence of unions in their activities after they are formed may tell a different story). Similarly, Nigeria's labor market can be rated as better than that of Tanzania and Cameroon (which are categorized in group 4) in terms of workers/employers rights and freedom of association as well as the overall atmosphere of industrial relations.

The implication of the above statements in relation to the wage determination process is clear: the role of unions in the wage setting is likely to differ. In countries with strong restrictions in forming employee associations, employers will have an absolute advantage in wage bargaining and thus may succeed in setting average wages at very low levels; while in countries where there is a relative freedom of association for employees that is guaranteed by law, workers, particularly those at the lower level of income and occupational distributions, would secure an average wage higher than what would be the case in the absence of such freedom.

2.1.3.2. Labor Market Institutions*:* Governments usually intervene, though in most cases with a good intention, in the workings of labor markets using various regulations and institutions so as to override market oriented outcomes which they think would be unfair to the majority of workers. They do so, for example by setting specific requirements such as minimum wage and occupational/health safety standards, legislations on income and job security such as those related to pensions and lay off

procedures, and legislations on industrial relations such as the rights to organize. The labor market institutions so created due to the presence or absence of such restrictions (such as labor unions, unemployment benefits, minimum wages, and high firing costs) have very important implications in the context of the African urban labor markets. For example, labor unions may increase their members' wages; unemployment benefits may increase the reservation wage of individual workers and thus reduce the incentive for job searching; minimum wages may price the least skilled labor 'high' out of market; and high firing costs may deter employers from hiring and thus reduce the demand for labor, particularly for a more stable, permanent and full time employment.

Out of these labor market institutions, information in our survey data sets is available about the possible effects of '*labor unions*' and '*minimum wage legislations*' which are more common in the African context. We will discuss them below and in part II and part III we will empirically assess their impacts on wage determination and firm level wage gaps respectively.[17]

In order to collect information about the effects of these institutions on performance and employment decisions in each country, questions were posed to employers/owners to rate their subjective assessment of the severity of each variable within a given scale. In one of the sections of the survey instruments (for Nigeria and Ethiopia), for example, employers were asked to rank various labor market regulations with regard to the severity of their impacts on business performance using a scale ranging

[17] However, it doesn't mean that these labor market institutions determine the bulk of labor market distortions/segmentation in Africa, or for that matter anywhere in the world. Based on a very detailed data from Mexico, Maloney and Riberio's (1999) study using a quintile analysis suggest that 'even in the

from 1 (no problem) to 5 (severe problem). A rate of 3 represents a more or less moderate problem[18]. Among those in the list were minimum wages and layoff procedures. Preliminary analysis of these variables provides us with some lights on the expected outcomes. Surprisingly, for example, the Nigerian data shows that minimum wages are rated as moderate to severe obstacles by more than 40 percent of the respondents (see table1-10). Specifically close to 21 percent of the respondent firms in Nigeria rated minimum wages as severe business problems.

Table 1-10. Labor regulations and firms who identified them as obstacles

Type of Labor Market Regulation	% of firms	
	Nigeria	Ethiopia
Dealing with hiring procedures for local workers	5.7%	5.4%
Dealing with hiring procedures for foreign workers	9.7%	16.6%
Overtime restrictions	3.9%	...
Layoff procedures and cost of retrenchment	11.0%	17.6%
Limits on temporary hiring	6.7%	7.1%
Minimum Wage	40.8%	8.0%
Inflexible Salary scale for skilled workers	...	13.0%
N=	**223**	**422**

Source: Calculated using the appropriate firm Survey data sets.

On the other hand, Table 1-10 also shows that only 8 percent of the respondents in Ethiopia considered minimum wages as moderate to severe business obstacles and out of these only close to 1 percent said that minimum wages are severe problems. Thus, minimum wages are felt more of a constraint in Nigeria than in Ethiopia

absence of minimum wages or union power, substantial segmentation of the labor force will remain in LDCs'.

Labor Unions: There are different opinions about the role of unions on labor market outcomes. Union supporters argue that these organizations give workers a collective voice and enable them get better wages. Opponents of unions, on the other hand, view them as institutions created to raise their members' wages only, while discouraging investment and reducing employment and profits.

Generally, unions in most cases secure more wages and benefits to their members. In the US, union wage and benefits advantage in 1995 were 25 percent more on wages, 128 percent on insurance, 174 percent on pension, 38 percent on compensation. For blue-collar workers, the advantages respectively were 50 percent, 149 percent, 323 percent, and 63 percent. (Yates, 1998). Our study also finds that being a union member has a premium on the level of average wages both in Nigeria and Ethiopia (see part II).

Labor unions understandably make the already employed labor more powerful than the unemployed indicating that the outcomes of labor market institutions may be guided by the interests and behaviors of those who were lucky to have landed on a job. There are also studies that find that unions rather positively impact the quantity of unskilled labor employed as would be predicted by efficient bargaining models of union behavior (Faloney and Ribeiro, 1998; Blanchflower, et al, 1991). According to data from our manufacturing sector surveys, about 20 percent of the respondents in Ethiopia who have kept labor force in excess of what they would have liked mentioned 'pressure from unions' to be among the reasons for doing so. This means that consistent with the

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[18] These firm level data sets will be discussed and analyzed in subsequent essays in the context of institutions, labor market outcomes and gender issues.

literature and empirical results to date, unions in some African countries affect not only the level of wages, but the level of employment as well[19].

The proportion of establishments with labor unions and the degree of unionization within those firms differ from one country to another within Africa, and as a result the effect of unions will also be different from one country to another[20]. A preliminary look at our survey data sets, for example, reveals that close to 20 percent of establishments in Ethiopia reported to have labor unions in their work place; while the figure for Nigeria is around 49 percent. The average rates of unionization in establishments that have unions also show differences in the two countries: 77 percent of workers in such firms are members of a union in Ethiopia; while for Nigeria the percentage of unionization stands at just 43 percent. It should be noted here that not only are there more unionized firms in Nigeria than in Ethiopia, but historically the unions are relatively weaker in the latter, and particularly more so in the public firms.

In Ethiopia, unions exist both in private as well as public enterprises, but as the public enterprises are in most cases larger and more organized, the likelihood of a firm having a labor union and the size of union membership are quite large in public firms compared with private ones. The 1993 Ethiopia's labor law forbids workers in the civil service from forming or joining trade unions, while the 1994 constitution allows them to organize and bargain collectively, should they wish. There are indications, as reflected by its promises, however that the government would bring the law in line with the

[19] For a formal and detailed discussions of the literature on the wage and employment effects of unions and minimum wage legislations, see part II.

constitution. Labor unions in general have limited independence and ability in Ethiopia, particularly in government owned corporations and enterprises since they are always under the scrutiny of the enterprise administration. Indeed, during the previous socialist administration, an umbrella national trade union, called the AETU (All Ethiopian Trade Union) was formed by the government as an instrument of controlling the workers. There are also repeated interferences and scrutiny by the current government in the functions of the national trade union (CETU, the Confederation of Ethiopian Trade unions) including a creation of breakaway group by the government composed of its own hand picked loyalists and the government's refusal to recognize the legitimate leadership of CETU at that time, as well as a frequent arrest and intimidation of leaders and the Executive Committee of the Ethiopian Teachers' Union (Amnesty International: Trade Union Action, 1988; and ICFTU survey, 1999). The Ethiopian labor law also prohibits trade unions from acting in an overtly political manner, and it stipulates some essential services in which workers cannot strike such as those in public transport; city cleansing and sanitation; electricity-generating plants; post and telecommunications; banks; and water supply providers. In most cases, wage bargaining exists only nominally, and firm level wage bargaining exists mostly in private firms only.

On the other hand, labor unions had traditionally an important role in Nigeria both at a workplace and national issues. The sole national trade union centre, the Nigerian Labor Congress (NLC), is known to be strong and, in most cases, uses a confrontational approach with the government in protecting the interests of its members. According to a

[20] The share of firms with labor unions and the degree of their unionization are computed based on

World Bank document, the NLC is one of the strong and historically independent trade unions in SSA that have been at the forefront of pro-democracy movements in their respective countries in Africa (World Bank, 1995). There are, however, occasional interference in the activities of the unions by the government. The Nigerian labor law generally provides for a single trade union system, and all registered industrial unions have to affiliate to the NLC. The law also stipulates that people working for the customs, the Central Bank, and external telecommunications are not allowed to join or form unions. The government, through the Registrar of Trade Unions (Minister of Labor), also has broad power to supervise trade union accounts at any time, to interfere in collective bargaining. The implication here is that, contrary to the assessments we saw earlier based on the signing of labor market conventions and the ratings of freedom of associations, there are government interferences on union activities in both countries, but in fact the interference is worse in the case of Ethiopia than in Nigeria.

As a result, the effect of unions on labor market outcomes is expected to be stronger in Nigeria than in Ethiopia due to two main reasons reinforcing each other: More firm coverage of unions and more relative independence and strength. Generally, given consistent results from earlier studies on the subject, we expect that unionized firms will pay more than non-unionized firms, and workers who are members of trade unions get a premium in their wages compared with their non-union counterparts in both countries, but the union premiums are quite likely to be larger in Nigeria.

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questions directed to the owners and managers. These questions are of the type "Is there any labor union in your firm?" and "What percent of your labor force is member of a union?"

Figure 1-4.
Labor unions and memberships by country

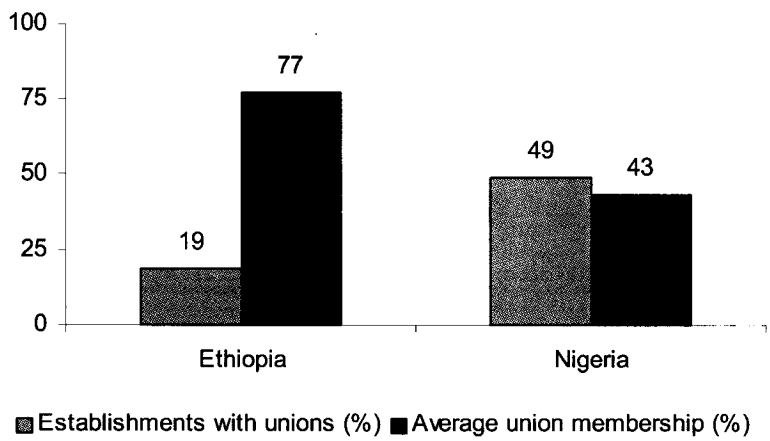

Table 1-11. Firms with union and average percentage of unionization

Size Group	Ethiopia		Nigeria	
	Firms with union(%)	% of wkrs unionized	Firms with union(%)	% of wkrs unionized
Micro (1-5)	1.02	43.50	0.00	0.00
Small (6-10)	2.47	13.60	NA	NA
Medium (11-49)	5.17	38.86	10.71	8.64
Large (50-100)	25.93	69.57	34.09	29.70
Very Large (100+)	71.76	89.93	71.43	63.00
Overall	18.92	77.44	48.90	42.70

Source: Computed by Author using establishment survey datasets

It is also clear from the above table that the likelihood of having a union in a firm increases with the size of the firm in both countries (though there is no such pattern for the rate of unionization). The differing characteristics of the two countries in terms of unions are thus very likely to have different outcomes on wages and gender wage gaps[21].

[21] For a detailed discussion of the mechanisms through which unions affect wages, see part II.

Minimum wage legislations: It has long been a conventional wisdom among labor economists that minimum wage legislations would lead to fewer jobs than would be the case without them. Minimum wages, particularly if they are sufficiently above what the going level of productivity warrants, also create labor market distortions by reducing the incentive of employers to hire more workers at the lower end of the wage distribution. In a standard neo-classical model, if the average wage is exogenously raised, total employment level would fall (and therefore, the higher the level of the minimum wage, the more unemployment there will be in the economy). Minimum wage legislation, according to some studies, mainly affects the least skilled workers as it prices them out of the market (OECD Job Study, 1995; Saint-paul ,1996; Rama 2003). Proponents of minimum wages on the other hand, however, argue that the net effect of such legislations would be making the working poor [who would have been paid lower than the minimum wages] better off through higher income, especially in the context of a country with high supply of unskilled labor.

In a segmented setting of labor markets in Africa (where the minimum wage mostly covers only the formal sector), the outcome of a minimum wage legislation can be seen as a two fold effect: First, when minimum wages are introduced/raised, the direct impact will be a decrease in employment in the covered (formal) sector. This is because in a neo-classical setting, the demand for labor is a negative function of wages. However, there is also a secondary effect elsewhere, in the uncovered sector. Some of the workers who lose their jobs in the covered sector will now join the informal, uncovered sectors, thus further depressing wages there (some of them who have a reservation wage higher than the going wage rate in the informal sector may theoretically remain unemployed).

Employment, particularly that of unskilled workers, therefore, will be less than what it would have been in the absence of 'minimum wages'.

A number of empirical studies have been conducted on the employment effects of minimum wages. For example, Bell (1997) estimated the employment impacts of a reduction in the 'manufacturing sector minimum wages' in Mexico and an increase of the same variable in Colombia in the 1980s. Her result was that in Colombia a 15 percent increase in minimum real wages reduced employment between 1977 and 1987 by 5 percent, though she found no such significant impact in Mexico. The effects of minimum wages can also be wide-ranging and go even beyond the direct unemployment outcomes. One example is the potential effect of 'higher' minimum wages that force employers to cut back training budgets. This may deprive low-paid workers of a crucial means of their long-term career advancement though they get a small increase in their current income (Hashimoto, 1982). Workers also lose the on-the-job training opportunities when they lose their jobs. Moreover, as the minimum wages are focused on money wages alone, they can also possibly lead to reductions in other non-money income sources such as fringe benefits that the employer may lower as a response to minimum wage legislations. This may even lead to deterioration of workers' conditions in the long run.

Minimum wages are set at very different points in different countries. In Ethiopia, for example, the government mandates a minimum wage of 120 ETB (Ethiopian Birr) which is approximately $15 per month for wage earners in the private and most public sectors. In some public enterprises, the minimum wage is set at 175 ETB, which is approximately $22 per month; while the minimum wage in the banking and insurance sectors is around 200 ETB (approximately $25) per month.

Table 1-12. Minimum wages in USD equivalent and relative to average wages

	In USD equivalent		Relative to average wages (%)	
Minimum wage level for …	Nigeria	Ethiopia	Nigeria	Ethiopia
Private Sector	NA	15	..	26
Public Sector	..	15-22	..	28
Federal	75	..	34	..
State	55	..	..	..
Banking/Insurance	..	25	..	..

Source: ILO data base; and calculation by the Author

In Nigeria, on the other hand, minimum wages are much higher than in Ethiopia (see Table 1-12). Minimum wages in Nigeria were set at around 7,500 Naira (approximately $75) per month for federal workers and about 5,000 Naira (approximately $55) per month for state employees in the year 2000[22]. However, it is reported that the government issued the legislations without due consultations with state governments, several of whom argued that they could not afford to pay the new scales (as a result of which several labor disruptions were caused). In fact, some states even threatened to bring rationalizations and sackings of current employees as the only alternative to concede for most of the raise in minimum wages.[23] This confirms the result from our

[22] This is consistent with the results from our survey data where it was shown that close to 41% of employers rated minimum wages as serious obstacles to their performance.

[23] One state (Osun) is reported to have sacked about 3,000 workers as a result. Interestingly, the rival party in the sate sought to capitalize on this and asked all the sacked workers to report at its secretariat for jobs. (Source: World Socialist Web Site (www.wsws.org) 'Nigerian Unions concluding separate agreements

survey data sets that from the point of view of firm owners and managers, the impacts of minimum wages in the case of Nigeria are relatively serious compared with any other labor market related regulations and institutions[24].

Other restrictive labor market regulations include government laws requiring job security and mandatory benefits to be provided by the employer. Job security laws, usually imposed by governments or labor unions, restrict the employers' ability to lay off workers and thus lead to a sub-optimal level of employment, and also increase their labor costs[25]. The same applies to mandatory benefits. However, these regulations will not be covered in this study because of lack of sufficient data.

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over minimum wage', 27th July 2000). The full URL for the article is: http://www.wsws.org/articles/2000/jul2000/nig-j27_prn.shtml

[24] As noted earlier, given the structure of SSA's economies where traditional agriculture dominates, the majority of the labor force in the region lies beyond the reach of most labor standards and regulations. For example, minimum wage legislations or paid maternity benefits apply to only a small proportion of the total SSA labor force. When one focuses on the manufacturing or wage sector alone, as is our focus here, however, the share of industrial workers affected may be proportionally significant.

[25] Due to such protection laws and mandatory benefits to workers, for example, labor costs in Germany are the world's highest and are believed to be the biggest single obstacle to job creation in Germany (Sowell, 2004).

CHAPTER 3.

SUMMARY AND CONCLUSIONS

In general African labor markets are characterized by some common features such as a dominant public sector, weak labor market regulations, high unemployment rates, high and growing informal sector activities as well as high levels of gender gaps. High level of unemployment in the African urban formal sector, especially youth unemployment, resulting from rapid urbanization and disappointing economic performance, creates a personal disincentive to invest on education. It also creates loss of motivation to find a job in the formal economy and, among others, increases the size of the informal sector. Also in most of Africa, women's participation in the formal sector, their enrollment in education, particularly in higher levels, and their pay are all lower relative to those of men suggesting that labor markets in the region in fact are unfavorable to women and may need some reforms. An economic structure where the industrial sector is not yet well developed, as well as traditional norms, and culturally predetermined roles of women in most of African societies have further narrowed down women's opportunities for an increased participation in formal economic activities.

Based on the subjective assessment of business owners and managers regarding the institutional framework with in which firms had to operate, we find that labor market regulations and institutions have different impacts in different countries. For example, minimum wage legislation in Nigeria is rated as a serious obstacle affecting business

performance and growth by about 40 percent of firms; while close to 20 percent of Ethiopian firms who reported to have excess labor force mentioned pressure from unions as one major reason for doing so. We also see a large public sector in Africa generally absorbs a significant share of total government budget, and public firms tend to have a different wage structure than private firms. We also see that there are differences across countries within Africa. For example, the fiscal burden of public sector as a share of total recurrent budget of the government ranges from 22 percent in Kenya to 50 percent in Mozambique. Similarly, we also see that the ratio of average wages for skilled labor in public firms to that of private firms significantly varies from about 50 percent in Cameroon to close to 12 percent in Zambia. The major impediments related to labor market regulations that need priority as evaluated by employers also differ from country to country. For example, minimum wages are rated as the most important impediments of business performance by employers in Nigeria, while in Ethiopia layoff procedures are relatively more important than other labor market regulations. As a result, in subsequent parts of this study, we would expect that these labor market institutions will have different influences on labor market outcomes in the two countries.

In the next two parts, the study will investigate the impacts of labor market institutions on the process of wage determination and gender wage gaps in the manufacturing sector of the two African countries: Ethiopia and Nigeria. Accordingly, Part two discusses the theoretical background of the wage determination process and looks at the effects of institutions and other firm characteristics as determinants of hourly earnings. It also investigates the relative wage effects of worker level human capital (and hence productivity) characteristics. Part three then analyses the effects of these same

institutions in narrowing or widening firm level gender wage gaps. It also applies two common decomposition procedures in the literature to separate the total gender wage gaps into a part that can be '*explained*' by differences in human capital characteristics between men and women and that which is '*unexplained*' by such differences and thus at least part of it may be due to gender discrimination.

PART II.

EFFECTS OF INSTITUTIONS ON WAGE DETERMINATION: EVIDENCE FROM LINKED EMPLOYER-EMPLOYEE MANUFACTURING SURVEY DATA IN AFRICA

CHAPTER 4.

INTRODUCTION

This study applies an extended framework of the Mincerian earnings function (Mincer, 1974) to investigate the role of firm-level institutions and other firm level characteristics in the determination of hourly wages. In doing so, it uses a Linked Employer-Employee (LEE) sample of urban manufacturing survey data sets from two selected African countries (Ethiopia and Nigeria). The effect of workplace characteristics on wage outcomes and firm performance has been a focus of recent studies (Abowd, 1998; Bath and Dale-Olsen, 1999; Abowd, et. al, 2002) owing to an increasing availability of matched employer-employee survey data sets, but institutions were not included in the firm characteristics investigated by these studies, and almost all of the recent work on the process of wage determination focused outside Africa. This study primarily is intended to close these two fundamental gaps in the literature to date.

Institutions that are likely to affect labor market outcomes can be either informal (traditional and social norms) or formal (established). The former include traditions, formal and informal laws, culturally predetermined roles for women, codes of conduct in a given occasion or work environment etc., while the latter include official laws and institutions such as minimum wage legislations, labor market regulations regarding hiring and firing procedures, and unions.

Understandably, with regard to the informal institutions (norms, traditions, etc.), it is quite likely that religious affiliation of individuals and religious composition of the

specific society may influence gender relations and labor market outcomes. Thus the sets of norms and traditional codes of conduct based on religious beliefs heavily influence the economic roles of women and their relative earnings in various ways: Women unfriendly social institutions may impose direct constraints on women's full participation in social and economic activities. They also restrict women's access to productive resources such as land, credit, education and other factors. By restricting their access to credit, for example, such institutions restrict women's ability to start their own businesses.

The formal institutions also influence the level of expected wages and gender outcomes in various ways. For example, the prevalence of independent and strong unions means that the average wage in an economy will most likely be higher than what it would have been in the absence of unions. The same may be said about minimum wages. However, if women's access to such institutions is different from those of men, we would expect the effect of these institutions to be different between men and women. Moreover, we would also expect to get different effects of such institutions between workers in the two countries depending on the differences in cultural, socio-economic and religious settings.

Three main reasons were behind the selection of the two African countries for this study: 1) As two of the most populous countries in the continent, Nigeria and Ethiopia together represent a great majority of the population in Africa and both countries have great diversity in terms of language, religious composition and life style within their borders; 2) The two countries are different from each other in their socio-economic and cultural settings. In most parts of Nigeria the tradition of Muslim teachings dominate, while in Ethiopia, with an almost equivalent religious composition, there are no

significant concentration of a specific religion in a given region, and modern school system is not in any way attached to any specific religion. However, there is a body of evidences in the world indicating that gender inequalities in participation in economic activities are generally higher in Muslim and Hindu-dominated countries compared with Christian ones (Morrission and Jetting, 2004). It is, therefore, natural to expect from our empirical study that gender impacts of labor market institutions in Nigeria, a predominantly Muslim society, to be higher than in Ethiopia where no such clear religious domination exists. There are also significant differences in formal labor market institutions between the two countries (ILO, 2002; World Bank, 1995; see also part I); and, 3) Both countries have very recent firm and worker level survey data sets that can be linked to each other and be used for labor market analysis.

Various well-known models of labor market analysis, such as implicit contract models, and job-matching models, have been applied to explain the effects of labor market rigidities on unemployment and to analyze labor market outcomes in different institutional settings (Morrission and Jetting, 2004; Topel and Ward, 1992). In our case, the study will show how these different institutional settings affect the wage determination process and gender outcomes in the context of Africa. The institutional variables available in the datasets include labor unions, employers' subjective assessments of the effects of minimum wages on their performance, employers' subjective assessments of the impacts of labor market regulations, employers' assessment of the severity and cost of lay off procedures as well as ownership type. However, due to concerns related to the reliability of some of these variables, the empirical investigation in this part analyzes the effects related only to the prevalence of unions, union

membership, unionization rate and public ownership. To this end, the hypotheses that the study tests can be summarized as follows: "*Labor market institutions and regulations have significant influences on the level of individual wages in urban labor markets in Africa*". That is, we expect to reject the null hypothesis that institutions do not have any effect on wages. With respect to firm ownership, this implies that state owned enterprises and private firms should have differing wage structures, and they most likely pay different wage rates for workers with comparable human capital characteristics. Particularly, given the dominant role played by the public sector in employment and total output in Africa and the findings from earlier researches that public sector pay in Africa is substantially less than private firms (World Bank, 1995), we expect to have different wage structures between state owned and private enterprises in the two countries[26].

Even though the emphasis of the study is the impact of institutions and gender on the process of wage determination, the paper also uses the LEE survey data sets to provide information on the estimates of the returns to investment on education and other individual characteristics. The main justification for reporting the estimates of the returns to education is the fact that there has not been much recent research work done on labor market issues in African manufacturing sector. In fact, not much recent information exists on the estimates of the returns to education in Africa's urban labor market as a whole. One of the major sources of international comparative data for the returns to education is Psacharopoulos (1993), but it has estimates only for few African countries, and even these estimates are relatively old – for example, Botswana's estimate was done for the

[26] For example, engineers in the private sector get from two times what their colleagues with same

year 1975 and that of Cote d'Ivoire was done for 1984. The study, therefore, adds to the stock of limited knowledge about the returns to education and the major determinants of earnings in the African urban labor markets.

The paper generally finds that in both countries, firm-level labor market institutions and other establishment characteristics are important determinants of the level of hourly wages. Results show that unions (both their existence in a firm and percentage of workers who are members of these unions) significantly affect the level of wage rates in both countries, but the magnitudes of the impacts are greater in the case of Nigeria. We also see from the results that some of the institutions appear to have significant wage effects for some groups of firms within each country, but do not appear to have any significant effect for others. For example, even though union membership has a significant influence in wages for the whole sample of workers in Ethiopia, it does not have any such influence for the sub-sample of public enterprises. This partly confirms that unions in Ethiopian public enterprises are not powerful enough to bargain for their members' exclusive benefits. However, it should also be noted that according to our data sets, the share of firms with unions as well as unionization rate are much higher in the public enterprises than in private ones and that probably explains the differing outcomes between the private and public sector sub-samples: most of the public enterprises have labor unions (69 percent compared with 14 percent for private firms), and most of the public sector workers are union members (68 percent compared with 17 percent for private firms). It is also quite possible that the spill over effects of unions is large in the

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qualifications in the public sector get (in Nigeria and Cameroon) to close to nine times (in Zambia).

public sector that the wage premium of unions over the wage of non-union members ceases to exist after a while. Theory also suggests that unions raise wages in covered sector, but reduce them in the uncovered sector, though the final effect depends on productivity effects. Using a two sector (union and nonunion) model, part II of this study discusses the theoretical possibilities of spill over and wage threat effects.

On the other hand, the study also finds that in the case of public enterprises in Nigeria, none of the firm level institutions have any significant effect on wage determination, and in both countries, consistent with findings from other researches, state owned enterprises pay substantially less than private firms. The paper also finds that in both countries, education and experience are important determinants of wages; 'gender' plays an important role in wage determination in that, after a number of individual and firm level characteristics are controlled for, women get lower earnings than men. But, as one would expect, the negative impact of being a woman on expected earnings is more pronounced in Nigeria, where women's participation in the formal sector and their access to education are more limited than in Ethiopia.

The remaining chapters of part II are outlined as follows: Chapter 5 provides brief background information on the economic and labor force structures in each of the two countries separately. Chapter 6 discusses the different specifications of the Mincerian Earnings Function Model and provides some empirical evidences to date that applied the model to compute the returns to education. Chapter 7 discusses the survey datasets and characteristics. Chapter 8 discusses results of the various specifications of the Mincerian Earnings model. Chapter 9 discusses summary of the results and concludes.

CHAPTER 5.

BACKGROUND INFORMATION BY COUNTRY

5.1. Economic and Labor force structure in Ethiopia

The total labor force in Ethiopia is estimated at around 27.5 million (as of 2000). Out of this, around 11.3 million (or about 41 percent) are female (World Development Indicators, 2002). Labor force participation in general in Ethiopia, as in other African countries, is high: - about 85 percent for men and 58 percent for women (ILO, 2002). The non-agricultural labor force participation for women, particularly that of manufacturing, however, is very small.

As in most Africa, the social values in Ethiopia to certain extent favor men and disadvantage women such that at a national level, access to education, employment in the formal sector as well as access to resources are higher for men than for women. This is reflected by the higher school enrollment and labor force participation rates of men compared to that of women. Women also get less access to formal employment opportunities unless they acquire a relatively higher level of education than men (as reflected by a higher average years of education for women than men in the manufacturing sector). However, there is no explicit social, religious or cultural restriction towards women's access to education and their participation in non-household economic activities. In fact, starting from mid to late seventies until the beginning of nineties, the then socialist government had an open policy of compulsory literacy

campaign throughout the country where all adults, including women (in as far as they are illiterate and not attending school) were required to regularly go to a 'mass education center' in their locality to learn the basics of reading, writing and math. As a result of that effort, illiteracy in the country dropped significantly, and the government, to its credit for such a successful effort, has received a UNESCO award. Enrollment rates of women in secondary education also picked up significantly following the years of 'mass education', and it is believed that a substantial number of men and women who started schooling through this program were able to continue and complete secondary and university levels of education. The participation of women in economic and political activities was also openly encouraged by the Marxist regime under an ideological rhetoric "without a full participation of women, a revolution can not succeed!", and an umbrella association "All Ethiopian Women Association (AEWA)" was created for this purpose.

School enrollment ratios are generally low in Ethiopia, and except for primary level, they have not shown significant improvements during the last two decades. Gross enrollment rates respectively for primary, secondary and tertiary levels in 1999 were 75 percent, 15 percent, and just close to 1 percent. Enrollment rates for women, particularly at higher levels of education, are even much lower. According to estimates by UNCTAD (2002), the school enrollment gaps (defined as females as percentage of males) for the year 2001 were 62 percent, 55 percent and 25 percent respectively for primary, secondary and post secondary levels. Adult illiteracy rates for both men and women, on the other hand, declined respectively from 62 percent and 80 percent in 1990 to around 54 percent and 70 percent in 1999; while youth illiteracy also declined from 48 percent and 66 percent respectively for men and women in 1990 to 40 percent and 53 percent in 1999

(World Bank, 2002). Total public spending on education as a percentage of GDP has not also improved much, however: it increased just from 3 percent in 1985 to close to 4 percent in 1995, which is somewhat comparable to the average for Sub Saharan Africa.

Industry as a whole contributes about 11 percent of the total Ethiopian GDP, of which only about 5 percent to 7 percent is manufacturing. The agricultural sector accounts for about 50 percent of the GDP, 90 percent of export earnings and 85 percent of total employment, and the services sector accounts for close to 40 percent of the GDP. In addition to its smaller share of GDP, the growth of manufacturing sector in Ethiopia has also been relatively disappointing. The annual average growth rate of manufacturing output was 4.8 percent for the period between 1991 to 2000. In 1998, it was negative at – 1.04 percent, but jumped to 14.8 percent in 1999. Agriculture and services are, therefore, still the dominant sectors in terms of their contribution to the country's GDP, but with the ongoing liberalization efforts and increasing private sector participation in the economy, the contribution of the industrial sector will most likely rise further in the future.

5.2. Economic and Labor force structure in Nigeria

The total labor force in Nigeria is estimated to be around 50 million of which just around 30 percent are female. Labor force participation rate for men is comparable with that in Ethiopia (around 86 percent), but female labor force participation is lower (less than 50 percent by the end of 1990s) and female non-agricultural labor force participation is even lower.

Nigeria has performed better than, or at least as well as, other countries in Africa in terms of education. For example, adult illiteracy rate for males and females (aged 15

years and older) respectively declined from 41 percent and 62 percent in 1990 to 29 percent and 46 percent in 1999. The corresponding average figures for SSA were 40 percent in 1990 and 31 percent in 1999 for men; and 60 percent in 1990 and 47 percent in 1999 for women (World Bank, 2002).

Gross enrollment ratios at all levels have also shown positive changes in Nigeria. Secondary enrollment rate, for example, increased from 18 percent in 1980 to 33.2 percent in 1995. Total public spending on education as a percentage of GNP, however, has gone down very dramatically from 6.4 percent in 1980 to less than 1 percent in 1995, which is much lower than in Ethiopia and the corresponding average for Sub Saharan Africa (SSA) which in 1990 was more than 4 percent of the region's GNP.

Nigeria is the 6th largest oil producing country among members of the Organization of Petroleum Exporting Countries (OPEC) with a daily production level of more than 2.2 million barrels. Industry as a whole contributes about 46 percent of the Nigerian GDP, of which only about 4.1 percent belongs to manufacturing. Despite its seemingly smaller share, the average annual growth rate of manufacturing in Nigeria has recently been quite high. The average annual growth rate of manufacturing sector in Nigeria was 0.7 percent for the period between 1980 to 1990. In 1999, it was 2.1 percent and by 2000 it jumped to 4.9 percent. This shows the increasing potential role that manufacturing can play in the economy.

As in most other African countries, roles assigned to Nigerian men and women both in the society as well as at a household level are largely culturally pre-determined and the social and cultural values clearly favor men. This, as is evidenced from various studies, is exacerbated by Nigeria's social and religious history starting from its pre-

colonial period. Up until independence in the 1960s, for example, modern education was not available to a significant share of the society. This was particularly true for the Northern part where the majority of the population is Muslim and the education system in general focuses on the traditional Islamic teachings. Particularly during the period of British Administration, expansion of modern education was deliberately suppressed since traditional leaders in that part of the country were able to convince their British colonizers to respect their major wishes – that Christian missionaries be banned from working in their regions. At the same time, however, the main forces behind expansion of modern schools and main educators in the country were these Christian missionaries. In fact, historical evidences show that more than 90 percent of student enrollments at that time were controlled by schools run by Christian missionaries (Coleman, 1960). Such a prohibition of missionaries from working in some parts of the country (mainly in the North), therefore, meant that quite a few Nigerians in those regions could go to a higher level of modern education. As a consequence, by around the end of 1950s, while close to 20 percent of the school age population in the southern regions of Nigeria was in school, just 0.03 percent of boys and 0 percent of girls in the north had such a chance (Bray, 1981).

There was, however, a system of Islamic education that long existed in Nigeria's northern region, but it was geared towards enabling men and women become literate so that they can read the 'Koran' and for women to learn from it that it is their duty to obey and please husbands while playing secondary role in household decisions. The contents of such schools in most cases emphasize spiritual and literary authority than intellectual curiosity, and as some put it, "The sole purpose of Islamic education is to learn Islamic

doctrine" (Callaway and Crevey, 1994). Note that the current constitution in Nigeria stipulates that Nigeria is a secular state, but allows the operation of Sharia law (a strict Islamic law) for consenting Muslims in most of the northern states – thus the traditions and norms within Nigeria are also different[27].

Table 2-1 below provides a summary of comparative figures indicating the labor force and economic structures in the two African countries.

Table 2-1. Comparison of selected labor force and economic structures: Ethiopia & Nigeria (2000/1)

	Share of Labor Force (in %)			Labor Force Participation rate (%)			Women in Adm. & mgr position (%)	Share of urban pop (%)	Wage gap* (wf/wm)
	Agr.	Ind.	Serv.	Total	Male	Female			
Ethiopia	72	12	16	73	86	59	11%	18	73
Nigeria	64	13	23	68	88	49	6%	44	52
SSA	62	15	23	..	..	..	..	..	..

	Firms with Unions* (%)	Average Unioniza-tion rate* (%)	Min. wages ($)	Per Capita GDP	Share of GDP from (in %) Agr.	Ind.	Serv.	Informal Economy as % of GDP	Post Sec. enrollment gap**
Ethiopia	20	77	15-25	100	64	11	44	40	25
Nigeria	49	43	55-75	360	31	39	29	58	38
SSA	..	..	..	..	..	..	..	42	..

Sources: World Bank, various issues, and Author's computations

* Based on survey datasets

** Defined as Females as percentages of Males

Generally, therefore, one finds more restrictive traditional norms and rules in Nigeria than in Ethiopia and more restrictive labor market regulations there (see also part I; World Bank, 1995; ILO, 2002). In this setting, we would expect that "*the wage effects*

[27] According to the Economist Intelligence Unit (EIU), the north-western state of Zamfara became the first state in the federation to introduce Sharia in January 2000, triggering a dozen other northern states to have introduced Sharia by the end of 2001 -- though Sharia's imposition is opposed by many groups within Nigeria and has also been a major source of religious and ethnic conflict within the country (EIU, 2004).

of labor market institutions and regulations will be different between the two African countries". The study generally shows that the two African countries, given differences in socio-cultural and institutional settings, are likely to have different institutional and 'gender' effects on individual wages. For example, differences between countries in terms of the women's labor force participation rates may reflect differences in opportunities and success rates of women in the formal sector, and thus a higher labor force participation rate may mean higher opportunity and success. Indeed, there are also prior studies that tend to support the likelihood of such a comparative outcome. A recent study by Klein (2004) for example reported that the relative labor force participation rate of women was a significant determinant of the number and type of medals won by a country's women in the 2000 Sydney Summer Olympics; and an important determinant of the likelihood of qualifying for the 1999 Women's Soccer World Cup and performance in that competition. His findings thus concluded that societies in which women have greater economic opportunities are ones that enable athletically talented women to reach their full potential. The article therefore seems to support that Ethiopian women's dominance in long distance running and other athletics in the world of Olympics (while there are close to none in Nigeria) may be a reflection of more opportunities (and thus less discrimination) for Ethiopian women than those in Nigeria. We therefore specifically expect the negative coefficients of the 'female' gender dummy to be higher (in absolute terms) in Nigeria than in Ethiopia.

With regard to the effects of labor unions, various studies indicate that unions increase average wage rates in an economy and that the effects vary with the relative size of the unions themselves. As will be shown later using a two sector model, a high level of

unionization is associated with high level of unemployment, less competition in labor markets, and correspondingly a relatively higher real wages and higher real labor costs at a firm level (World Bank, 1995; Nickell et. al., 2001). Note that unions in general may also have important roles beyond that of wage determination, but this study will focus only on the their wage-effects[28].

[28] For example, they can possibly influence an individuals' choice of labor market activities: By pushing up the average wage rate, for example, unions may create an incentive to abstain from entrepreneurship and innovation, but forcing potential entrepreneurs to enter instead the labor market as employees. It can also be argued that the resulting high wages tend to decrease the probability of finding a job in the formal sector thus pushing people to self employment and informal sector employment.

CHAPTER 6.

THE MODEL OF WAGE DETERMINATION

6.1. The Earnings Function Model Revisited

The standard specification of the 'Mincerian Earnings Function' (Mincer, 1974) is commonly used to estimate the returns to education (and other attributes of a worker). This model is one of the most successful and extensively applied specifications in empirical econometrics, and in general it specifies the relationship between the different types of an individual worker's characteristics and his/her earnings per unit of time. The specification also assumes that forgone earnings are proxies for the cost of schooling. Each worker's working life is also assumed to be independent of his/her years of schooling.

The model treats education as an outcome of a private decision to invest on 'human capital'. A rational individual who maximizes the stream of 'net returns' to education is thus assumed to invest on schooling only in as far as such an investment increases his life time income, in net present value terms. The common functional form of the Mincerian earnings function (Mincer, 1974) is specified as follows:

$$\ln(w_i) = \alpha + \beta S_i + \gamma_1 EXPR_i + \gamma_2 EXPR_i^2 + \partial X_i + \varepsilon_i \qquad (1)$$

where $ln(w_i)$ is the natural logarithm of wages per unit of time (in our case per hour), S_i is schooling (number of years of education), $EXPR_i$ is labor market experience, X_i stands for other observable individual characteristics that are assumed or are known to affect the level of wages and 'ε_i' is a well behaved disturbance term representing other unobserved factors that are independent of the explanatory variables and contribute to worker's wages. The subscript '*i*' refers to each individual employee *(i.e. i=1, ...,N).* The vector 'X_i' in all the specifications represents variable 'tenure' and 'tenure squared'. However, as mentioned earlier, the data sets reveal that women tend to concentrate more on low-paying occupations, and in order to control for this, in some specifications of the model vector 'X_i ' includes dummy variables representing these different occupational categories as well. Also note that in the above specification the variable representing 'experience' is included as a 'quadratic term' as well in order to capture the concavity of the earnings profile, showing that earnings will increase at a decreasing rate with higher and higher levels of labor market experience. For the same reason, tenure is also included as a quadratic term as well whenever it is included as a regressor.

The coefficients β, $\gamma 1$ and ∂ represent the returns respectively to 'schooling', labor market 'experience' (including on-the-job training) and other individual characteristics included in the specification. The basic model is based on the assumption that individual workers over time accumulate their human capital both at school, and in the labor marker once they join the work force (see Willis, 1986). Note that, as mentioned earlier, the function is concave in the 'experience' variable (*EXPR*) because of diminishing marginal returns to accumulated labor market experience and 'on-the-job' training . As a result, the

coefficient $\gamma 2$ is expected to be negative, and the same applies to the coefficient of the term representing 'tenure squared' as well.

For a wealth-maximizing rational individual worker, the coefficient for the years of education (β) measures the internal rate of return to investment on an additional year of schooling. Note also that the effect of labor market experience on earnings peaks when experience reaches $-\gamma 1/2\gamma 2$ where $\gamma 1$ is the coefficient of labor market experience and $\gamma 2$ is the coefficient of 'experience squared'. Similarly, the effect of tenure on earnings peaks when it reaches at the ratio where is the coefficient of tenure and is the coefficient of its quadratic term, tenure squared.

It is documented that various non-human capital factors affect the level of wages, and thus workers of equal qualifications may be paid differently. That is some firms pay more than others, other things held constant. There are various explanations for the prevalence of higher wages in some firms as opposed to others. According to efficiency wage models, higher wages cause workers to become more productive. The earlier versions of these models focused more on poor economies where higher wages were argued to have allowed workers to afford to buy more food and thus become more stronger and more productive; while the later versions of these models argued that a higher wage rate would pay for itself by reducing possible turnover costs associated with replacing workers who would have preferred to quit due to lower wages. Another model explaining higher wage levels in some establishments than others is the 'shirking model' which argues that by paying higher wages to its workers than they could get every where else, a firm in essence provides an incentive to its workers to want to keep their current jobs. According to this model, workers are less likely to shirk on the job because of the

great fear and cost associated with getting caught and fired, and thus the firm reduces its operating costs by not having to supervise its workers as much as it would in the absence of high wage levels. However, beyond such theories, this paper shows that firm level institutional behavior and other characteristics also play important role in creating difference in wage rates across firms.

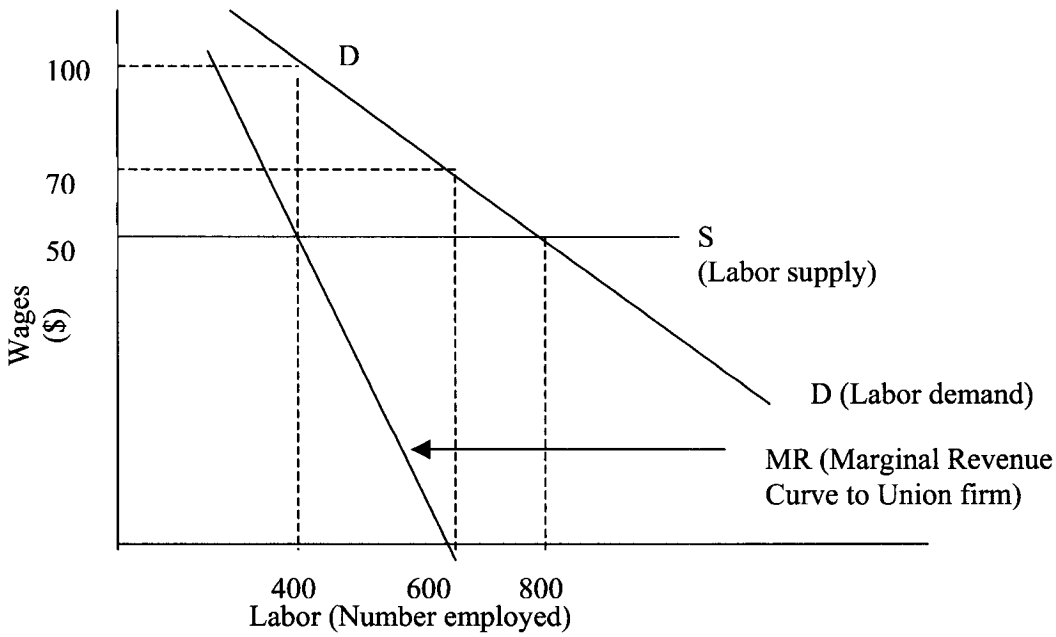
How do institutions affect wages? Institutions influence the wage determination process in a firm in a variety of ways. The following paragraphs discuss the wage effects of the two labor market institutions this study focuses on: unions and minimum wage legislations.

Unions: As pointed out in Part I, unions are labor market institutions in most cases with the right and power to negotiate and set wage levels and benefits to member workers in a firm. In firms where workers are organized into unions, no worker has a right to unilaterally under-bid the wage rates set by the union. Evidence suggests that historically union wages are much higher than non-union wages. In general, the positive wage effects of unions tends to be realized with out a loss in employment only in industries where the demand for labor is inelastic and the technology is capital intensive (thus labor's share of total cost being small). Unions are also more likely to survive best in industries with high entry barriers for the obvious reason that in a competitive market, competition from non-union firms may result into job losses from unionized firms.

The following illustration in figure 2-1 briefly discusses the wage and employment tradeoffs and the potential economy-wide union effects. In the figure below, the industry's demand for labor is shown by DD and the workers' supply of labor is shown by SS. The unions has, by assumption, a monopoly on the supply of labor to the

firms where it is organized. Thus, if the union wants most of its members to be employed, it does get this objective achieved by setting the wage rates at $50. If on the other hand it wants to achieve the biggest total wage receipts by its workers (wage rates x man-hours supplied), then it sets wage rates at $70 so that employment level of its members will be at 600 workers where the marginal revenue curve of the union intersects with the axis representing employment (i.e. the x-axis). If it strives to make sure that the level of profits attained is maximized (where profit is defined as the total difference between total wages received and supply costs of labor), then, as a monopoly supplier, it will set the wage rate at $100 with a resulting employment level of 400 workers, and thus maximizing profits at $20,000 (i.e. 100*400 - 50*400). In the figure, this is attained at the point where marginal revenue curve intersects with the monopoly supply curve.

Figure 2-1. Effects of unions: Wage and employment level tradeoffs



Thus, depending on the union's other non-wage objectives, whenever a union bargains for increased wage rates, it also may have to accept to have fewer members due to the negative employment effects of higher wages. Generally, there are a number of ways used by unions to achieve their objective of securing higher wages to their members. These include: a) preventing employers from paying wages below a given level (say by setting wages at $100 in figure 2-1; b) limiting labor availability for employment in their industry, i.e. by artificially restricting labor supply (say to 400 workers in the figure). A typical example of the second way is forming 'Craft Unions' representing workers with a given type of skill and training in order to create entry barriers and restrain entry into the specific profession[29]. In almost all cases, however, unions often set wages than limiting labor supply and entry to the industry by workers. Although the effect of setting wages at a higher level or setting labor supply at a lower level could be the same, unions in most cases feel pressured to keep current workers employed and they rarely prefer reducing the number of workers in their industry. As a result, in some cases, they may resort to limiting output or productivity per worker in order to increase the demand for labor, but the this may be useful only if the price elasticity of output demand is very low (i.e. inelastic demand).

Literature suggests that generally there are two main wage effects of unions over a non-union situation. These are: the spill over effect and the wage threat effect. In the former, the spill over effect occurs when union actions result into lower employment

[29] I have read an article a while ago claiming that the American Medical Association once helped close down a number of medical schools at the beginning of the century.

levels due to increased labor costs. When workers who are dis-employed from unionized firms and sectors seek jobs in non-unionized firms, the increased labor supply reduces average wages in the non-unionized firms and sectors thereby creating a union-nonunion wage differential. In the latter case (the wage threat effect), union wage premiums arise when non-unionized firms raise wages to union levels in order to avoid being unionized. This most likely occurs at non-unionized firms operating in highly unionized industries. The issue of which of the above two effects dominates tends to determine the level of unemployment effect that accompanies the union wage effects. If the wage threat effect predominates with the result that both union and non-union wages increased, there will be a high level of unemployment. When the spill over effect dominates, there will be modest increase in wages with lower unemployment rates. Practically, the first case seems to have occurred in most of Europe where high union wage increases and massive unemployment was experienced; while the latter case is typical of most of the US industries where both union wage hikes and unemployment have been kept at lower levels.

The spillover effect of unions can also be seen from is Figure 2-1 above. Let us start from the equilibrium position where labor supply and demand are equal and the maximum number of workers (800) are employed. Let us also assume a hypothetical 100 percent increase of average wages in a given unionized firm or sector, i.e. that wage rates in a union firm increase from $50 to $100 per unit of time due to unions' pressure. Given the hypothetical marginal revenue curve of the unions (MR) and labor supply and demand curves as represented by SS and DD respectively, we see that total employment would have fallen from 800 people to 400 people. This means 400 people will be out of

work as a result. Assuming the unionized firms can not take more than 400 employees under the new wage scale, this means, the pool of job seekers in the nonunion firms will increase by the same amount (i.e. they will spillover into nonunion firms) and as a result wages in the nonunion firms will go down. The spillover effect is therefore to increase labor supply in nonunion firms and reduce wages there. The magnitude of the reduction in wages in the nonunion firms depends on the elasticity of labor supply and that of demand for labor.

The wage threat effect happens as follows: As pointed out above, when the 400 workers that were shed off from the unionized firms join the pool of labor supply in the nonunion firms, they naturally put a downward pressure on wages there. Workers in these firms may then resort to form their own unions in order to get what their unionized counterparts are getting. However, knowing this, nonunion firms may also resort to increase wages to their workers in order to avoid being unionized. The ultimate union-nonunion wage differences between firms therefore depends on the size of the wage increases at the nonunion firms which in turn influences how many of those workers from union firms can be absorbed in the nonunion sector. The two union effects thus determine the net effect of employment and wages in the economy. In the case of our two countries, we thus expect to get a positive wage effect of unions (though we will not be able to see the possible results of employment effects). However, we also expect that union wage effects in the case of Nigeria will be larger because of higher firm coverage of unions, and their relative strength than unions in Ethiopia where more frequent interference in union activities is observed (see part I).

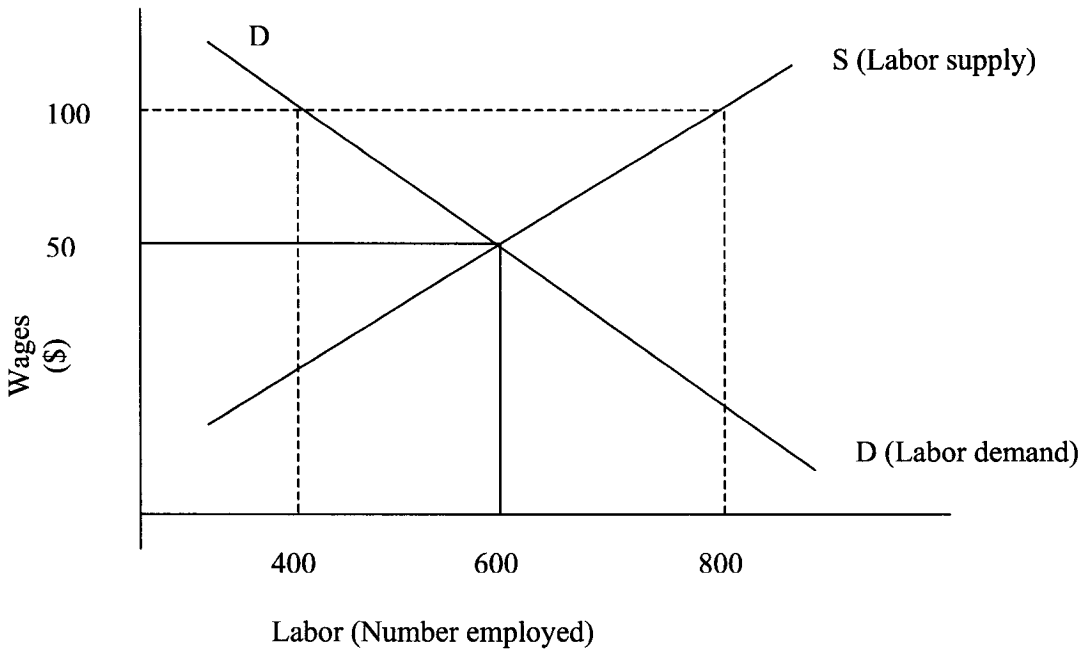
Minimum Wage legislations: In the classical economics term, the effects of minimum wages is similar to that of a price floor (a commodity price restriction) imposed by the government prohibiting prices from falling below a given level. The illustration below briefly describes these effects.

Let us start from a hypothetical equilibrium position of the labor market where labor supply and labor demand are equal. The market clearing average wages, according to Figure 2-2, is $50 and the number of workers employed will be 600. If we assume that the figure represents 'low-skilled' workers who normally fall within or around the minimum wage figure, an increase in the minimum wages to $100 will double the average wage of these low-skilled workers, but clearly it also reduces labor demand by the employers and thus reduces total employment in the group by about 25 percent, to 400 workers.

Thus, as a minimum wage legislation theoretically prevents firms from offering wages below the amount set as a floor, they may also reduce the demand for labor and thus may have an effect of raising unemployment which is similar to that of unions. However, there are differences in the type of workers affected: Minimum wage effects (both in terms of pay and level of employment) mostly affect unskilled labor that is usually found at the lower portion of wage and occupational distributions, while the union effects are most likely to be across the board touching all skill and occupational categories. Depending on the level they are set at and other factors such as elasticity of labor demand (of the type affected by minimum wages), the effects will also be different across countries.

As mentioned earlier, minimum wages are rated as the most significant obstacles in the business performance and hiring decisions of employers in Nigeria than any other labor market regulation, while in Ethiopia they are not rated as significant problems. Therefore, we would expect to see that labor market outcomes due to minimum wages will be more significant in the case of Nigeria[30].

Figure 2-2. Effects of minimum wage laws on aggregate employment and average wages



[30] However, unfortunately, due to data related problems specific to these variables, it was suggested, and I agreed, to drop the minimum wage indicators from the empirical analysis. Particularly, there are few observations with these variables and since they are measures of employers' assessments, it is quite likely that there will be a large measurement error.

6.2. Empirical Evidence on the Returns to Human Capital

The original estimate of the returns to education was that by Mincer (1974) using the 1960 US census data -- thus the origin of the term 'Mincerian' earnings function. His study found that the returns to schooling for the US in the 1960s were 10 percent per schooling year and the returns to experience were around 8 percent. Since then quite a number of estimations have been done for many countries around the world. For example, a recent study by Harmon, et. al. (2000) analyzed the 1995 International Social Survey Program (ISSP) data sets for about 25 developed and East European countries and found that the returns to schooling for men varies from less than 3 percent in Norway to close to 18 percent in Northern Ireland; while the returns to schooling for women vary from less than 2 percent in the Netherlands to close to 17 percent in Northern Ireland. The same study finds that most of the estimates of the returns to education in the ISSP group of countries for both gender groups lie between 4 percent and around 9 percent with few exceptions (Great Britain, Northern Ireland and the Republic of Ireland) that have returns to education exceeding 10 percent. Consistent with results from other studies (Psacharopoulos (1993), Schultz (1989), Khandker (1991)), the study also found that in almost all countries it investigated, the returns to education for women are larger than those for men[31].

There are also estimates of the returns to education done on some African countries. Psacharopoulos (1993) estimated the returns to education for Botswana, for the year 1975, at 16.4 percent for men and 18.2 percent for women. He also reported the

[31] See Psacharopoulos (1994), and Willis (1986) for more examples.

returns to education in Cote d'Ivoire for the year 1984 at 11.1 percent and 22.6 percent for men and women respectively. Psacharopoulos (1985) also reported the coefficients on years of schooling for Ethiopia (with out regard to gender) at 8 percent (for the year 1972), at 16.4 percent for Kenya and at 15.8 percent for Morocco (both for the year 1970), and at 11.9 percent for Tanzania (for the year 1980)[32].

6.3. An Extended Earnings Function Model

The basic Mincerian Earnings Function model, as shown earlier, enables us to investigate the effects of worker level characteristics. However, thanks to an increasing availability of Linked (matched) Employer-Employee (LEE) data sets, a number of researchers have investigated and found out that workplace characteristics also matter in wage determination (Mazumdar, 1994, Abowd, et, al. 2002, Hamermesh, 1999). The workplace characteristics considered by these empirical studies included size, sector, and location, and these work place characteristics have consistently been found as important determinants of individual wage rates. However, in addition to such firm level characteristics, our extended model here includes various institutional variables to the model as regressors. The institutional variables that will be considered in this study include the availability of a trade union in each firm (a dummy variable with a value of one if there is a trade union in the firm and zero otherwise), rate of unionization (the percentage of work force in each firm that belongs to a union), etc.[33] The separate effects

[32] For a survey of detailed empirical studies on wage determination, see Berndt, 1991.

[33] When a certain characteristics of a worker is represented by a dummy variable (with a value of '1' and estimated coefficient of λ_i), then that worker has earnings of e^{λ_i} times the earnings of a worker with out that characteristics (dummy variable equals zero).

of each of these institutions and other observable firm level characteristics is investigated using the following expanded OLS specification of the Mincerian Earnings Function:

$$\ln(w_i) = \alpha + \beta S_i + \gamma_1 EXPR_i + \gamma_2 EXPR_i^2 + \partial X_i + \varphi INST_i + \phi Y_i + \varepsilon_i \quad (2)$$

where, $INST_i$ is a vector representing the various firm level labor market institutions described above, and φ_i is a vector of the corresponding coefficients; Y_i is a vector representing other firm level characteristics such as sector, location, and size of the establishment where each worker is employed, and ϕ_i is the coefficient of these other firm level characteristics. All other variables are defined as in the previous specifications.

In the empirical application of most of the specifications of the above extended model, this study controls for non-institution firm level characteristics as well. For example, the *sector* dummies are added to capture differences that may arise due to sectoral variations. The excluded category is the 'Textile and Garments' sector for Ethiopia and 'Machine Tools and Non-Metal producers' for Nigeria. The next set of explanatory variables included a dummy for 'ownership status' of the establishment (dummies for 'foreign' and 'public' ownerships with 'domestic' and 'private' firms being the excluded categories respectively in both countries). Dummy variables representing small and medium '*size*' firms (with the 'Large' size group being the excluded category)[34] were also added to capture the enterprise size-effects. In order to capture the effects of firm location, I also added '*regional*' controls represented by a dummy variable

with a value of one for the capital city in each country, and zero otherwise. In order to look at the comparative results in the northern parts of Nigeria (where a relatively more women-restrictive system exists) vis a vis the rest of the country, I also introduced an alternative location dummy named '*north*' which equals one if the firm is located in one of the northern regions, and zero otherwise[35].

The following paragraphs briefly discuss the transmission through which the wage effects of these variables happens[36].

Unionzd_firm: Refers to whether there is a labor union in a firm, and is observed at a firm level. Workers in union firms, as discussed, get a wage premium over workers in the nonunion firms. The effect from this variable depends on the size of spill over effect to nonunion members since the premium of unions benefit in most cases nonunion members as well.

Union_dummy: is a variable representing whether the worker belongs to a labor union, and thus is a worker level characteristics. We expect that workers who are members of a union get a premium over those colleagues who are not union members.

Un-rate: This variable stands for the rate of unionization and is observed at a firm level. Given the existence of a union in a firm, the rate of unionization improves the

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[34] The dummies for size here were arbitrarily defined in both cases as follows: Small (<=10 workers), Medium (11-100 workers) and large (100+ workers).

[35] The classification of firm location as 'North' or otherwise is based on a visual inspection of the geographical location of the regions from the map for the Federal Republic of Nigeria. Accordingly, the firms that are assigned a value of '1' for this variable are those located in the regions of Jigawa, Kaduna, Kano and Plateau. See Annex 1-4 for the map.

[36] Because of data problems and tautological nature of the variable as it was put forward in the questionnaires, the minimum wage effects are not included in the empirical analyses of part II and III. Again due to the possible measurement errors resulting from the way the questions were asked in the survey instruments, it was decided that variables representing the severity of labor market regulations and lay off procedures should not also be included in the empirical analyses.

bargaining power of workers (through unions) against the employer, making the cost of strikes and lockout very high the employer, and thus increasing wage rates that employers are willing to pay compared with wages received by workers who work in nonunion firms. However, within the unionized firms, union premium is more likely to be higher when the rate of unionization is smaller. If unionization is large, there will be a larger spill over effect to nonunion members and it is possible that workers in highly unionized firms get lower than those in firms with low unionization rate.

6.4. Firm Fixed-Effects Specification of the Earnings Model

We hypothesized that the establishment level variables including institutions are important determinants of the levels of wages and thus including them in the earnings model would systematically alter the results of the basic function that we would obtain without controlling for them. That is, in as far as they have a strong influence on wage determination, their inclusion is expected to reduce estimates of the returns to education, experience and the gender dummy coefficients. However, using the OLS specification, it is not possible to list all firm level characteristics and institutional indicators for at least two major reasons: i) some are inherently not observable directly, ii) others, though observable, may not be collected by the questionnaires used for the survey data sets that are analyzed here. However, it would be important to know what the overall effect would be if all the firm level differences were controlled for. In order to do that, this study will apply a firm fixed-effects specification of the earnings function as an alternative.

Basically the fixed effects specification is represented as follows:

$$\ln(w_i) = \alpha + \beta S_i + \gamma_1 EXPR_i + \gamma_2 EXPR_i^2 + \delta_1 tenur + \delta_2 tenur^2 + \sum_{i=1}^{j} occup + \varepsilon_i \qquad 3$$

Where '*tenur*' is the length of time since the worker joined the current place of work (tenure) and '$tenur^2$' is it's quadratic term. *Occup* refers to the dummies for the 'j' different occupational categories (excluding the base category), and α is the firm fixed effects (which is equivalent to $\sum_{i=1}^{k} Firm_i$ where '$Firm_i$' stands for a separate dummy variable for each firm in the data set, and $i=1...k$ with k being the number of firms in each sample). The number of occupational categories in the Ethiopian data equals 6 and in the Nigerian data, it equals 7. Thus j=5 for Ethiopia and j=6 for Nigeria. All the other variables are defined as discussed earlier for the previous specifications of the model.

CHAPTER 7.

THE DATA SETS

7.1. Data Sources and Characteristics

The establishment survey data sets used for this analysis were drawn from a first round of firm surveys carried out by the World Bank in Ethiopia and Nigeria in collaboration with local counterparts. The main objective of undertaking both the surveys was to get a first hand information about the structural and regulatory impediments that establishments face in their performance and growth. The survey in Ethiopia was carried out during the period of July to October, 2002, and covered a total of about 420 manufacturing firms sampled from six (6) major industrial regions of the Ethiopian Federal Administration and seven (7) major industrial branches (groups[37]. The survey in Nigeria was carried out during the period of March and April, 2001, and covered a total of about 230 Manufacturing firms in about 14 locations (regions) of the Nigerian Federal Administration and 13 major industrial branches (groups)[38].

The samples for both of the datasets were stratified by region, sector, and size. The data collected in both cases covers detailed firm level information such as investment

[37] The locations covered by the survey are Addis Ababa, Amhara Region, Eastern region, Oromia region, Southern Region and Tigray Region. Two cities from each location (except Addis) were selected. The sub-sectors are Food, Beverages, Textiles, Garments, Leather and Leather Products, Wood, Furniture and Metal work.

[38] The locations covered by the survey are Abia, Anambra, Benue, Enugu, Imo, Jigawa, Kaduna, Kano, Kwara, Lagos, Ogun, Oyo, Plateau and River; and the sectors are Food, Wood, Furniture, Textile, Garments, Metal, Machinery and Tools, Leather, Non-metal, Beverages, Chemical/paints, Pharmaceuticals and plastics.

decision of entrepreneurs, sources of investment financing, establishment level exports and imports, output, capacity utilization, capital stock, sales, regulations, as well as workers' training. In addition to the firm level questions directed to the management or owner of the establishments, up to 10 randomly selected workers were also interviewed from each firm in the sample. Data collected from these randomly selected workers includes information on wages (and allowances), tenure, number of hours worked per week, occupational category, educational level attained, experience both inside and outside the current company, age and gender.

As workers get paid in different time intervals (monthly, weekly, daily, etc.), data collected on worker level wages needed be converted into a common time unit. Using information about each wage level, pay time interval, as well as the number of hours worked in a week, I converted all worker level wages into their hourly equivalents for each sample[39]. I then matched all the worker level (employee) variables with the firm level (employer) data that was collected by interviewing the management of each firm. The final sample so created from the Ethiopian survey consisted of a total of 2538 workers from different occupational categories. Of these, about 570 (or roughly 22 percent) are women. For Nigeria, the final sample (after weeding out very few outliers and variables with wrongly coded figures) consisted a total of 1783 workers out of which 331 workers (18.7 percent of the total in sample) are women.

The gender and occupational distribution of sampled workers show that women tend to concentrate in lower level, and lower paying occupations compared with their

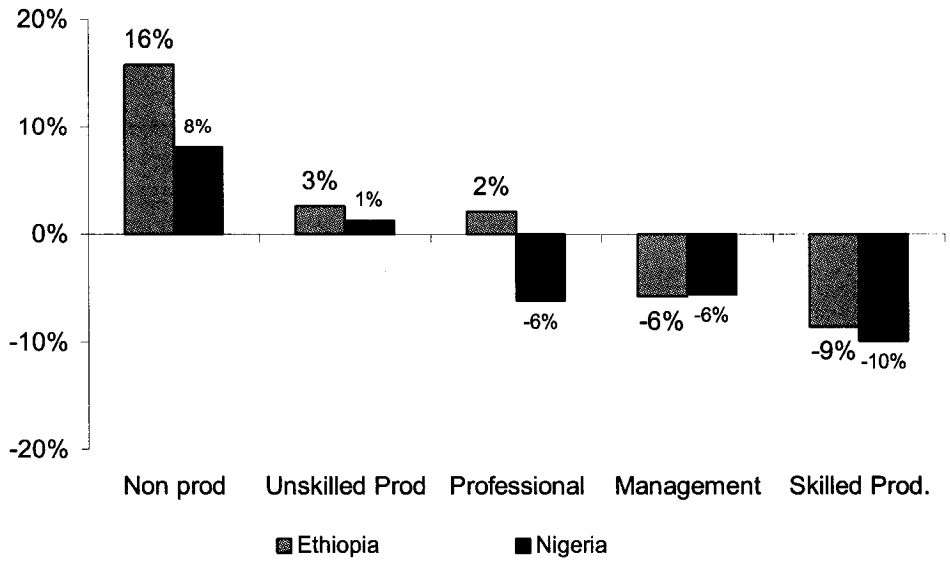
share in the total firm level workforce. Accordingly, as shown in the chart below, when we look at the gender distribution of sampled workers (who reported their current occupation), we see that in both countries relatively few women work at the management and skilled level occupational categories; while there is a larger proportion of them in the non-production and unskilled occupational categories[40].

The corresponding average wage comparative figures for each country in each occupational category and gender are presented in table 2-2 below. We see from the figures that the last two occupational categories where women are concentrated the most, have also the lowest average wages, and that in almost all occupational categories (except professional and non-production occupational categories in Ethiopia), women on average get less than their male colleagues. Moreover, not only do women on average get remunerated at lower rates, but surprisingly the gap is also more pronounced in higher level jobs, particularly at management level. For example women in the management occupational category get about 50 percent of the average for men (in the same occupational category) in both countries. Similarly, in the professional category, women in Nigeria get just a little more than 50 percent of the average for men in that category; while in Ethiopia they get a little more than the average for men. In the non-production category also, women's average pay in Ethiopia is equivalent to that of men. For the whole sample, Ethiopian women get on average about 73 percent of that of men, and

[39] Some empirical studies use monthly or weekly wages and control for hours worked. However, such a specification fails to take account of the potential endogeneity of hours worked (i.e. that number of hours worked may itself depend on the wage rate).

Nigerian women get a little more than half of what their men counterparts on average receive[41].

Figure2-3.
Share of women in sampled manufacturing firms by occupational category in 2001/2
(Relative to their average shares*)



Source: Computed by the Author using the relevant firm survey data sets

* The overall share of women in the whole sample is close to 20% for Ethiopia and 14% for Nigeria. To make visual comparisons easier, these figures are set to zero and the above figures for each occupational category are expressed relative to these sample averages. Thus the above figures show us by how much higher (when the figures are positive) or lower (when the figures are positive) women's shares are in each occupational category relative to the overall sample averages.

[40] The 'Non-production' category, according to information on the questionnaire, includes such workers as cleaners, guards, etc. It is not possible to know the actual occupation of each worker within each category (i.e. whether she/he is a guard, cleaner, engineer, etc.) and the occupational distributions are based on the classifications provided in the survey instrument.

[41] In order to account for the effect of such occupational differences on wage rates, our empirical investigation will control for occupational characteristics as well.

Table 2-2. Average hourly wages by gender and occupation

(in local currency) and women's average wage as percent of men's

	Ethiopia				Nigeria			
	Average wages				Average wages			
Occupation	Men (wm)	Women (wf)	All sample	wf/wm*	Men (wm)	Women (wf)	All sample	wf/wm
Management	31.8	15.6	29.4	49%	1588.1	656.6	1527.0	41%
Professionals	7.6	8.8	7.9	116%	1160.7	619.0	1105.4	53%
Skilled Production	3.8	2.5	3.7	65%	583.1	400.2	571.7	69%
Unskilled Production	2.9	2.6	2.8	91%	720.6	462.3	679.8	64%
Non Production	2.9	3.2	3.0	110%	478.0	353.1	430.6	74%
Total	5.7	4.1	5.3	73%	792.4	410.6	720.4	52%

Source: Calculated by the author using the survey dat asets

* wf/wm is the share of women's average wages as a percentage of men's

7.2. Basic Statistics on Average Human Capital and Wages

A preliminary investigation of the worker level data sets shows that women on average have more years of schooling in both countries indicating that women may need to have more education than men to get access to employment in the manufacturing sector. The average years of education for women in our sample is 11.1 compared with 10.0 for men in Ethiopia; and the average years of education for women in Nigeria is 13 compared with 12.5 for men (see table 2-3 below). The table also shows that women in both samples are likely to have less potential experience than their men counterparts:- the average age of sampled women workers is 31 years in both countries compared with 33 and 37 years for men respectively in Ethiopia and Nigeria[42].

[42] In both cases, the differences are statistically significant at 1% level.

Table 2-3. Average human capital characteristics of sampled workers

A) **Ethiopia**

	% in whole sample	Average Years of education	Average Age	% of who completed		% with university degree
				primary	Secondary	
Male	77.3	10.0	33.4	87.4	51.4	4.9
Female	22.7	11.1	31.2	90.4	70.3	3.3
Total	100.0	10.3	32.9	88.1	55.7	4.5

B) **Nigeria**

	% in whole sample	Average Years of education	Average Age	% of who completed		% with university degree
				primary	Secondary	
	81.3	12.5	37.0	12.1	41.7	18.7
Female	18.7	12.9	31.4	7.8	44.7	16.2
Total	100.0	12.6	35.9	11.3	42.2	18.3

Source: Calculated by the Author using the appropriate survey data sets

Despite their generally higher number of years of education, the data also shows that few women are likely to complete tertiary level of education in both countries. On the other hand, more women than men have completed 'high school' education only. For example, in the Ethiopian sample, the percentage of women who have completed primary or secondary school is higher than that of men[43], and the percentage of women who have completed university level schooling is less (3.3 percent compared to 5 percent for men).

[43] About 90% and 70% of women in our sample have completed respectively primary and secondary schooling compared with 87% and 51% for men.

In Nigeria too, the share of women with completed secondary or technical/vocational school is higher than that of men; while the share of women who only have completed elementary schooling or those with university degree are less (7.8 percent compared with 12.1 percent for men in primary and 16 percent compared with 19 percent for men in completed university education). Generally, the sample data sets include a well educated group of workers in both countries.

The data sets in both countries also show that women on average get paid less than men. A closer look at the distribution of wages shows that the wage profiles of men is different from those of women in each country (see table 2-3 above). We also see that the share of women at the higher portion of the wage distribution is low in both countries, while that of men is larger (see figure 2-4 below). The figure also depicts that the proportion of women in the lower portion of the distribution of log hourly wages is large, and this is more pronounced in the case of Nigeria. This suggests that the mean hourly wages of men are higher than the mean hourly wages of women. Accordingly, we find that in Ethiopia the average hourly wage for women is about 4.0 ETB (Ethiopian Birr, the local currency in Ethiopia) compared with close to 6.0 ETB for men (see table 2-4a below). Similarly, in Nigeria men on average get around 789 Naira (the Nigerian local currency) per hour compared to an average of 407 Naira for women. When we look at the average earnings figures (wages+allowances) in Nigeria, women receive much less than men given men's relatively higher average in-kind and cash allowances (see table 2-4b below). Moreover, proportionately more men than women get such various types of in-kind and cash allowances. For example, 39 percent of men in our Nigerian sample reported to have received clothing allowances while only 24 percent of women reported

so; and 37 percent of men reported to have received transport allowances compared with 33 percent of women. Similarly, the data also shows that the percentage of male workers who reported to have received medical allowances is higher -- 89 percent compared to 82 percent for women.

Table 2-4. Average pay, hours worked and percentage of those who received training in Current place of work

A) **Ethiopia**

Sample	Hourly Wages (ETB)	Hours Per week	Received Training (%)
MEN	5.68	46.3	19.6
WOMEN	4.12	45.1	22.4
TOTAL	5.32	46.0	20.3

B) **Nigeria**

Sample	Hourly Wages (Naira)	Allow-ances*	Bonus*	Hours Per week	Received Training (%)
MEN	789.1	90,026	11,841	44.2	17
WOMEN	407.1	47,157	5,933	42.1	11
TOTAL	720.4	82,429	10,790	43.9	16

Source: Calculated by the Author using relevant survey data sets

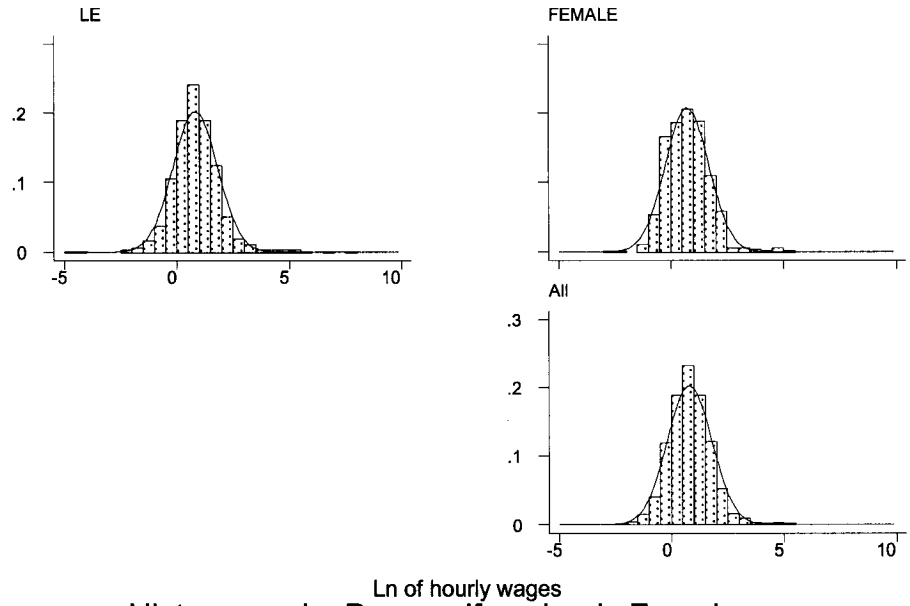
* Allowances reported here are monthly, and bonuses are annual.
* The Ethiopian data does not have information on allowances and bonuses.

It should be noted that as mentioned, the relatively lower wages and earnings of women in both samples is in spite of the higher level of average years of education they have attained compared with their male colleagues in the sample. Most probably, this may mean that women in both countries face more constraints to get access to jobs in the formal manufacturing sector unless they attain a relatively higher level of education than

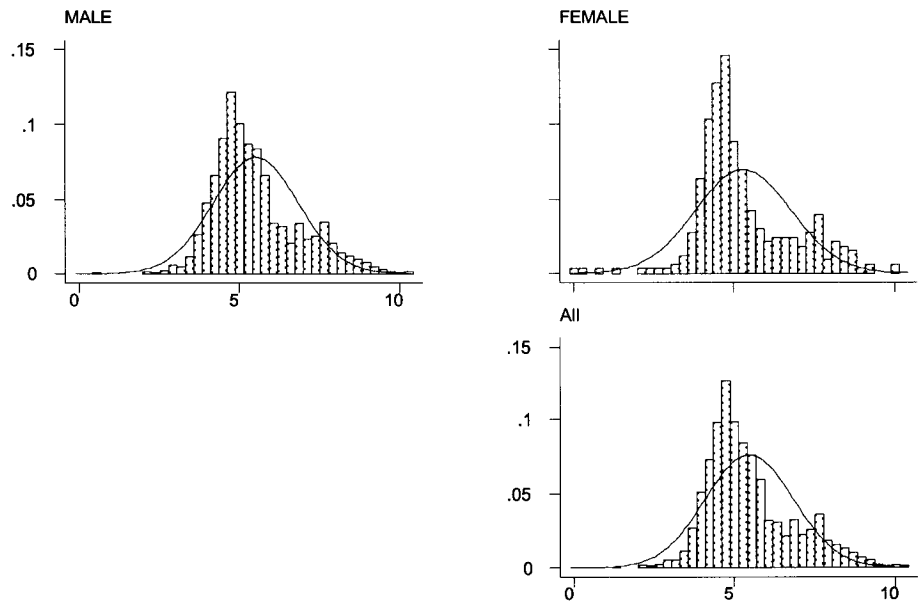
men; and once they land on the job, it is clear that on average they get compensated at a lower rate than their men counterparts. This is the case, as we will see later, even for those workers in the same job cell (that is after controlling for differences in occupational categories).

Figure 2-4. Distribution of ln of hourly wages by gender

A) Ethiopia



B) Nigeria



In terms of access to training opportunities provided by the companies they work for, women in Ethiopia are equally likely to receive training as men once they join their current workplace; but a comparative disadvantage for women is observed in the case of Nigeria where overall 17 percent of men compared to 11 percent of women reported to have received training provided by their company. Even for those Nigerian women who were lucky enough to get training opportunities, the post-training rewards were relatively smaller: Only 7 percent of sampled women in Nigeria reported to have wage increases after completing training; while 11 percent of men got post-training wage increases[44].

In summary, therefore, we see that women in the urban manufacturing sectors of both countries get paid at lower rates while they generally have spent more years at school, and have acquired more human capital. As mentioned, there are also some differences between the averages from the two data sets: For example, women in Ethiopia have comparable access to company sponsored training opportunities as men; while in Nigeria they are less likely to get company sponsored training opportunities compared with men. Under such different settings, we would expect to find that, among others, in the earnings function, the coefficients of the dummy variable 'Female' are larger in Nigeria than in Ethiopia.

[44] Data on post-training rewards was not collected in the Ethiopian survey.

CHAPTER 8.

EMPIRICAL RESULTS ON WAGE DETERMINATION IN AFRICA

8.1. Results of the OLS specification of the Earnings Function

As is a tradition for a well-established literature, I first estimated the standard Human Capital Model (and any of its variants) using Ordinary Least Squares (OLS). The separate wage-effects of the institutional and establishment characteristics that resulted from the extended earnings model using the Ethiopian and Nigerian manufacturing sector data sets are summarized in the following tables (see Table 2-5a and 2-5b). The first table shows the regression results separately for the whole sample as well as for men and women sub-samples; while the second table (Table 2-5b) shows the regression results for the whole sample as well as for public and private sub-samples.

There are a total of eight (8) columns of coefficients in each table. The first four columns in each table show regression results for Nigeria, while the last four (numbered from 5 to 8) show regression results for Ethiopia. The first column in the results for each country (column numbers 1 and 5) represent regression outputs for the whole sample and include the 'Female' dummy as an additional explanatory variable. Columns number 2 and 6 are also results for the whole sample, but they do not include 'Female' dummy as explanatory variable. Column numbers 3 and 7 of Table 2-5a report the regression results separately for women sub-samples only, while column numbers 4 and 8 report the

regression outputs for men sub-samples only. Similarly, column numbers 3 and 7 of Table 5b report the regression results separately for sub-samples of private enterprises only, while column numbers 4 and 8 report the regression outputs for sub-samples of public enterprises.

Table 2-5. Results of the Basic Human Capital Model
(OLS estimates of wage determination)

A) **By country and gender**

	Nigeria				Ethiopia			
	All Sample		Women	Men	All Sample		Women	Men
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	-0.1525				-0.1011			
	(1.777)*				(2.723)***			
Educyrs	0.0913	0.0941	0.1695	0.0788	0.0532	0.0526	0.0709	0.0486
	(7.946)***	(8.027)***	(4.694)***	(6.695)***	(11.930)***	(11.714)***	(6.143)***	(9.820)***
Expr	0.0147	0.0198	0.0093	0.018	0.0323	0.0334	0.0348	0.0306
	(1.225)	(1.682)*	(0.265)	(1.356)	(9.087)***	(9.438)***	(4.368)***	(7.710)***
Exprsq	0.000	-0.0001	0.0003	-0.0001	-0.0005	-0.0005	-0.0005	-0.0005
	(0.093)	(0.423)	(0.316)	(0.433)	(7.966)***	(8.088)***	(4.575)***	(6.856)***
Tenure	0.035	0.0339	0.0657	0.0274	0.0118	0.0109	0.0197	0.0081
	(2.617)***	(2.530)**	(1.825)*	(1.918)*	(1.862)*	(1.743)*	(1.595)	(1.129)
Tenuresq	-0.0003	-0.0003	-0.0014	0.000	-0.0004	-0.0004	-0.0005	-0.0003
	(0.687)	(0.617)	(1.380)	(0.083)	(2.043)**	(2.017)**	(1.371)	(1.508)
union_dummy	0.2002	0.1931	0.329	0.1703	0.1377	0.1361	0.1032	0.1482
	(1.820)*	(1.751)*	(1.133)	(1.424)	(2.626)***	(2.567)**	(1.031)	(2.405)**
unionzd_firm	0.6245	0.6402	0.147	0.6692	0.3262	0.328	0.6883	0.1937
	(3.152)***	(3.222)***	(0.291)	(3.123)***	(3.150)***	(3.169)***	(2.445)**	(1.858)*
un_rate	-0.0067	-0.007	-0.0035	-0.0066	-0.0019	-0.0018	-0.006	-0.0001
	(3.055)***	(3.168)***	(0.603)	(2.788)***	(1.449)	(1.380)	(1.816)*	(0.061)
Ownership?	Yes**	Yes**	Ye**s	Yes**	Yes**	Yes*	Yes*	Yes*
Sector?	Yes*	Yes*	Yes*	Yes*	Yes**	Yes*	Yes*	Yes*
Occupation?	Yes**	Yes**	Yes	Yes*	Yes***	Yes***	Yes***	Yes***
Size?	Yes*	Yes*	Yes*	Yes*	Yes***	Yes***	Yes***	Yes***
Region?	Yes***	Yes***	Yes	Yes	Yes***	Yes***	Yes***	Yes***
Adj. R^2	0.287	0.279	0.345	0.368	0.505	0.497	0.529	0.499

Robust t statistics in parentheses

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

B) **By country and ownership**

	Nigeria				Ethiopia			
	All Sample		Private	Public	All Sample		Private	Public
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	-0.1525		-0.1539	-0.1233	-0.1011		-0.1099	-0.0529
	(1.777)*		(1.637)	(1.139)	(2.723)***		(2.613)***	(0.903)
Educyrs	0.0913	0.0941	0.0879	0.1268	0.0532	0.0526	0.0514	0.0543
	(7.946)***	(8.027)***	(7.257)***	(4.663)***	(11.930)***	(11.714)***	(10.674)***	(6.034)***
Expr	0.0147	0.0198	0.0125	0.0046	0.0323	0.0334	0.0324	0.0264
	(1.225)	(1.682)*	(0.995)	(0.162)	(9.087)***	(9.438)***	(8.587)***	(2.878)***
Exprsq	0.000	-0.0001	0.000	0.0003	-0.0005	-0.0005	-0.0005	-0.0004
	(0.093)	(0.423)	(0.055)	(0.498)	(7.966)***	(8.088)***	(7.448)***	(3.443)***
Tenure	0.035	0.0339	0.041	0.0168	0.0118	0.0109	0.0104	0.0247
	(2.617)***	(2.530)**	(2.943)***	(0.624)	(1.862)*	(1.743)*	(1.526)	(1.655)*
Tenuresq	-0.0003	-0.0003	-0.0006	0.0005	-0.0004	-0.0004	-0.0003	-0.0007
	(0.687)	(0.617)	(1.105)	(0.470)	(2.043)**	(2.017)**	(1.723)*	(1.744)*
union_dummy	0.2002	0.1931	0.1657	0.3151	0.1377	0.1361	0.113	-0.0697
	(1.820)*	(1.751)*	(1.390)	(1.401)	(2.626)***	(2.567)**	(1.894)*	(0.785)
unionzd_firm	0.6245	0.6402	0.6672	-4.3482	0.3262	0.328	0.3425	-0.2645
	(3.152)***	(3.222)***	(3.276)***	(2.811)***	(3.150)***	(3.169)***	(3.094)***	(0.900)
un_rate	-0.0067	-0.007	-0.0067	0.0339	-0.0019	-0.0018	-0.002	0.0056
	(3.055)***	(3.168)***	(2.974)***	(2.641)***	(1.449)	(1.380)	(1.399)	(1.701)*
Ownership?	Yes**	Yes**	Yes	Yes	Yes**	Yes*	Yes	Yes
Sector?	Yes*	Yes*	Yes*	Yes*	Yes**	Yes*	Yes	Yes
Occupation?	Yes**	Yes**	Yes*	Yes*	Yes***	Yes***	Yes	Yes
Size?	Yes*	Yes*	Yes*	Yes*	Yes***	Yes***	Yes	Yes
Region?	Yes***	Yes***	Yes	Yes	Yes***	Yes***	Yes	Yes
Adj. R^2	0.287	0.279	0.495	0.493	0.505	0.497	0.541	0.539

Robust t statistics in parentheses

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

The findings show that overall institutional variables are important determinants of wage levels in both countries, but there are also differences between the results from the two countries reflecting the fact that some institutions are important in one country and not in the other. In some cases the relative importance of any given institution or firm level characteristic also differs between the two countries reflecting the inherent differences in

the socio cultural norms as well the economic and labor market structure in each country. The results of the various specifications of the extended OLS model can generally be summarized as follows: For the list and definitions of explanatory variables included in the regressions, for the detailed results of the various specifications (with and without institutional controls), as well as for the basic statistics of the variables, see the Appendices 2-1 to 2-10.

The wage effect of unions is very significant in both countries, but there are differences in the magnitude of these effects between countries and across the various sub categories of establishments within each country. In both countries, firms where there are labor unions pay more than those with out unions, suggesting, consistent with earlier studies (Abowd, et. al, 2002; Hamermesh, 1999) that there is a wage premium of the prevalence of unions. However, as mentioned earlier, not only are there more unionized firms in Nigeria than in Ethiopia, but historically the unions are relatively weaker in the latter where there have been frequent interference in union activities (see part I). As a result, the wage effect of having unions in a firm is stronger in Nigeria than in Ethiopia due to two major reasons reinforcing each other: More firm coverage of unions and more relative independence. Accordingly, we see from the results that in Nigeria, workers in firms with unions get as much as 62 percent more than their colleagues in non-union firms; while in Ethiopia the premium for working in a unionized firm is about 33 percent. Being member of a labor union also has a positive premium of about 14 percent in Ethiopia compared with workers who are not union members, while in Nigeria there is a 20 percent wage premium for being member of a union. The rate of unionization, that is the share of workers who belong to a union, does not, however, have any significant

impact on predicted wage rates in both countries except where it has a very small coefficient for some specifications in the case of Nigeria and the women sub-sample in Ethiopia.

In order to keep the above summary tables manageable, I put 'YES' in each row representing some of the firm level characteristics in order to indicate that they have been controlled for (see Appendices 2-2 to 2-9 for the corresponding coefficients and significance levels). The results indicate that these other firm level characteristics are also important in the wage determination process. In both countries, foreign owned firms pay substantially higher (up to 30 percent more in Nigeria and about 14 percent more in Ethiopia) than domestic firms. Consistent with the findings of other studies (World Bank, 1995; Temesgen, 2003a), public enterprises in Ethiopia pay substantially less (about 9 percent) than private firms. The same is true in the case of Nigeria where public firms appear to pay substantially less (by about 28 percent) than private firms when regional differences are not controlled for[45]. The study finds that other firm level characteristics such as sector and location of establishments are also important in both countries in determining hourly wages. The textile and garments sector, which is the base category in the specifications, pays significantly less than the food/beverages, wood/metal furniture, and leather/leather products sectors in Ethiopia[46]; while in Nigeria those workers in the

[45] It is documented, for example, that for some highly technical labor which is in a very short supply in Africa, public enterprises pay extremely well below the private sector. For example, a World Bank study shows that an engineer in most African private sector companies earns more than twice his public sector counterpart. The study attributes such a high gap between civil service and private sector pay to shortages of technical staff in the region (World Bank, 1995).

[46] Some of the sectoral categories here were created by combining two sectors from the original groupings; i.e. food_bev was created by combining food and beverages sectors, while text_garm was created by combining the textile and garments sectors.

wood/metal furniture as well as plastic manufacturing sub-sectors get paid significantly less than those in the excluded category (machine, tools and non-metal producers). Workers in small and medium sized establishments earn respectively up to 57 percent and 41 percent less than those in large firms in Ethiopia, we get no significant size effects in the case of Nigeria.

The study also suggests that in both countries, location significantly contributes to wage differences. In Nigeria, workers in the capital city (Lagos) get as much as 92 percent more than those in other regions, other things being equal; while in Ethiopia workers in the capital city (Addis Ababa) get about 14 percent more than workers in other regions. Among other possible reasons, such wage differences are clearly a reflection of differences in the cost of living which is higher in both capital cities compared to other regions in each country. We also see that in Nigeria, workers in the northern part of the country (represented by the other alternative regional dummy we introduced as '*north*') receive about 80% lower wages that those in the southern part of the country which probably is also due to differences in cost of living.

8.2. Comparative results by gender and ownership

The wage effects of institutions in most cases are very likely to vary depending on the various characteristics of the firms themselves. For example, it is quite possible that the extent to which a certain firm follows the various regulations and rules depends on whether the firm is owned by the state or not. In most cases, state owned enterprises tend to strictly follow government rules and regulations in their day to day activities as they do not have any incentive not to; while private firms may be likely to find loopholes to

ignore the rules in their search to minimize costs or maximize profits. Moreover, as we saw above, public firms in both countries tend to have a some what different pay structure than private firms, and thus it certainly would be interesting to look at the effects of institutional variables on the wage setting process in the public sector separately and find out whether they are different from private firms.

The effect of unions is also different for public enterprises compared with private firms in both countries in that union power in the public enterprises indeed seems to serve the interests of employers. In the case of Ethiopian public enterprises, both working in a unionized firm and being member of a union do not matter in wage determination, mainly because unions in these public firms are scrutinized by the government, and do not have the independence and the power to protect the interests of workers. On the other hand, being a union member has no significant positive premium in the case of Nigerian public firms, but contrary to the results for the whole sample, working in a unionized public enterprise in Nigeria in fact results into a reduced wage level. This may possibly be because unions in the Nigerian public sector are also less independent than those in private firms, and are largely used as instruments to protect the interests of the public sector employer than that of workers, and may be they mainly bargain for enterprise wide non-wage benefits such as job security and pension. Note that, again contrary to the results for the whole sample, the rate at which workers are unionized also influences wage rates in the case of Nigerian public enterprises (but still not significant in the case of Ethiopia). The higher the level of unionization, the higher is the level of expected wages in the public sector in Nigeria since large union coverage creates a stronger voice for the workers in a firm and thus gives them a stronger bargaining power.

We also see that the effects of some institutional variables change when we look at the women-only sub samples indicating that these institutions most likely affect women differently. For example, working in a unionized firm has a positive and significant premium for men compared with men who work in firms with no unions in both countries. However, there is no such premium for women who work in unionized firms compared with their colleagues who work in a non-unionized firm in Nigeria; while in Ethiopia, even though there is such a premium for women in unionized firms, it is much lower than the corresponding premium for men.

We also see from the results of all the specifications that consistent with earlier studies (Psacharopoulos, 1993; Schultz, 1989; Harmon, et. al, 2000; Psacharopoulos and Tzannatos, 1995), the returns to education for women are relatively larger than those of men, probably implying a more important role of improved access to education for women in increasing their income and thus reducing gender wage disparity in Africa. Accordingly, the marginal return to a one year of schooling without regard to the gender of the worker (for the whole sample) in Ethiopia, controlling for occupation, is about 7 percent, and for women alone it is 8 percent; while the marginal return to a one year of schooling without regard to the gender of the worker (for the whole sample) in Nigeria is about 11 percent, and 19 percent for women only. The estimates also show that, conditional on schooling, tenure and occupational differences, each additional year of total labor market experience in Ethiopia increases hourly wages by about 3.1 percent for men and by about 3.5 percent for women; while for Nigeria the returns to each year of

labor market experience stands at 2.0 percent for men and at 1.0 percent for women.[47] Moreover, being female in the Ethiopian manufacturing sector, after controlling for the basic human capital characteristics of *experience, tenure,* and *education* as well as occupational differences reduces the returns to hourly work by as high as 10 percent; while for the Nigerian case, it reduces hourly wages by as much as 16 percent (see Appendices).[48]

The positive effect of experience on hourly wages peaks at 20 years (of total labor market experience) for the whole sample in Ethiopia. The peak time for men is 18 years and 22 years for women. On the other hand, for Nigeria, the effects of experience on hourly wages is estimated to peak at 20 years for the whole sample, while for men it peaks at 18 years and for women at 17 years.

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[47] A joint F-test was done in order to investigate whether men and women face different labor market structure. The joint F test considers a null hypothesis that the earnings regressions that were run independently for each gender group are identical. If, say, βi and $\propto i$ are the two coefficients respectively from the regressions for men and women workers, we test the null hypothesis that, $\beta i = \propto i$ jointly which is equivalent to testing whether the labor market structures faced by both men and women are the same. The relevant joint F test is therefore expressed as:

$$F_{K,\,N+M-2k} = \frac{(EES_R - EES_{UR})/K}{EES_{UR}/(N+M-2k}$$

Where K is the degrees of freedom, N and M are the number of male and female workers respectively, EES_R is the error sum of squares in the restricted model (where the regression for the whole sample is run with out the gender dummy – i.e. the coefficient for the gender dummy set to zero); and EES_{UR} stands for the error sum of squares in the unrestricted model. The null hypothesis was rejected with 99 percent probability.

[48] Most people take the coefficients of a dummy variable and multiply it by 100 to get the corresponding percentage changes. However, as implied in a footnote earlier, for a semi-logarithmic function of the form $\ln Y=\alpha+\beta D+\varepsilon$ where D represents a dummy variable, the interpretation of the coefficient β as a percentage impact on Y is equal to $e^{\beta}-1$. That is, in order to calculate a precise percentage change ($\delta 1$) on the dependent variable due to a dummy variable, it is necessary first to calculate the anti-log of a regression coefficient ($\beta 1$) and then subtract one from the result; i.e. $(\beta 1)=\ln(1+\delta 1)$. See Havorsen and Palmquist (1980), Kennedy (1992) for details in the interpretation of dummy variables in Semi-logarithmic equations.

8.3. Results of the Firm Fixed-Effects Specifications

The study has shown that establishment characteristics have important influence in wage determination. However, as explained earlier, it is not possible to add into the list of regressors all observable establishment characteristics. There are also unobservable establishment characteristics with potentially significant wage effects. Thus, as pointed out earlier, the firm fixed effects specification of the earnings function can help us to account for the effects of all observable and unobservable firm level characteristics. The results of this specification show that in both countries, even after controlling for all firm level characteristics and occupational differences, the coefficients for the 'gender' dummy are still large and statistically very significant suggesting that the effect of 'gender' in wage determination is generally quite high, and there are differing treatments of women and men in the labor market. According to the results of this specification, in the case of Ethiopia, after all the differences in firm characteristics are controlled for, women get 9 percent less than men, while in Nigeria they get 12 percent less than men (see table 2-6. See also Appendices 2-5 and 2-9 for details). The firm fixed effects specification results also show that the returns to education in Ethiopia are estimated at 4.5 percent per year and at around 8 percent for Nigeria after all establishment characteristics and occupational differences are controlled for, and the results confirm that the returns to education are still higher for women than for men in both countries, as found in the previous OLS specifications.

Table 2-6. Results from firm fixed effect model by country

	Ethiopia				Nigeria			
	All Sample		Men	Women	All Sample		Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	-0.094				-0.118			
	(2.76)**				(2.74)**			
Educyrs	0.046	0.045	0.042	0.049	0.075	0.079	0.064	0.111
	(11.27)**	(11.08)**	(9.16)**	(3.93)**	(11.21)**	(11.88)**	(9.23)**	(4.74)**
Expr	0.026	0.027	0.024	0.016	0.032	0.037	0.039	-0.019
	(8.04)**	(8.38)**	(6.70)**	(1.350)	(5.22)**	(6.11)**	(6.14)**	(0.890)
Exprsq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	(6.52)**	(6.67)**	(5.27)**	(2.00)*	(2.66)**	(3.24)**	(3.74)**	(1.630)
Tenure	0.016	0.015	0.011	0.019	0.049	0.046	0.037	0.059
	(2.52)*	(2.39)*	(1.510)	(1.080)	(6.16)**	(5.84)**	(4.38)**	(2.55)*
Tenuresq	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001
	(1.450)	(1.380)	(0.440)	(0.480)	(3.82)**	(3.57)**	(2.43)*	(1.950)
Occupation controlled for ?	YES	YES	YES	YES	YES	YES	YES	YES

Absolute value of t-statistics in parentheses
* significant at 5% level; ** significant at 1% level

Note that there is a big fall in the returns to education obtained from the results of the fixed effects specifications compared with the OLS ones. According to the fixed effects specification, the returns to education for women in Ethiopia are estimated at around 5 percent for each year of schooling, compared with 4 percent for men; while the returns to education for women in Nigeria is around 11 percent for each year of schooling compared with 6 percent for men.

CHAPTER 9.

SUMMARY OF RESULTS AND CONCLUSIONS

The contribution of the study can be summarized as follows: it investigated the possible effects of firm-level labor market institutions and other firm level characteristics, as well as individual level human capital characteristics on the process of wage determination, and conducted a comparative analysis of these effects using manufacturing LEE data sets from two of the most populous SSA countries. The findings of the model can be summarized as follows (see Appendices 2-2 to 2-9 for details): In both countries, institutional variables and other firm level characteristics play a very important role in the determination of wage rates. For example, introducing institutional variables into the earnings model improved its explanatory power in both cases as indicated by a substantial increase in the coefficient of determination (R^2). Availability of unions in a firm, percentage of workers in a firm who are members of these unions, as well as union membership have significant influences on wage rates in different specifications of the earnings model.

Results show that unions are important institutions that significantly affect the level of wages in both countries, but the magnitude of the impact is greater in the case of Nigeria. After most of the individual and other firm level characteristics are controlled for, we see that working in a firm with unions increases wages by 33 percent in Ethiopia and by 62 percent in Nigeria. Being a union member in Ethiopia has a wage premium of close to 14 percent over those who are non-union members, while union members in

Nigeria get a premium of about 20 percent more than their non-union counterparts. We also see from the results that some of these institutions appear to have significant wage effects for some groups of firms within each country, but do not appear to have any significant effect for others. For example, even though union membership has a significant influence in wages for the whole sample of workers in Ethiopia, it does not have any such influence in the case of public enterprises. This partly confirms that unions in Ethiopian public enterprises are not powerful to bargain for their members' exclusive benefits. The results also show that in both countries, consistent with findings from other researches, state owned enterprises pay less than private firms. Other firm characteristics such as size, location, sector and ownership are also found to be very important determinants of wage rates in the African labor market. The results also show that, consistent with other empirical studies on the subject, education and experience are the two most important human capital variables in the wage setting process, and that gender matters in determining individual wages in the context of the manufacturing sector of the two African countries. The coefficients for the gender dummy 'Female' are negative and very significant for most of the specifications, both OLS and firm fixed effect models[49]. The Firm Fixed Effects specification shows, for example, that after controlling for experience, tenure, occupation and all firm level characteristics, being female reduces hourly wages by as much as 9 percent in Ethiopia; while being female reduces hourly wage by around as much as 12 percent in Nigeria.

[49] A subsequent essay, using this same data sets, will attempt to decompose this gender based earnings differential in to two components: A part related to differences in human capital and a part related to differing returns to human capital for the two gender groups (termed by the literature as discrimination).

However, there are two clear observations that we get by comparing the results with controls for institutional variables with those without such controls. First, the coefficients of schooling (estimates for the returns to education) are lower in the specifications with these controls than the ones in the basic specification without such controls; and second, the negative coefficients associated with the 'Female' gender dummy variable (in absolute terms) also become smaller in magnitude when the overall effects of institutional and other firm characteristics are controlled for using the firm-fixed effects specification, compared with the results in the basic specification without such controls.

The implication is clear: Previous estimates of wage determinants without controlling for establishment level characteristics including institutional variables (e.g. estimates that are based on labor force and household survey data sets alone), are essentially upward biased and thus overestimate the effects of schooling and other individual [human capital] characteristics on earnings, as well as the impact of gender.

Some important policy implications can be drawn from the study. For example, the evidence presented in the paper as well as those from other studies suggest that the returns to education, particularly for women, are in most cases large enough to attract individuals to invest on their human capital. However, lower enrollment rates in most of African countries particularly at higher levels of education for women suggest that there is some kind of 'market failure' that prevents these individuals from attaining their optimal investment strategy. This may be an indication that there is a role that intervention can play. If the market failure is due to information asymmetry about the importance of education, creating awareness would be necessary. Public investment in

schools and related infrastructure that facilitate access to education is also an important area of intervention. If the lower enrollment rates are due to high cost of education (both tuition and opportunity costs), then a mechanism should be introduced to lower these costs to an affordable level. Moreover, the findings that institutions play a significant role in the wage determination process means that there is a potential welfare gain from ensuring more access for women to wage enhancing institutions such as unions, formal employment opportunities in the private industry as well as to better paying positions and sectors. Such measures should also be accompanied by other strategies that improve the performances of the labor market institutions in a way that increases workers' income without significantly increasing labor costs to the establishments.

There are, however, a number of important points that should be considered in interpreting the results from this study. The following, I think, are worth to be mentioned:

First, as our sample of workers consists of only wage earners in the manufacturing sector, the results obtained can not be generalized as applicable to other types of workers and to workers in the non-manufacturing employment activities in the two countries. Especially, results of the returns to schooling can not be taken as 'economy-wide' or even as applicable to the manufacturing sector of these countries in general. The survey sampling procedures did not cover all the possible sectors of manufacturing activities: as mentioned earlier, the surveys covered only selected sectors and regions in both countries. Any extrapolation of the results to the whole economy should therefore be interpreted cautiously.

Second, we extended the standard Mincerian earnings framework by introducing institutions and other establishment level characteristics. However, the standard

framework itself assumes that its two important variables (education and experience) as given (exogenously determined), while the potential endogeneity of education is widely accepted in the recent literature. The coefficients on years of education may not also reflect the pure effects of education on productivity if it is correlated with other unobserved individual characteristics that are also correlated with wages. In such a case, coefficients of education variables reflect both the effect of education on productivity and the effect of the unobserved characteristic that is correlated with wages (such as ability to continue and progress in education and ability to perform better at work due to other complementary skills). A more detailed analysis (or rather better specification) would therefore treat education as endogenous and use instrumental variables to investigate the factors that determine schooling, but not wages. Given the data characteristics we are dealing with (i.e. lack of appropriate instrumental variable), that was not possible to do. Moreover, as the information on earnings and individual characteristics was collected only from workers already on the job, the data set lacks information on others who do not participate in the labor market or those that do, but are employed in non-manufacturing or informal sector activities.

Moreover, theoretically it is possible that for some individuals, the prevailing market wage may be too low to attract them into the labor market (i.e. their reservation wage may be higher than the going market wage rate). The omission of such people, therefore, is known to cause a bias. Specifically, as the reservation wages are functions of unobserved characteristics such as ability, which may also be correlated with earnings, OLS estimates of the type we estimated for education and other human capital characteristics may be upwardly biased. The data characteristics do not allow us to

correct for selectivity bias. However, in as far as the selection bias are the same across all regions, sectors and for both sexes, the issue can be ignored with out causing any impact on the reliability of our estimates. Moreover, given the current situation in both countries where general urban unemployment is relatively high, while people with high credentials and experience have a good chance of being employed in the private sector, it is less likely to have people out of work just because their reservation wage is higher than the going private sector wage rate.

Despite such potential shortcomings mainly related to the datasets, however, the results presented here are very important for at least the following reasons:

First, the results add an additional compelling reason for the importance of a public policy that strengthens human capital development in general and that of women in particular with a focus on labor market institutions that play important roles in wage determination. Facilitating workers' rights for independent collective bargaining, better access for women to union membership and better paying occupational categories, and strengthening the educational system with relatively more focus to women's enrollment at higher levels as well as better access for women to post-employment training opportunities should be among the important priorities in these countries. The results also add to our conviction that better educated labor force means more productivity, more income to the households and a better standard of living. Related to this, the comparatively higher returns to education and on-the-job training (experience) for women means that more gender targeted human capital development at a company level will have both income and equality enhancing components and hence a better social pay off -- with improved educational attainment of females, in addition to a proportionately

larger increase in total income for each additional year of schooling, gender inequality in pay will also decline.

The study also shows that women's participation in the African urban industrial labor force is relatively low compared with their total participation rate. Moreover, even those who are working in the urban manufacturing sector are more likely to be working in low paying non-production or unskilled production occupational categories. Relatively quite few women work in the skilled production or management occupational categories in both countries. The causes for such biased concentration in specific job-cells should thoroughly be investigated; and the findings should be appropriately addressed through policy interventions. These policies would certainly improve labor market outcomes and help reduce poverty, and they will also enhance the welfare of millions of households in Africa who depend on wages as their main sources of income.

PART III.

EFFECTS OF FIRM CHARACTERISTICS ON GENDER WAGE GAPS AND INEQUALITY IN THE AFRICAN URBAN LABOR MARKETS: EVIDENCE FROM ESTABLISHMENT SURVEY DATASETS

CHAPTER 10.

INTRODUCTION

The development and welfare implications of gender outcomes (such as gender differences in employment, education and pay, empowerment of women in political and social activities) have long been recognized, and debates on women have assumed prominence on the global agenda over the last few decades. Numerous conferences and international meetings around the world have discussed gender issues, generally evolving against the backdrop of a consensus that women are not treated as equals of men.

In fact, achieving gender equality in general is now considered a very critical ingredient to reducing poverty and has become a development objective in its own right. The 2000 UN Millennium Development Goals (MDGs) lists gender equality as one of its eight (8) targets and even considers the empowerment of women as essential to achieving all of them. There is a growing empirical literature which suggests that gender equity in education raises social welfare through high economic growth, reduced fertility, child mortality, and under-nutrition (Coleman, 2004, Esteve-Volart, 2004) . A study by Abu-Ghaida and Klasen estimated that the costs of failing to meet the MDGs on gender equality in [primary and secondary] education by 2005, in terms of growth and forgone fertility, mortality and under-nutrition reduction (for 45 countries that are unlikely to meet the target) will be a 0.1 to 0.3 percentage points lower per capita growth rates, a 0.1 to 0.4 more children per woman, and by 2015, an average of 15 per 1,000 higher rates of

under five mortality, as well as a 2.5 percentage points higher prevalence of underweight children under five (Abu-Ghaida and Klasen, 2004). Studies also assert that although gender disparities hit women and girls the hardest, all of society pays a price for them (Coleman, 2004).

Gender discrimination is thus a very important economic as well as political issue and it has been relatively widely studied in many industrial countries. Studies on gender wage gaps and labor market discrimination in different countries have established that women get paid at lower rates than men even after controlling for differences in human capital characteristics such as education and experience (Horton, 1996; Psacharopoulos and Tzannatos, 1992). These studies also confirm that the size of gender pay inequality greatly varies from country to country and over time within the same country (Blau and Khan, 2001; Majumder and Begum, 2000). However, lack of appropriate data has been an impediment to undertake intensive studies on the subject in developing countries, particularly in the context of Africa. Moreover, most of the previous studies on gender did not look at firm level characteristics in their estimation of gender wage differentials. This study is intended to fill these two gaps in the literature: Narrowing the knowledge gap about African labor markets, and to investigate in detail the impact of firm characteristics on gender wage gaps. With this in mind, the study generally does three main tasks: i) It measures the level of gender wage gaps in each country, ii) It attempts to identify the contributions of firm level characteristics to gender wage gaps measured at the firm level, and iii) It measures part of the gender wage gap that is due to factors other than differences in human capital characteristics (part of which may result from labor

market discrimination against women) even after adding controls for firm characteristics, and compares the results for the two countries.

The study will focus on two of the most populous countries in the African continent (Ethiopia and Nigeria) primarily due to the following reasons: 1) As two of the most populous countries in the continent, Nigeria and Ethiopia together represent a great majority of the population in Africa, and both countries have great diversity in terms of language and life style within their borders, 2) The two countries are different from each other in their socio-economic and cultural settings. In most parts of Nigeria the tradition of Muslim teachings dominate, while in Ethiopia, despite an almost equivalent religious composition, there is no significant concentration of a specific religion in a given region, and modern school system is not in any way attached to any specific religion. As a result, we expect differing labor market outcomes in these two countries, particularly in terms of gender wage differences, and 3) Both countries have very recent firm and worker level survey data sets that can be linked to each other and provide a unique opportunity to investigate the impact of firm characteristics on wage gaps and other labor market analyses[50].

It should be noted that the prevalence of gender wage gaps in an economy does not necessarily indicate '*discrimination*', as it can also result from differences in average productivity characteristics between men and women. So, we can claim that there is discrimination only in as far as the whole gender wage gap is not attributed to such differences. If there is any part of the gender wage gap that is not explained by

[50] For more comparative information, see also part I and part II.

differences in human capital or productivity characteristics, then an important policy relevant question would be "what factors determine the size of this gap?" . As its focus is on the impacts of institutions and other firm characteristics, the main hypothesis of the study can thus be summarized as follows: "*Firm level characteristics and institutions are important determinants of the level of gender wage gaps and discrimination in African urban labor market*".

In the literature related to the subject of wage discrimination, it is part of the total gender wage gap that '*unexplained*' by differences in human capital (productivity) characteristics as a whole which commonly is taken as a measure 'discrimination'. This part is called 'unexplained' because it is not related to (or explained by) gender differences in human capital variables such as education and labor market experience. Accordingly, this study also uses the 'unexplained' part of total gender wage gap and 'gender wage discrimination' interchangeably in the discussion. However, it should kept in mind that the 'unexplained' part captures the impact of discrimination as well as that of all the unobserved characteristics and omitted variables

In order to identify the contributions of institutions and other firm level characteristics to gender wage gaps, the study sets out a two-stage model of gender wage gap determination that applies firm level institutions and other characteristics as regressors. Using this model, we find that in Nigeria, the presence of unions in a firm as well as the rate of unionization have very significant effects on the size of firm level gender wage gaps, but there are no such effects in the case of Ethiopia. In the case of Nigeria, the presence of unions widens gender wage gaps by as much as 2 percent. Also it appears that public enterprises in both countries have smaller gender wage gaps

compared with private firms, but the size of the coefficient is very small in the case of Nigeria, but quite substantial in the case of Ethiopia.

The study also attempts to measure the size of non-productivity related gender wage gap (discrimination) in the two African countries, using two gender wage gap decomposition procedures common in the literature. The first common method is the 'Oaxaca-Blinder' decomposition procedure (Oaxaca, 1973; Blinder, 1973). The Oaxaca-Blinder decomposition procedure (henceforth OB) simply gives us, in percentage terms, the share of gender wage gap which is due to labor market discrimination, that is how much *less* women would receive on average if they had similar human capital as their men counterparts. The second method is a reformulated (augmented) method as put forward by some recent post-Oaxaca-Blinder labor market researchers such as Cotton (1988) and Neumark (1988). This method, in addition to measuring the size of discrimination, can also be used to estimate the disadvantage discrimination imposes on women and the advantage bestowed on men in the African urban labor markets. Using the OB procedure, we find that there is a substantial level of gender discrimination in both countries, but the overall level of this discrimination is higher in Nigeria than that in Ethiopia. We also get the same results using the Cotton-Neumark decomposition procedure that gender wage discrimination is substantial in both countries, but in addition, this procedure also suggests that the part of gender wage discrimination which is due to *'women's disadvantage'* is higher in Nigeria than in Ethiopia.

The rest of this part of the study is organized as follows: Chapter 11 discusses theory and empirical evidence of gender wage gaps as reported by various studies to date. It also very briefly discusses the situation of women in Africa with special emphasis on

the two countries. Chapter 12 outlines different methods employed in the measurement of gender wage gaps, and sets out a two stages model of 'gender wage gap determination' to show the magnitude of influences exerted by firm level characteristics. It also briefly discusses the main results of the 'wage gap determination' model. Chapter 13 then discusses the theoretical foundations of the two procedures of gender wage gap decomposition. Chapter 14 briefly discusses the empirical results of gender wage decomposition procedures in the two countries. It then shows the overall contributions of controlling for institutions and other firm level characteristics to the size of gender wage discrimination. Chapter 15 summarizes the discussions, draws the basic implications of the results and concludes.

CHAPTER 11

. GENDER DISPARITY: THEORY AND EVIDENCE TO DATE

Gender differences in pay can happen due to one or a combination of supply and demand side factors in the labor market. In terms of the supply side, we find that women tend to self select and concentrate in occupations and industries that are low paying and thus they get lower average wages. In the demand side, women get differing labor market treatments which places them in subordinate positions in career and remuneration compared with men, and that results into lower average wages compared with men. This latter phenomenon refers to discrimination in the labor market against women. It should be noted, however, that even in the former (supply side), women's expectations and previous experiences with respect to labor market outcomes, i.e. discrimination of various types, influence their choices of occupations and industries (resulting into occupational segregation) via feedback effects.

Gender discrimination generally is said to exist when two workers who otherwise are identical in their human capital endowments and other characteristics except their gender are paid different wages. There are various theories associated with the question of '*why employers discriminate*'. According to the taste-based theory of discrimination developed by Gary Becker (Becker, 1957), men may tend to receive preferential treatments because employers may have preference to employ men rather then women, or men dislike to work alongside women particularly in lower positions, or consumers are

assumed to prefer to deal with men than with women. Since employers are assumed to maximize profit using this strategy, and since employers' utility maximization is consistent with their motive of profit maximization, then the utility of the employer is increasing in profit and decreasing in the proportion of women employed in the firm. The employer thus employs women only if the disutility of employing a woman is compensated for by increased profit from that action, and that can obviously happen only if he/she pays women less.

According to the '*crowding hypothesis*' (Edgeworth, 1922; Zellner, 1972; and Bergmen, 1971), men and women are non competing groups of workers due to discrimination or other barriers, including male dominating unions preventing women from joining the uncrowded male dominated sectors and occupations. In this framework, gender is seen as a criterion to sort workers into the two sex groups and allocating them into the *crowded* and *uncrowded* sectors. This idea is consistent with the theory of labor market segmentation and duality (Stiglitz, 1973). A version of this theory asserts that the resulting discrimination may be due to '*voluntary crowding*' as a result of differences between men and women in job preferences (Killingsworth, 1990; Manning, 1996). According to this argument, women may have particularly strong preferences for jobs in the crowded sector and opt to forgo higher pay in other sectors.

Employers also may find it profitable to discriminate due to different supply elasticities of labor from men and women. As in the case of a monopolistic producer who maximizes profit by charging different prices to different consumer of a product depending on their elasticity of demand, employer may do the same because, for example, it may be profitable for an employer discriminate between men and women by

paying women less than men due to their lower elasticity of supply. In this case, women tend to be paid less than their marginal productivity. Related to this, women's non human characteristics also contribute. Due to family commitments and responsibility of rearing children, women tend to be less mobile from place to place (if the work requires frequent trips), and due to maternity leaves and pregnancy, they generally are assumed to accumulate less level of labor market experience regardless of the actual labor market experience of each individual.

It should also be noted that gender pay differences may actually reflect differences in workers' productivity, and yet be results of discrimination that originated outside the workplace. Suppose that in a given patriarchal society people believe that women are not as productive and as capable as men in an engineering field, or for that matter in any professional occupation which is high paying. Parents, therefore, tend to send their daughters into non-engineering fields (assuming they decide on these issues for their children), if they send them to school at all. The result is that boys will be more likely to be engineers than girls. This in the long run will result into more men trained for engineering and other professional jobs and get easier access to such jobs than women. This perception becomes self re-enforcing because men are, in fact, more technically equipped and productive than women. Such a model of '*self-fulfilling prophecy*' is in fact consistent with most empirical results – i.e. pre labor market entry discrimination being reflected into post labor market entry discrimination in pay. However, as pointed out earlier, the characteristics of our survey data sets do not allow us to look at this issue. Thus in the real world of uncertainty and lack of perfect information about each individual, employers often tend to use readily available general information about

productivity related characteristics regarding each group of worker when making hiring decisions. As women generally tend to have lower education and experience than men, employers may believe that women on average are less productive than men. Thus they tend to prefer to hire men than women. This results into what is known as '*statistical discrimination*' against women.

There are also persistent disparities between men and women in access to and command over resources, political voice as well as employment opportunities, particularly in the modern sector. For example, in most developing countries including those in Africa, women lack independent rights to own and manage property. In terms of political voice, women's relatively poor socio-economic status limits their ability to influence social and political decisions that directly and indirectly affect their lives both at community/village and national levels. Also in Africa, more women than men are engaged in informal economic activities (World Bank, 2000), and when they work in the formal sector activities, they get compensated at lower rates than men with comparable qualifications (see part II of this study; Temesgen, 2003b; Verner, 2001). These imply that there is likely to be a high level of labor market discrimination against women in African countries; and the less are women's labor force participation in the modern sector and their relative educational achievement compared to men, the larger would be the '*discrimination*' component of the gender wage gaps.

Research indicates that not only do women have less average human capital endowments in most parts of the world, but they are also treated differently than men in pre-employment as well as post-employment phases of their life cycle. The pre-employment treatment refers to women's relatively low access to education and

employment opportunities, while the post-employment treatment refers to women's relatively low access to promotion and training opportunities. The outcomes of these differing treatments on gender wage gaps obviously depend, among others, on workplace characteristics as well as institutional settings in the economy.

Generally more men are literate than women worldwide (80 percent men, compared with 64 percent of women). More boys than girls are enrolled in all levels of schooling (particularly in secondary and tertiary levels); and even when they succeed to go to school, specially in developing countries, women are more likely to drop out before finishing their schooling, and as a result their average years of schooling are lower than that of men (see table 3-1 below).

Table 3.1. Average Years of Education by Gender – 1990

	Secondary Level		Tertiary Level		All Levels	
	Male	Female	Male	Female	Male	Female
OECD	2.75	2.44	0.52	0.35	8.74	8.15
East Asia	2.06	1.71	0.28	0.20	7.15	6.09
Latin America	1.45	1.42	0.26	0.21	5.54	5.32
SSA	0.70	0.40	0.05	0.02	3.40	2.16

Source: Calculated by the author using data sets from Barro and Lee (1993)\

There are some world-wide encouraging improvements in terms of women's labor force participation and educational achievement over the past few decades, however. Progress has particularly been made in terms of access to education and completion of various education levels for women in the developing world. For example, female adult illiteracy rate in East Asia went down from 43 percent in 1970 to 24 percent in 1990; while for Latin America it fell down from 26 percent in 1970 to 21 percent in 1990

(World Bank, 1995). The percentage of women who completed secondary school education in East Asia increased from 4.1 percent in 1970 to almost 14 percent in 1990; while for those in Latin America it rose from 5.4 percent to almost 9 percent during the same period. For Sub Saharan Africa, the increase was from less than 1 percent in 1970 to almost 2 percent in 1990 – an encouraging, though not impressive, achievement (World Bank, World Development Indicators). Women's share of the total labor force has also been increasing in most regions of the world, where they comprise at least one third of the total labor force in all regions except Northern Africa and Western Asia[51].

Such improvements are expected to narrow the gender wage gap and the associated discrimination component in each country[52]. But studies also indicate that a lot remains to be done in improving the status of women in most parts of the world. In some countries (such as Saudi Arabia, Pakistan and Nigeria) where women's rights issues are at the front line of a protracted battle between religious extremists and moderates, conservative and patriarchal practices, often reinforced by religious values, are still a drag on development (Coleman, 2004). While there is evidence that women typically work in sectors and occupations that are lower paying, they also get paid lower wages than their male colleagues even when they work in the same sector and same occupational category (Seguino, 2000, Temesgen, 2003, Horton, 1996; see also Appendix 3-5 for summary of selected empirical studies on this issue).

Gender wage gaps persist in almost all countries of the world, irrespective of the socio-economic condition. However, labor market characteristics and institutions largely

[51] United Nations, The World's Women 2000: Trends and Statistics (2000): 110

determine the size of gender wage differentials in each economy. There are significant variations among countries and establishments in terms of labor market characteristics. The effects of these characteristics also obviously differ between different countries and between men and women. For example, Seguino (2000) reports that the female/male ratio measure of wage-gap (Wf/Wm) ranges from 0.482 for Korea (in 1975-95) to 0.869 for Paraguay (in 1983-94)[53]. Horton's (1996) volume on a seven-country study of women in East Asian labor markets also reported that women's wages as a percent of men's were 55.8 percent for urban employees and 50.6 percent for rural employees in India (1987-88); while the percentage of women's wages for urban employees and rural employees in Indonesia respectively were 38. percent and 38.6 percent in 1980; and 54.4 percent and 50.2 percent in 1990. A volume edited by Psacharopoulos and Tzannatos (1992) with a collection of 21 studies on 15 different Latin American countries reports that on average, women receive about 70 percent of what men get. In Malaysia, women earn about 20 percent less than men in the same occupational categories (Schafgan, 2000; Chapman and Harding, 1985).

As pointed out earlier, gender wage gaps persist in developed economies as well. In the US, for example, the average female wage (for all full time workers), as a percentage of male's is about 76.5 percent. There is also a wide variation of inequality across occupational categories and sub categories in the US: Women in the Manager/Professional occupation category get 71.5 percent of earnings by their male

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[52] Our data does not allow to test for this since for such an analysis, a data set with records for multiple years is required.

[53] For a complete table of the values for the various measurements of wage gap, see Seguino (2000), page 1218

colleagues; and those in the Farm/Agriculture category earn 82.8 percent, while the share in the Technical/Sales and Administration category is only 68.8 percent. Within the medical Professional category, female Registered Nurses get 94.4 percent of men's while for female physicians the figure is very low -- only 62.4 percent, (Bureau of Labor Statistics, 2000). Our data also shows that occupational differences matter in the process of wage determination, and thus in the level of gender wage gaps as well (see Part II).

One important question to ask at this point is "how much of the total gender wage gap is attributable to differing treatment (or discrimination) in the labor market?". In most cases, empirical studies find that differences in human capital and occupation do not account for the whole of the total gender wage gap, and the remaining share is attributed to '*discrimination*'. This discrimination component also significantly varies by country. For example, it has been estimated at 39 percent for the USA, 79 percent for Japan, 24 percent for Canada, 36 percent for Russia, 19 percent for Italy, 34 percent for Israel, 59 percent for Finland and 54 percent for Sweden (see Blau and Kahn, 2001; Manafi, 2000; Cain, 1986; Groshen, 1991).

The pictures with regard to the African labor market, as portrayed by few earlier works, are somewhat mixed, however. Estimates find that there is substantial gender wage discrimination in some African countries, and none or very small in some others. For example, Knight and Sabot (1982) find that average wage for men in the Tanzanian manufacturing sector was substantially higher than that of women, the gender wage gap being about 37 percent in favor of men. Using the Oaxaca decomposition procedure on data collected from manufacturing employees during an establishment survey conducted in 1971, they found that almost all of the 37 percent gap is explained by differences in

productivity related individual characteristics of workers, and thus there is no *discrimination*. This is in marked contrast to most other studies. These same authors also analyzed the extent of race discrimination as well using the same data and found that only a small part of the difference in average wages between Asians and Africans can be explained by the significantly higher level of education attained by the former. The first finding, that is the absence of gender wage discrimination against women, challenges the conventional understanding that economic development brings social enlightenment and thus more gender equality in pay, while the second finding, that of discrimination in favor of Asians, challenges the belief that only groups with substantial political and economic power benefit from discrimination.

On the other hand, Siphambe and Thokweng-Bakwena (2001) applied the Oaxaca decomposition methodology on a labor Force survey data from Botswana separately for the public and private sector workers, and they found that there is generally gender wage discrimination in Botswana, but it is relatively less in the public sector; while in the private sector discrimination against women is a major factor in earnings differences. Agesa (1999) used urban workers data for Kenya and found that on average women get about 63 percent of men's total wages, and close to 60 percent of this men-women wage gap is due to '*discrimination*'.

However, due to the nature of the data sets they used, almost none of the studies mentioned above have controlled for workplace characteristics, and thus the role of workplace segregation in gender wage inequality has been overlooked even though it may contribute a large part of the gender wage gaps. As a result, all differences not accounted for by workers' characteristics have been attributed to gender bias thus

probably overestimating the level of *'discrimination'*. This study, however, accounts for the contribution of firm level institutions and other characteristics as well in the level of firm level gender wage gaps. Thus it provides a better picture of gender wage discrimination in the two African countries.

In general, the magnitude of gender wage disparity in Africa varies from one country to another, and in most cases, a significant part of the gender wage gap is explained by differences in human capital (productivity) characteristics. Even out of the gender wage gap which is not so explained by human capital characteristics, this study finds that much is influenced by firm level institutions and other characteristics. This partly implies, from the policy perspective, that targeting on firm level characteristics that would improve women's positions, such as those providing women with better access to training and promotion opportunities, would contribute a lot in closing a significant share of the total gender wage gap. The study also implies that pro gender-equity measures should be taken together with improvements in the institutional arrangements that currently tend to favor men over women, and essentially bar women from attaining their full potential.

11.1. Women in Africa: a brief comparison of Nigeria and Ethiopia

In Africa, women have relatively less access to education, particularly at secondary and tertiary levels, compared with men. Their participation in formal economic activities is also less, and most of them work as household care givers or in traditional farming activities. Also within Africa, there are significant variations in terms of women's socio-economic status. For example, women's labor force participation in Nigeria is just 49

percent compared with close to 60 percent in Ethiopia and other African countries. Moreover, maternity leave benefits expressed as a share of women's full wages, are just 50 percent in Nigeria compared with 100 percent in Ethiopia and most OECD countries. Such a comparative background information on women's educational, labor force as well as socio-economic status would help us to hypothesize the possible effects of differences in institutional arrangements and firm characteristics on the magnitude of gender wage discrimination between the two countries.

As in most Africa, social values in Nigeria and Ethiopia favor men and disadvantage women, such that access to education, employment in the formal sector as well as access to resources are higher for men than for women, and roles assigned to men and women both in the community as well as at household levels give women a secondary role (UNECA, 1994, World Bank, 1995).

Table 3-2. Comparative indicators of gender inequality

	Labor Force Participation, 2000		**School enrollment gender gap, 2001***		**Maternity leave benefits 1998 ++**	**Labor force gender parity index (2000)*** **	**Union members by gender (%)****	
	Men	**Women**	**Sec.**	**Post Sec.**			**Men**	**Women**
Ethiopia	86	59	55	25	100	0.7	21	30
Nigeria	88	49	49	22	50	0.6	39	31

Sources: ILO, 2000; UNCTAD, 2002; World Development Indicators (2002), Firm Survey datasets

* Defined as female as a percentage of males. Thus, lower number means higher gap.
** Based on manufacturing survey data sets for the two countries
***Labor force gender parity index:** is the ratio of the percentage of women who are economically active to the percentage of men who are. The ILO defines the economically active population as all those who supply labor for the production of goods and services during a specified period.
++**Maternity leave benefits:** refer to the compensation provided to women during maternity leave, as a share of their full wages.

However, the social disadvantage faced by women in general is more restrictive in Nigeria than in Ethiopia. In addition to the cultural and traditional norms imposed by a society dominated by Islamic doctrine, there is also a historical explanation for such differences. In the case of Nigeria, evidences suggest that up until independence in the 1960s, for example, modern education was not available to a significant share of the society. This was particularly true for the Northern part where the majority of the population is Muslim and the education system in general focuses on the traditional Islamic teachings. Particularly during the period of British Administration, expansion of modern education was deliberately suppressed since traditional leaders in that part of the country were able to convince their British colonizers to respect their major wishes – that Christian missionaries be banned from working in their regions. At the same time, however, the main forces behind expansion of modern schools and the main educators in the country were Christian missionaries. Historical evidences also show that more than 90 percent of both schools and student enrollments at that time were controlled by Christian missionaries (Coleman, 1960). The prohibition of missionaries from working in some parts of the country (mainly in the North), therefore, meant that no one virtually could go to a higher level of modern education in those regions. By around the end of 1950s, as a consequence, close to 20 percent of the school age population (24 percent for boys and 18 percent for girls) in the south was in school compared with just 0.03 percent of boys and 0 percent of girls in the north (Bray, 1981). There was, however, a system of Islamic education that long existed mainly in the north that was geared towards enabling men and women become literate so that they can read the 'koran' and for women to learn from it that it is their duty to obey and please husbands while playing secondary role in

household decisions. The contents of Islamic schools emphasize spiritual and literary authority than intellectual curiosity since, as some put it, "the sole purpose of Islamic education is to learn Islamic doctrine" (Callaway and Crevey, 1994). This literally meant that there was little modern education in the north and as a result very few men and virtually no women had the opportunity to get modern education. Moreover, there are evidences suggesting that in some parts of Nigeria, particularly in the Islamic region of the North, women must have the permission of their husbands to work (Coleman, 1960).

The traditional assignment of specific household and social roles existed in the southern part of Nigeria as well, though not as stark and pronounced as in the North. As a result, labor force participation, access to education and formal employment opportunities were much favorable to men than to women. Moreover, discrimination against women in Nigeria comes not only from their employers, but also from their male workplace colleagues as well. One study that examined the relationship between female and male workers in a Nigerian factory confirmed that female workers in Nigeria face discrimination from male co-workers too, rather than direct from management alone. That study argued that men utilize gender discrimination to gain or maintain for themselves positions of relative privilege and power. Women workers thus often find themselves alienated from their male co-workers, while men fail altogether to understand women's reluctance to become involved actively in what they see as institutions catering to male interests such as trade unions (Pittin, R., 1984).

On the other hand, in Ethiopia, there are no explicit social or cultural restrictions towards women's access to education and their participation in non-household economic activities. In fact, starting from the introduction of modern school systems in the country

in the late 1890s, successive governments had attempted to encourage enrollment and widen school coverage. During the reign of the last Ethiopian king, Haile selassie I, the country is believed to have devoted large amounts of resources to increase enrollment and many students were sent abroad for further education. In fact, only a few proportion of the society, particularly the well connected and well to do individuals did get much of the opportunity, but the difference in access and opportunity was more of based on income and status than gender. An increasing number of female students were therefore also enrolled at various levels of education. After the fall of the imperial regime in early 1970s, a socialist government took power. Starting from late seventies, the then socialist government introduced and enforced an open policy of compulsory literacy campaign throughout the country where all adults, including women (in as far as they are illiterate and not attending school) were required to regularly go to a 'mass education center' in their locality to learn the basics of reading, writing and math. As a result of that effort, illiteracy in the country dropped significantly, and the government, to its credit for such a successful effort, received an award from the United Nations Education, Scientific and Cultural Organization (UNESCO). Enrollment rates of women in secondary education also picked up significantly following the years of 'mass education', and it is believed that a substantial number of men and women who started schooling through this program were able to continue and complete secondary and university levels of education. The participation of women in economic and political activities was also openly encouraged by the Marxist regime under an ideological rhetoric which says "without a full participation of women, a revolution can not succeed!", and an umbrella association called 'All Ethiopian Women Association (AEWA)' was created for this purpose.

As a result, women in Ethiopia, particularly those in urban areas, have a higher participation rate in non-household economic activities and higher access to education and training opportunities than those in Nigeria. According to figures from the African Development Bank, women's share of the labor force in Nigeria at 28.4 percent is much lower than that in Ethiopia (36.7 percent) and compared with the average of Sub Saharan Africa which stands at 33.8 percent (ADB, 2003). Our survey data sets also show that in terms of access to training opportunities provided by the companies they work for, women in Ethiopia are equally likely to receive training as men once they join their current establishment of work; but a comparative disadvantage for women is observed in the case of Nigeria where overall 17 percent of men compared to 11 percent of women reported to have received training once they join their current workplace (see part I). Clearly, such a lower access to training for women in the case of Nigeria further restricts the human capital development of women specifically in terms of their post-employment educational achievement. Generally, therefore, one finds more restrictive traditional norms and rules in Nigeria than in Ethiopia and more restrictive labor market regulations (see also part I and part II of this study; ILO, 2002). Moreover, as shown in part II of this study, being a women in Ethiopia reduces expected average wages by 11 percent compared with that of men after all individual characteristics are controlled for, while in Nigeria the reduction in wages for women is as high as 19 percent. With such a different socio-cultural and labor market settings, we naturally would expect to have differing effects of institutions and other firm level characteristics on gender wage gaps, and different outcomes with regard to gender wage discrimination in the two countries.

CHAPTER 12.

GENDER WAGE GAP AND ITS DETERMINANTS

12.1. Measuring the extent of gender wage gaps

There are different common ways of measuring the size of gender wage gaps. One such measure is using the difference between the log values of average wages for men and women computed as:

$$\text{WGAP1} = \text{Log}(\overline{Wm}) - \text{Log}(\overline{Wf}) \qquad (1)$$

where $\overline{Wm}$ and $\overline{Wf}$ are average wages received by men and women employees respectively. WGAP1 measures the log point differential, which can be taken as an approximation of a percentage difference in pay between men and women. Taking the anti-log of WGAP1, subtracting one and multiplying the result by 100, we will get the percentage 'mark-up' of male over female wages[54].

Another common measure of gender wage gap is computed as the ratio of average wages received by each of the two gender groups, in most cases as the ratio of women's average wages to men's. Multiplying this wage gap by 100 gives us the average wage received by women as a percentage of the average wage for men.

$$\text{WGAP2} = \overline{Wf} \ / \ \overline{Wm} \qquad (2)$$

[54] This is the wage gap measure (computed at the firm level and controlling for individual and firm characteristics) that will be used in our analyses in the latter parts of this study.

Some researchers redefine these measures, taking into account the differences in human capital between men and women in the economy (or in the sample), by adjusting average wages of each gender group for the corresponding differences in average education (Seguino, 2000; Blau and Khan, 2001)[55].

Note that each of the above measures of wage gaps give different results, and the interpretations are also different. WGAP1, for example, measures differences in log of average wages between men and women, while WGAP2 is used to express the average women's wage as a percentage of men's. Thus, the absolute sizes of each measure for the same country will be different from one another, but in relative terms, when they are used to compare wage gaps across countries, all the measures give similar results.

Table 3-3 below provides the computed values of the two most commonly used measures of gender wage gap discussed above (WGAP1 and WGAP2) using manufacturing sector survey datasets from some selected African countries.

Table 3-3. Measures of gender wage-gaps using Manufacturing Sector datasets

Measure	Definition	Wage - Gap by country			
		Ethiopia	Ghana	Nigeria	Zimbabwe
WGAP1	$\text{Log}(\overline{Wm}) - \text{Log}(\overline{Wf})$	**0.32**	**0.22**	**0.66**	**0.31**
WGAP2	$\overline{Wf} \ / \ \overline{Wm}$	**0.73**	**0.80**	**0.52**	**0.73**

Source: Computed by the author using appropriate Firm Survey data sets.
* From Verner, 2001.

[55] For example, an 'efficiency' gender wage gap which is a modified version of WGAP1 can be derived by correcting gender wages for specific educational attainments of men and women in the sample as follows: $Log\left(\overline{Wm}/\overline{Educms}\right) - Log\left(\overline{Wf}/\overline{Educfs}\right)$. Similarly, $\left(\overline{Wf}/\overline{Educfs}\right) \div \left(\overline{Wm}/\overline{Educms}\right)$ can be one possible 'efficiency' version of WGAP2 where $\overline{Educ\,ms}$ and $\overline{Educ\,fs}$ are average years of education respectively for men and women workers in the sample.

The table shows that substantial gender wage gaps exist in the countries considered, and both measures confirm that gender wage gap is the largest in Nigeria. According to the first measure (WGAP1), Nigerian men on average get 66 percent more than women compared with 22 percent, 31 percent and 32 percent respectively for Ghana, Zimbabwe and Ethiopia. The second measure (WGAP2) shows that Nigerian women on average get only 52 percent of men's wages compared with 73 percent each for Zimbabwe and Ethiopia and 80 percent for Ghana.

Various economic and social reasons can be cited for the existence and magnitude of gender wage gaps in an economy, at a certain time. These include differing access to education and formal employment opportunities, as well as differing post-employment access to promotion and pay raise. However, empirical studies confirm that even as the gender gap in the attainments of these characteristics narrow down over time, a proportional narrowing down of the wage gaps was not observed in most countries of the world (Newell and Reilly, 2001; Horton, 1996). Thus, it is obvious that some other variables must also be important determinants of the level of gender wage gaps[56]. This study is intended to focus on some of these variables, particularly institutions and other firm level characteristics that might have contributed to differing treatments of women and men in the labor market. The following section sets out a two-stages model of gender wage-gap determination in order to investigate the impact of such institutions and other firm level characteristics.

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[56] Indeed the fact that women tend to be risk averse in terms of looking for alternative employment even if they are aware that they are under-paid may also be a contributing factor for persistent gender wage gap compared to their male counterparts. Barth and Dale-Olsen (1999), for example, find that male turnover is more wage elastic than female turnover.

12.2. The Model of Gender Wage Gap Determination

As demonstrated in other studies, firm level institutions and other characteristics play a very important role in wage determination (Temesgen, 2003b; Cotton, 1988; Cardoso, 1997; see also part II). Thus quite likely they also have an important influence on gender earnings gaps as well. For example, studies indicate that higher level of *unionization* is found to be associated with higher average wage levels (Nickell et. al, 2001)[57]. The effect of labor unions on gender wage gaps depends on a variety of factors such as the union density, and the likelihood of women versus men in joining the unions. If, for example, a union bargains for higher wages exclusively to its members, and if women are less likely to join unions than men, we may find significant gender wage gaps due to unions. Also, since public enterprises are more egalitarian (see part II), we would expect that gender wage gaps in public enterprises would be less than those in private firms.

However, the effects of each institution and firm characteristic may be different from one country to another. An interesting question from the policy point of view would therefore be like "which of these institutions and firm characteristics represent forces that tend to narrow gender wage gaps down, and which ones play the opposite direction, and thus tend to widen firm level gender wage-gaps in an economy?" In order to answer this question, the study develops a model of wage gap determination where the dependent

[57] There are also other possible secondary effects of unions, but are not discussed here since the focus of this study is on wage and gender effects. For example, by pushing up the average wage rate, unions may also create an incentive for individuals to abstain from entrepreneurship and innovation, but instead make it more attractive to enter the labor market as employees. Looking from a different perspective, the resulting high wages may also decrease the probability of finding a job in the formal sector thus pushing people to self employment and informal employment.

variable is the within-firm gender wage gap, and the independent variables are a set of various institutions and other firm characteristics that are likely to affect firm-level outcomes.

The procedure is a two stages approach: First, it estimates the basic specification of the earnings function (using human capital characteristics of workers such as education, experience squared, tenure, and tenure squared) separately for men and women. Thus, for this purpose, the common functional form of the Mincerian earnings function (Mincer, 1974) can be specified as follows:

(3)

$$\ln(w_i) = \alpha + \beta S_i + \gamma_1 EXPR_i + \gamma_2 EXPR_i^2 + \delta_1 tenur + \delta_2 tenur^2 + \varepsilon_i$$

where *ln(wi)* is the natural logarithm of hourly wages, *Si* is number of years of schooling, *EXPRi* is labor market experience, and '*tenur*' is tenure at the current place of work. As in part II, $EXPR_i^2$ and $tenur^2$ are quadratic terms for experience and tenure. The coefficients β, γ1 and δ1 represent the returns respectively to 'schooling', total labor market experience and tenure.

Now, let $y_i^m = \ln(w_i)$ be the firm level average value of the predicted wages for the male sub sample in each firm and $y_i^f = \ln(w_i)$ be the firm level average of the predicted wages for the female sub sample in each firm. The model of gender wage-gap determination will then be of the following type:

$$(y_i^m - y_i^f) = \partial_i + \phi_i INST_i + \varphi_i z_i + \varepsilon_i \qquad 4$$

where $INST_i$ represents a vector of variables representing firm-level 'institutions', Z_i is a vector of other firm level characteristics, ϕ_i and φ_i are the corresponding coefficients to be estimated, and ε_i, as before, is a normally behaving error term. As discussed in part II, variables included in the vector of $INST_i$ are union existence in the firm, and the percent of workers who are union members in each firm. Other firm level control variables included in vector Z' include sector, size, location and domestic/foreign as well as public/private ownership categories. Firm level training opportunities (proxied by whether the firm has made investment for workers' training) is also controlled for. The following section discusses empirical results of the wage-gap determination model for both countries.

12.3. Empirical Results of Gender Wage-Gap Determination

Table 3-4 below shows summaries of the separate effects of selected institutions and other firm characteristics. It is obvious from the results that some institutional variables and firm characteristics have a significant impact on the gender wage gaps in both countries. However, the magnitude, level of significance and direction of the effects are in some cases very different, reflecting the differences in socio-cultural and institutional arrangements between the two countries. As shown in the following table, the institutional variables and firm level characteristics generally explain some proportion of the overall variation of firm level gender wage gaps. The model in general has a reasonable explanatory power as reflected by the coefficient of determination (R^2). The

coefficient of determination in both countries is higher than 20 percent (For detailed results and for the various specifications of the wage-gap determination model, see Appendix 3-1).

Table 3-4. Determinants of gender wage-gaps in African manufacturing sector

	Nigeria			Ethiopia	
	(1)	(2)	(3)+	(4)	(5)
unionzd_firm	0.0193	0.0199	0.0176	0.5112	0.5103
	(2.055)**	(2.113)**	(1.897)*	(0.814)	(0.842)
un_rate	-0.0003	-0.0003	-0.0003	-0.0069	-0.0068
	(2.721)***	(2.806)***	(2.422)**	(1.109)	(1.149)
Foreign	-0.0078	-0.007	-0.0066	-0.0846	-0.0253
	(1.652)	(1.454)	(1.400)	(1.597)	(0.489)
Public	-0.0135	-0.0154	-0.0176	-0.1339	-0.1151
	(2.306)**	(2.465)**	(2.776)***	(2.910)***	(2.488)**
train_op	-0.0084	-0.0082	-0.0084	-0.0444	-0.0459
	(1.988)**	(1.973)*	(2.046)**	(0.848)	(0.877)
Sector controlled for?	Yes	Yes	Yes	Yes*	Yes*
Region controlled for?	No	Yes (Lagos)*	Yes (north)	No	Yes***
Size controlled for?	Yes	Yes	Yes	Yes**	Yes**
Adj. R-squared	0.199	0.211	0.218	0.236	0.260

Robust t statistics in parentheses

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

+ The difference between columns 3 and 4 is that in the former regions were controlled for using 'Lagos'; while in the latter, regional control uses 'north' consisting of regions in the northern part of Nigeria.

Dependent variable=Fitted firm level men-women wage gap

The separate effects of institutions and other firm characteristics from this model can generally be summarized as follows:

Firms with unions are more discriminatory (though the size of the coefficient is very small) than those with out a union in the case of Nigeria; while the prevalence of unions have no such significant effect on the gender wage-gap in the case of Ethiopia.

The results show that in Nigeria unionized firms widen the gender wage gap by close to 2.0 percent compared with non-unionized firms. This is a reflection of two reasons: The high premium of being a union member as shown in part II, combined with a low probability of membership for women serve in favor of men's wages in the case of Nigeria; Also, as shown in part II, the returns to working in a union firm in Nigeria is less for women (at 15 percent) than for men (at 67 percent) compared with those who work in nonunion firms. On the other hand, the result in the Ethiopian case confirms that unions are not as powerful to have an effect on gender wage gap outcomes. In the case of Ethiopia, women working in union firms get substantial premium over the wages of those women who work in nonunion firms. However, within a unionized firm, women who are union members do not get a premium over nonunion members; while there is a substantial (close to 15 percent) premium to men union members over the wages of men who are nonunion members. It seems that the high premium of working in union firms for women is offset by a significant premium of being a union member for men, and thus the effect of unions on firm level gender wage gaps becomes insignificant in the case of Ethiopia.

Another important variable related to unions that was used as an explanatory variable is the rate of unionization. The size of the coefficient for this variable is very small in both cases, but is highly significant in the case of Nigeria where it appears to have a gender-wage narrowing role (negative sign), and still appears to be non-significant in the case of Ethiopia. In Nigeria, the negative coefficient of 'unionization rate' means that the higher the share of workers in a firm who belong to a union, the higher will be the likelihood of women to become members and get the resulting wage premium. Thus,

such a phenomenon clearly increases their average wages and narrows the gender wage gaps at a firm level.

Finally, we also get that in both countries, public enterprises have smaller gender wage gaps than private firms (though by a small margin in the case of Nigeria). The results show that in the case of Nigeria, gender wage gaps in the public enterprises, other things equal, are smaller than those in private firms by a magnitude of less than1 percent only; while in the case of Ethiopia, gender wage gaps in the public enterprises are between 11 percent to 13 percent less than those in the private sector. This is consistent with the results in part II where we saw that the coefficients for female dummy in the public firms' sub sample is about 50 percent less than that in the private firms. It is also interesting to see that one of the control variables included in the model, namely firm level training opportunities in the case of Nigeria (proxied by the firm's investment expenditure for workers' training) have highly significant influences in substantially narrowing gender wage gaps. The most likely explanation for these results is that better availability of training opportunities in Nigerian firms would increase women's human capital and thus their average wages. These may have a direct policy implication that providing women with more formal employment opportunities and firm level investment on training play a very important gender equalizing role.

CHAPTER 13.

DECOMPOSING GENDER WAGE INEQUALITY

Gender wage gaps always exist in as far as there are differences in productivity characteristics between men and women, and thus do not necessarily imply labor market discrimination. Gender wage gaps will be a concern only if they exist in excess of such differences in human capital characteristics between men and women (i.e. or even after these differences are accounted for). A number of empirical studies have attempted to measure and decompose observed gender wage differentials into a part attributed to differences in '*average human capital*' and those attributed to differences in '*returns to human capital*'. The former basically refers to wage differentials due to differences in productivity related characteristics such as education and experience between the two gender groups; while the latter refers to the residual component that can not be explained by such differences (and thus is taken to represent the outcome of differing labor market treatments of the two gender groups). The two most common methods of wage gap decomposition in the economics literature are those introduced by Oaxaca (1973) and Blinder (1973) – thus known as the 'Oaxaca-Blinder' decomposition procedure, and that by Cotton (1988) and Neumark (1988) and thus known as the Cotton-Neumark decomposition procedure. Each of these procedures are briefly discussed below.

13.1. The Oaxaca-Blinder Decomposition Procedure

The Oaxaca-Blinder decomposition procedure (Oaxaca, 1973; Blinder, 1973), which implies two scenarios or assumptions on the basis of which we can estimate the men-women wage differentials that would exist in the absence of discrimination. According to Oaxaca (1973), these assumptions are that, if there were no discrimination: a) The wage structure currently faced by women would also apply to men; and b) The wage structure currently faced by men would also apply to women. These mean that, in the absence of discrimination, women (men) would on average receive the same wages as they presently receive, but that discrimination takes the form of men (women) receiving more (less) than a non-discriminating labor market would have awarded them (Oaxaca, 1973, p.695). As we will see later, OB therefore used either the prevailing men's or women's wage structures as a basis for computing wage gaps due to discriminating labor markets.

Decomposing 'gender' wage differentials requires, as a first step, computing the coefficients of wage determinant variables for each gender group in each sample. This helps us to compare the returns to each of these variables between men and women. Our discussion of wage gap decomposition analysis therefore begins by estimating the Mincerian log earnings function separately for each gender using the data for our sample of workers as follows[58]:

$$\ln(W)_i = \alpha_i + \chi_i \beta_i + \phi Y_i + \varepsilon_i \qquad (5)$$

Where i (i = 1, ... 10) is individual worker's number; *ln(W)* is the natural log of hourly wages for each individual i ; χ is a vector of worker level explanatory variables including the traditional human capital variables of education, experience, tenure and occupational categories; Y is a vector of firm level control variables such as sector, size, ownership and geographical location. ε is a well behaved error term. β_i is the coefficient to be estimated for each variable in vector χ and ϕ_i is the coefficient to be estimated for each firm level control variable in vector Y[59]. We will use this basic specification to develop the Oaxaca-Blinder decomposition procedure.

Now let $\bar{x}$ be the vector of average values of individual (and firm level) characteristics that determine productivity (and hence wages) of an individual worker, and for simplicity let $\hat{\beta}$ be a vector of the coefficients associated with these characteristics (as obtained from OLS estimations of the specified (Mincerian) earnings function. It follows that the average of log of wages ($\ln \bar{w}$) can be estimated by evaluating the fitted values at the 'means' of the independent variables as $\bar{x}'\hat{\beta}$ for the whole working population, which means that

$$\ln \bar{w} = \bar{x}'\hat{\beta} \qquad (6)$$

Once we run the specified earnings function separately for men and women using equation [6] described above, we should compute the corresponding fitted values of

[58] Note that this specification has already been discussed in essay II, but the discussion is repeated here for convenience purposes and to make it easier for readers to follow up.

earnings or wages per unit of time (such as hourly) in log forms for each gender group. Equivalently, these fitted values, evaluated at the "means" of the independent variables for each gender group of can be re-written as follows:

$$\ln(\overline{Wm}) = \overline{X'}_m \hat{\beta}_m \quad \text{for men} \qquad (7)$$

and

$$\ln(\overline{Ww}) = \overline{X'}_w \hat{\beta}_w \qquad \text{for women} \qquad (8)$$

where '*m*' and '*w* ' stand respectively for men and women.

Taking the differences between the fitted values in equations (7) and (8) above, we obtain a measure of the total gender wage gap, similar to WGAP1, as follows:

$$\ln(\overline{Wm}) - \ln(\overline{Ww}) = \overline{X'}_m \hat{\beta}_m - \overline{X'}_w \hat{\beta}_w \qquad (9)$$

Adding and subtracting the term $\overline{X'}_m \hat{\beta}_w$ in the second term of the right side of equation (10) above, we get:

$$\ln(\overline{Wm}) - \ln(\overline{Ww}) = \overline{X'}_m \hat{\beta}_m - \overline{X'}_w \hat{\beta}_w + \overline{X'}_m \hat{\beta}_w - \overline{X'}_m \hat{\beta}_w \qquad (10)$$

$$= \overline{X'}_m \hat{\beta}_m + \overline{X'}_m \hat{\beta}_w - \overline{X'}_m \hat{\beta}_w - \overline{X'}_w \hat{\beta}_w \qquad (11)$$

[59] It should be noted that separating the data by gender groups and running a regression for each group is an empirical issue and the resulting coefficients should be statistically tested.

Collecting and further rearranging the terms in equation (11) above, we can decompose the difference in the fitted values in to '*explained*' and '*unexplained*' components as follows:

$$\ln(\overline{Wm}) - \ln(\overline{Ww}) = (\overline{X'}_m - \overline{X'}_w)\hat{\beta}_w + \overline{X'}_m(\hat{\beta}_m - \hat{\beta}_w) \qquad (12)$$

which is mathematically the same as the following :

$$\ln(\overline{Wm}) - \ln(\overline{Ww}) = \hat{\beta}_m(\overline{X'}_m - \overline{X'}_w) + \overline{X'}_w(\hat{\beta}_m - \hat{\beta}_w) \qquad (13)$$

The above two specifications directly correspond to the two basic assumptions of Oaxaca regarding the wage structure that would prevail in the absence of discrimination The first equation above (equation 12) decomposes average wage differentials into a part attributable to differences in human capital characteristics (evaluated at the female returns) and a part attributable to differences in returns to men's and women's human capital characteristics (evaluated at the mean set of men's characteristics). On the other hand, the second specification (equation 13) decomposes average wage differentials into a part attributable to differences in human capital characteristics (evaluated at the male returns) and a part attributable to differences in returns to men's and women's characteristics (evaluated at the mean set of women's characteristics).

Clearly, the two versions are likely to result into different estimates. However, OB treated this as an index number problem given its similarity to the calculation of index numbers, and he obtained the estimates for both of the specifications and used the results to establish a range with in which the 'true' values of the components lie. Some

researchers on labor market discriminations after Oaxaca and Blinder followed this procedure of estimating both formulations; others used either one of the two specifications, while some others just used the averages of the results from the two specifications in their empirical studies (Gwartney and Long, 1978). In order to be able to easily compare the decomposition results, this study also presents, along with the separate results of the OB procedure, the mean wage gaps for each country as the average of the results from equation 12 (using female wage structure, i.e. female coefficients) and equation 13 (using male coefficients).

Generally, the first terms in the right hand side of the above two equations (12 and 13) reflect differences in wages due to differences in mean human capital characteristics. This component is referred to as the "*explained*" portion of the total gender wage gap and shows the average wage level difference women would expect given the differences in their average human capital characteristics compared to that of their male counterparts. The second term measures the difference in wages due to differences in the '*returns*' to these human capital characteristics. This in effect measures the extent to which women earn less than men (that is the amount they would receive if they were endowed with the same average human capital characteristics as men compared with what men receive). This same component can also be thought of as the extent to which men earn more than women if they were endowed with the average human capital characteristics of women. This is the portion of total wage gap which is "*unexplained*" by human capital differences and is usually interpreted in the literature as a wage gap due to 'discrimination'.

Empirical results of the OB decomposition procedure are discussed at the beginning of Chapter 14.1 below.

13.2. The Cotton-Neumark Decomposition Procedure

One major criticism of the Oaxaca-Blinder decomposition procedure is that measuring labor market discrimination by mere differences in male-female regression coefficients (i.e. differing wage structures) confounds demand side (or market) sources of discrimination with those that are supply side (non-market) sources. This major criticism was first made by Butler (1982) who questioned the validity of comparing regression coefficients of the two gender-groups for wage gap decomposition. The major shortcoming of the OB decomposition procedure is therefore that it did not adequately portray one of the most important assumptions made by Becker's (1971) original condition, that is, the wage structure that would have prevailed in the absence of gender discrimination. Moreover, the O-B methodology only measures discrimination in the labor market. If there are differences in access to productivity enhancing characteristics such as education which in turn will be rewarded differently in the labor market (e.g. men having better access to higher levels and/or higher quality of education and training opportunities than women), or for that matter if men have a higher probability of getting employment in general and some high paying job categories in particular (exclusiveness), the standard discrimination procedure as put forward by Oaxaca and Blinder will underestimate the true degree of discrimination. A more comprehensive analysis of gender based wage discrimination therefore should involve investigating not just the currently observed wage differences, but the total outcomes of a life time sequence of choices and decisions of the two gender groups[60].

[60] For example, Even and Macpherson (1990) and Madden (1999), tried to break down employment probabilities for each gender into differences in endowments and differences in returns to endowments.

In order to solve one major shortcoming of the traditional OB approach, which is that of neglecting the possibility of wage discrimination at the point of entry to the labor market, recent decomposition researchers (Cotton, 1988; Neumark, 1988) introduced an augmented specification of gender wage gap decomposition methodology. According to this augmented specification, the average of total gender wage differentials is decomposed into three terms (as opposed to two as in the previous cases) as follows: (For the details of the derivation, see Appendix 3-6).

$$\ln \overline{W}_m - \ln \overline{W}_w = \sum \hat{\beta}^* (\bar{x}_m - \bar{x}'_w) + \sum \bar{x}'_m (\hat{\beta}_m - \beta^*) + \sum \bar{x}'_w (\hat{\beta}^* - \hat{\beta}_w) \qquad (14)$$

What the above specification is doing basically is to separate the treatment or discrimination component of gender wage gap further into two elements: i) the advantage (benefit) of being a male worker, and ii) the disadvantage (cost) of being a female worker. In other words, the former measures the amount by which men's productivity characteristics are '*overvalued*' and the latter is the amount by which women's productivity characteristics are '*undervalued*'. Empirical results of the Cotton-Neumark decomposition procedure are discussed below in chapter 14.2 below.

CHAPTER 14.

RESULTS OF GENDER WAGE GAP DECOMPOSITIONS

14.1. Results of the Oaxaca-Blinder decomposition procedure

Table 3-5 below reports the '*explained*' and '*unexplained*' portions of wage differentials in each country obtained using the OB procedure as discussed above.

Table 3-5. Sources of female/male earnings differentials using OB method*

Source of gender wage gap	Contribution to wage differential by country					
	Using female coefficients (equation 12)		Using male coefficients (equation 13)		Averages	
	Ethiopia	*Nigeria*	*Ethiopia*	*Nigeria*	*Ethiopia*	*Nigeria*
Explained *(Skill diff.)*	60%	23%	58%	14%	59%	19%
Unexplained *(Discrim.)*	40%	77%	42%	86%	41%	81%

* See Appendix C-2 for a detailed presentation

** Recall that the estimated gap in log of wages for Ethiopia is 0.32, and for Nigeria it is 0.66. Therefore, we see that not only is the wage gap in Nigeria higher than in Ethiopia, but the discrimination component in Nigeria is also higher than in Ethiopia.

Interestingly, both the specifications give similar results for the Ethiopian data; while in the case of Nigeria the results are very different. Using specifications number 12 and 13 to compute the intervals for the true value of the discrimination component, we get that the '*explained*' component is estimated between 58 percent and 60 percent for Ethiopia, and the corresponding '*unexplained*' or '*discrimination*' component is between 40 percent and 42 percent. On the other hand, the *explained* component for Nigeria would lie between 14 percent and 23 percent, while the

corresponding '*unexplained*' or *discrimination* component lies between 77 percent and 86 percent.

The results also confirm, as expected, that discrimination against women in the labor market is higher in Nigeria where differences in wages due to average human capital differences (*explained*) are only as low as 14 percent compared with around 60 percent in Ethiopia. Similarly, we see that the *unexplained* (discrimination) component in Nigeria is as high as 86 percent while it is around 40 percent for Ethiopia. The average results suggest that the discrimination component of wage differentials for Ethiopia is about 41 percent compared with 81 percent for Nigeria suggesting that wage discrimination in Nigeria is much higher than in Ethiopia by as much as 100 percent (see column 6 and 7 of the above table). The magnitudes of '*unexplained components*' of the gender wage gaps shown above generally are in line with most of the results reported by earlier studies for other countries (Horton, 1996; Happy, et. al, 2001).

The separate contributions of the different individual and firm characteristics to the total and '*unexplained*' wage gap substantially differ. The size of these contributions also vary depending on which decomposition method is applied. Despite these differences in the magnitudes, both the decomposition procedures clearly show that institutions and firm level characteristics have significant influences on the size of gender wage discrimination in both countries. For the details of the separate percentage contributions from each variable to the '*explained*' and '*unexplained*' components in each specification, see Appendices 3-3 and 3-4.

14.2. Results of the Cotton-Neumark Decomposition Procedure

Summary of the results obtained using the augmented Cotton-Neumark decomposition procedure is shown in table 3-6 below. The table shows that confirming the earlier results of the OB procedure, the discrimination component of the gender wage gap in the augmented Cotton-Neumark methodology is again higher in Nigeria than in Ethiopia. The results also show that *'women's treatment disadvantage'* is much higher in Nigeria compared with that in Ethiopia, while the men's treatment advantage is not much different from that in Ethiopia. In this specification, it is estimated that approximately 60 percent (for Ethiopia) and 22 percent (for Nigeria) of the log wage differences represent the explained part of the total gender wage differences, a part which is due to men's productivity advantages evaluated at the hypothetical situation of the absence of discrimination (i.e. with a hypothetical situation of same wage structure for both men and women in the economy).

Table 3-6. Results of the Cotton-Neumark decomposition procedure

	Ethiopia	Nigeria
Explained*	60%	22%
Unexplained**	40%	78%
Of which: Men's Treatment Advantage	9%	15%
Women's Treatment Disadvantage	31%	63%

* Human Capital or skill differential
** Treatment differential

Table 3-6 also shows that the remaining log wage differentials (40 percent for Ethiopia and 78 percent for Nigeria) are due to '*treatment*' differences between men and women in the labor market (i.e. discrimination). These differences are further decomposed into '*treatment advantage'* of men and '*treatment disadvantage'* of women. The 'treatment advantage' of men accounted for about 9 percent and 15 percent of the log wage differentials respectively in Ethiopia and Nigeria. The treatment advantages are differences in the wages men currently receive and what they would receive had there been no discrimination that favors them. We also see that the treatment disadvantage components for women were about 31 percent and 63 percent of the log wage differences in Ethiopia and Nigeria respectively. These treatment disadvantages refer to differences in the current women's wage and the wage they would receive if there were no discrimination in the labor market (or no differences in their wage structures).

In summary, results of the Cotton-Neumark procedure confirm the results from the OB procedure that there is substantial gender wage discrimination in both countries, but the magnitude is larger in Nigeria than in Ethiopia. Moreover, the Cotton-Neumark procedure also finds that discrimination due to women's treatment disadvantage is much larger than that due to men's treatment advantage in both countries. Comparing women's treatment disadvantages from the Cotton-Neumark decomposition results for the two countries also shows that it is much higher in Nigeria than in Ethiopia (for more comparisons of the results from the two procedures, see Appendix C-2). The Cotton_Neumark procedure therefore allows us to measure not only discrimination as an 'unexplained' part of total gender wage gap as in the OB method, but it also allows us to measure the relative size of a gender discrimination component which is due to women's

disadvantage which in deed is even more important for policy targeting. In both countries, the result that this component of the unexplained part is quite large means that in both countries policy intervention is required to address it; and the result that this measure is much larger in Nigeria may be a reflection of the overall social and cultural conditions that tend to discourage women from participating in formal economic activities, in political decision making as well as in higher levels of education. This means that more needs to be done in Nigeria in the context of providing women with opportunities for a level playing field with their men counterparts.

14.3. Measuring the Overall Effects of Adding Establishment Characteristics

As demonstrated in part II, institutions and other firm characteristics play important roles in wage determination. We have also seen in chapter 12 of this study that establishment characteristics have important influences in the size and direction of gender wage gaps. Some of the firm characteristics tend to narrow firm-level gender wage gaps, while others widen it. It would therefore be appropriate to look at the overall effects of firm level characteristics for at least two reasons: i) it would allow us to judge how less precise previous estimates are because they did not control for these establishment characteristics, ii) it would give us information about the total size of gender wage discrimination which is attributed to institutions and other firm characteristics, and thus can be addressed by improving institutions and by providing equal access for men and women to these institutions. In order to measure the overall effects of institutions and other firm level characteristics on the 'decomposition' estimates, I re-run both the decomposition exercises (the OB and the Cotton-Neumark procedures) using only

individual level variables as regressors to see what the decomposition results with no controls for firm characteristics would look like. Comparing the '*hypothetical*' results from this approach with the previous results that control for institutions and other firm characteristics, as presented in tables 3-5 and 3-6, we get the overall effects of establishment characteristics as the difference between the two results. The individual level characteristics considered here include *education, experience, tenure,* and dummies for *occupational categories*. Tables 3-7a and 3-7b below compare the summary results of the OB and Cotton-Neumark procedures with and with out firm characteristic controls.

Table 3-7. Decomposition results: As share of total gender wage gaps (%)

A) **Using worker characteristics only**

	Ethiopia				**Nigeria**			
	Procedure			Average (columns 1 & 2)	**Procedure**			Average (columns 5 & 6)
	OB		Cotton-Neumark		**OB**		Cotton-Neumark	
Gender wage	*Female Coeff.*	*Male Coeff.*			*Female Coeff.*	*Male Coeff.*		
which is ...	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Explained*	69	64	57	66	18	55	48	37
Unexplained**	31	36	43	34	82	45	52	63
Of which:								
Men's Treatment Advantage	...	...	16	...	...	...	14	..
Women's Treatment Disadvantage	...	...	27	...	...	...	38	..

table 3-7. cont'd

b) **Using worker and firm level characteristics**

	Ethiopia				Nigeria			
	Procedure				Procedure			
	OB		Cotton-Neumark	Average (columns 1 & 2)	OB		Cotton-Neumark	Average (columns 5 & 6)
Gender wage gap	*Female Coeff.*	*Male Coeff.*			*Female Coeff.*	*Male Coeff.*		
Which is ...	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Explained*	60	58	60	59	23	14	22	19
Unexplained**	40	42	40	41	77	86	78	81
Of which:								
Men's Treatment Advantage	...	...	9	...	...	...	15	..
Women's Treatment Disadvantage	...	...	31	...	...	...	63	..

* Human Capital or skill differential
** Treatment differential

The tables show that, as expected, controlling for establishment characteristics has changed the results compared with what it would have been if only worker characteristics were used. Depending on the average values of the independent variables in each specification for men and women separately, and the corresponding returns to each of the variables (coefficients), adding successive firm characteristics as controls may increase or decrease the 'explained' or the 'unexplained' components of total gender wage gaps. In estimating the discrimination component using the worker characteristics only, there is a high likelihood of prevalence of omitted variables some of which are firm characteristics. In that case, if men are more qualified than women on average in terms of those omitted variables, then discrimination results will likely be '*overestimated*' when worker characteristics only are considered; while on the other hand if women are more qualified

than men in terms of those omitted variables, the results will likely be that discrimination is '*underestimated*' (see Blau, et. al., 1992). The comparison of results with and with out institutions and firm characteristic controls in this study show that the latter is more likely to be the case in both countries.

Our results show that (see Appendix 3-3 and 3-4), the average percentage contributions of firm characteristics to the 'explained' component of the total gender wage gap taken together are much lower than the average percentage contribution of worker characteristics taken alone. As a result, the size of 'explained' component of a specification with firm characteristic controls becomes much lower than a specification without such controls. This implies that adding firm characteristics into the specification reduces the size of the explained component which clearly means that it tends to increase the size of the 'unexplained' component of total gender wage gap. For example, the average contribution of individual characteristics using the Cotton-Neumark method for Nigeria is about 42 percent, while the average from institutions and other firm characteristics is just about 9 percent. Therefore, adding firm characteristics into the model brings the overall percentage of explained component down to 22 percent from the 42 percent (and thus increases the unexplained component), which means that using worker characteristics alone would have overestimated the 'explained' component and it would have underestimated the 'unexplained' component. Similarly, the average percentage contribution of firm characteristic controls to the explained component in the case of Ethiopia using the Cotton-Neumark method is 44 percent compared with 77 percent for worker level characteristics and thus adding firm characteristic controls bring the average explained component down to 60 percent from 77 percent. We also get the

similar results if we use the OB methods in that the explained components decrease when firm characteristics are controlled for. The average contributions of worker level characteristics alone to the explained and unexplained components of total wage gap using the OB method with men's coefficients respectively for Ethiopia are 75 percent and 25 percent, and that of firm characteristic controls alone are 43 percent and 57 percent. Since the contributions to the explained components from firm characteristic controls alone (43 percent) are lower than that from individual characteristics alone (75 percent); while the contributions from firm characteristic controls to the unexplained component (57 percent) are much higher than those from individual characteristics alone (25 percent), we get that including firm controls in or specification tends to reduce the overall average of explained component, and tends to increase the overall average of unexplained component of total gender wage gap. Same is true for the Nigerian case. As a result, in all cases of the decomposition procedures, we see that the *'unexplained'* or *'discrimination'* component of the total wage gap, with out controlling for establishment level variables would have been much lower than what we got after controlling for these establishment variables. Accordingly, if only worker characteristics were used in our model, the '*unexplained*' component of gender wage-gaps would have been 31 percent, 36 percent and 43 percent in Ethiopia using the OB with female coefficients, the OB with male coefficients, and the Cotton-Neumark methodologies respectively; while it would have been 82 percent, 45 percent and 52 percent in Nigeria using the OB with female coefficients, the OB with male coefficients, and the Cotton-Neumark methodologies respectively. If we just compare the averages of the results from OB with men's coefficients and OB with women's coefficients (equations 12 and 13), we see that the

discrimination components with individual characteristics only (34 percent for Ethiopia and 63 percent for Nigeria) are both smaller than the corresponding results with controls of firm level characteristics (41 percent for Ethiopia and 81 percent for Nigeria). Comparing the '*discrimination*' results computed with and without establishment level characteristics with each other, the paper therefore shows that the results obtained after controlling for such characteristics are much higher than those with out such controls. For example, we see that the *unexplained* component of gender wage gaps using the OB (female coefficient) procedure with firm characteristics controls in fact are higher by about 35 percent in Ethiopia and by 5 percent in Nigeria (computed as a ratio of the differences between the two results to the result without firm level controls); while the *unexplained* component of total wage gaps which is due to *women's treatment disadvantage* computed using the Cotton-Neumark procedure, after controlling for firm characteristics, exceed the results with out such controls by about 15 percent in the case of Ethiopia, and by about 65 percent in the case of Nigeria. These results therefore suggest that traditional estimates using worker characteristics only, because they do not account for firm level characteristics, tend to underestimate the 'discrimination' component of the total gender wage gap and as a result they might have actually underestimated the true level of labor market '*discrimination*' against women.

CHAPTER 15.

SUMMARY OF RESULTS AND CONCLUSIONS

The study has demonstrated that institutions and other firm characteristics significantly influence the level of gender wage gaps. We also see from the results that after differences in productivity related factors are accounted for, there remain substantial gender wage differences between men and women at a firm level. This suggests that the prevalence of gender wage gaps in Africa is not just a reflection of associated gaps in human capital variables between men and women, but also a result of labor market discrimination against women. Using the Oaxaca-Blinder (Oaxaca, 1973 and Blinder, 1973) as well as the Cotton-Neumark (Cotton, 1988 and Neumark, 1988) decomposition procedures, the study has shown that *discrimination* against women is substantial in both countries, but more so in Nigeria where one observes a more restrictive attitude towards women rendering them with very limited opportunities than those in Ethiopia.

It should be noted that the current literature on the measure of gender wage gaps has limitations in that it is based on average wages for women versus men at a given point of time. This may give a misleading picture when one looks at the total effects of gender wage inequality. For example, a 20 percent average gender wage gap in an economy may have a different implication on women's relative welfare depending on whether all women receive 20 percent less or those poorest 50 percent women get 40 percent less while the other 50 percent get equal average pay as men. It should also be

noted that gender wage gaps are believed to be just a small proportion of labor market discrimination against women. For example, women may face discrimination in access to manufacturing sector employment, but that is not directly observed from our data sets.

One important contribution of the analysis here is that it controls for institutions and other firm characteristics in the regression and decomposition procedures, thereby reducing the potential downward bias of gender effects that might have been the case in previous estimates. Comparing the '*discrimination*' results computed with and without establishment level characteristics with each other, the paper finds that the results with such controls are much higher than those with out such controls. For example, the *unexplained* component of gender wage gaps using the OB (female coefficient) procedure controlling for firm characteristics in fact are higher by about 35 percent in Ethiopia and by 5 percent in Nigeria (computed as a ratio of the differences between the two results to the result without firm level controls) than the *unexplained* component derived with out controlling for firm characteristics. Similarly, we also see that the *unexplained* component of total gender wage gaps due to women's *treatment disadvantage* computed using the Cotton-Neumark decomposition procedure, controlling for firm characteristics, is higher by about 15 percent than the results with out such controls in the case of Ethiopia, and by about 65 percent in the case of Nigeria. These results therefore suggest that previous estimates that do not account for firm level characteristics might have actually underestimated the true extent of '*discrimination*'.

Finally, a look at labor market discrimination is very important from policy perspectives since it helps us identify some policy intervention measures. In economies where the discrimination component is very high, the government may look into the possibility of introducing and/or enforcing anti discrimination or equal opportunity labor

market regulations in order to narrow gender discrimination and its effects on growth. It should be noted that the analyses presented here suggest that any attempt to close the '*explained*' wage gap between men and women should be carefully targeted at the appropriate endowment (individual characteristics), but the existing institutions and other firm characteristics should also be considered. If the existing firm level institutions are relatively unfavorable towards women, policy makers should, in their medium to long term vision, clearly identify and address them in a way that ensures a more favorable treatment of women. These should include better access to firm level training opportunities for women, as well as better access to employment into higher level occupational categories for which they are qualified, and better access to within-firm career promotion opportunities. Also, as the cross country comparisons attempted to show, gender discrimination is more pervasive in a society where social and traditional norms heavily bar women from participating in formal economic activities and in household and community level decision making. Thus, even though it may take time, changing the unfavorable institutions is important to avoid a persisting gender inequality, and thus a segmented labor market. In deed this task is more difficult than just focusing on increasing women's access to education, credits or political decision making power, but its long term impact is also substantial.

Policy makers can also help reduce the pre-employment discrimination against women by ensuring sufficient availability of child care institutions so that mothers can get the time to improve their human capital, and social attitudes also need to change so that household responsibility will be equally shared between men and women. Equal opportunity and affirmative action legislations need also be forwarded together with

creation of awareness about the importance of gender equality in order to reduce employer taste-based discrimination.

The gender gap narrowing roles of labor market institutions should also be strengthened. Labor unions, for example, can target to recruit more women for membership and leadership positions, and can also include gender related clauses when bargaining with employers. Such clauses can be of the following type: 'Employers will recruit at least a given percentage of total new female hires into the firm within a given period of time'. The clause can also specify positions such as professional or managerial occupational categories that target or give priority to qualified women. It can also specify that more proportions of women should be given training opportunities offered by the firm, among other requirements.

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APPENDIX A-1.

Selected Comparative Economic Indicators for SSA

A) GDP and Employment

Country	Per Capita GDP current $ (2000)e	Unemp. Rate (1999)	Annual Average Inflation (1990-99)	Annual empl. gr rate (1990-99)	Annual growth rate of	
					GDP (1990-2000)	Labor force (1990-2000)
Ethiopia	101	..	7.7	5.3	3.8	2.5
Kenya	338	..	15.9	8.9(a)	1.9	3.3
Nigeria	361	16.9(b)	28.7	2.7	3.1	2.7
S. Africa	2954	25.3	9.4	6.3(c)	2.0	2.0
Tanzania	257	22.0	21.7	..	3.1	2.7
Zimbabwe	..	6.0	..	1.6(d)	2.2	2.0

a) 2001; b) 1995; c) 2000; d) 1990-1994; e) African Development Bank database
Source: ILO (2000); World Bank (2002); African Development Bank (2002)

A) Distribution of GDP by Sector

Country/Region	Agriculture		Industry		Manufacturing		Services	
	1980	2000	1980	2000	1980	2000	1980	2000
Ghana	46.8	62.6	12.7	13.4	7.6	8.6	40.5	23.9
Nigeria	20.6	31.3	41.7	39.1	5.7	4.6	37.6	29.6
Etiopía	50.3	45.5	15.5	10.8	10.7	5.6	34.2	43.7
Tanzania	46.3	51.8	15.6	14.5	10.2	4.7	38.1	33.8
Uganda	73.8	50.0	5.2	14.5	4.4	8.2	20.9	35.5
Mozambique	42.8	49.3	16.6	25.4	8.8	14.2	40.6	25.3
Africa	22.3	20.00	39.0	26.3	8.7	13.2	38.7	53.7

Note: Manufacturing is a subset of industry.
Source: UNECA, (2002). Extracted from Annex table A1.2, pp. 50-51

B) Contribution of the Informal Economy

Country	Informal Economy As % of GNP 1999/2000	Informal Economy GNP per capita Current USD (2000)	GNP per capita, Atlas method (2000)
Benin	45.2	167.2	370
Etiopía	40.3	40.3	100
Ghana	38.4	126.7	330
Mozambique	40.3	84.6	210
Nigeria	57.9	150.5	260
Tanzania	58.3	157.4	270
Average for 23 African countries	42.0	287	782

Source: Adapted from Friedrich Schneider, 2002 'Size and measurement of the informal economy in 110 countries around the world', Table 2.

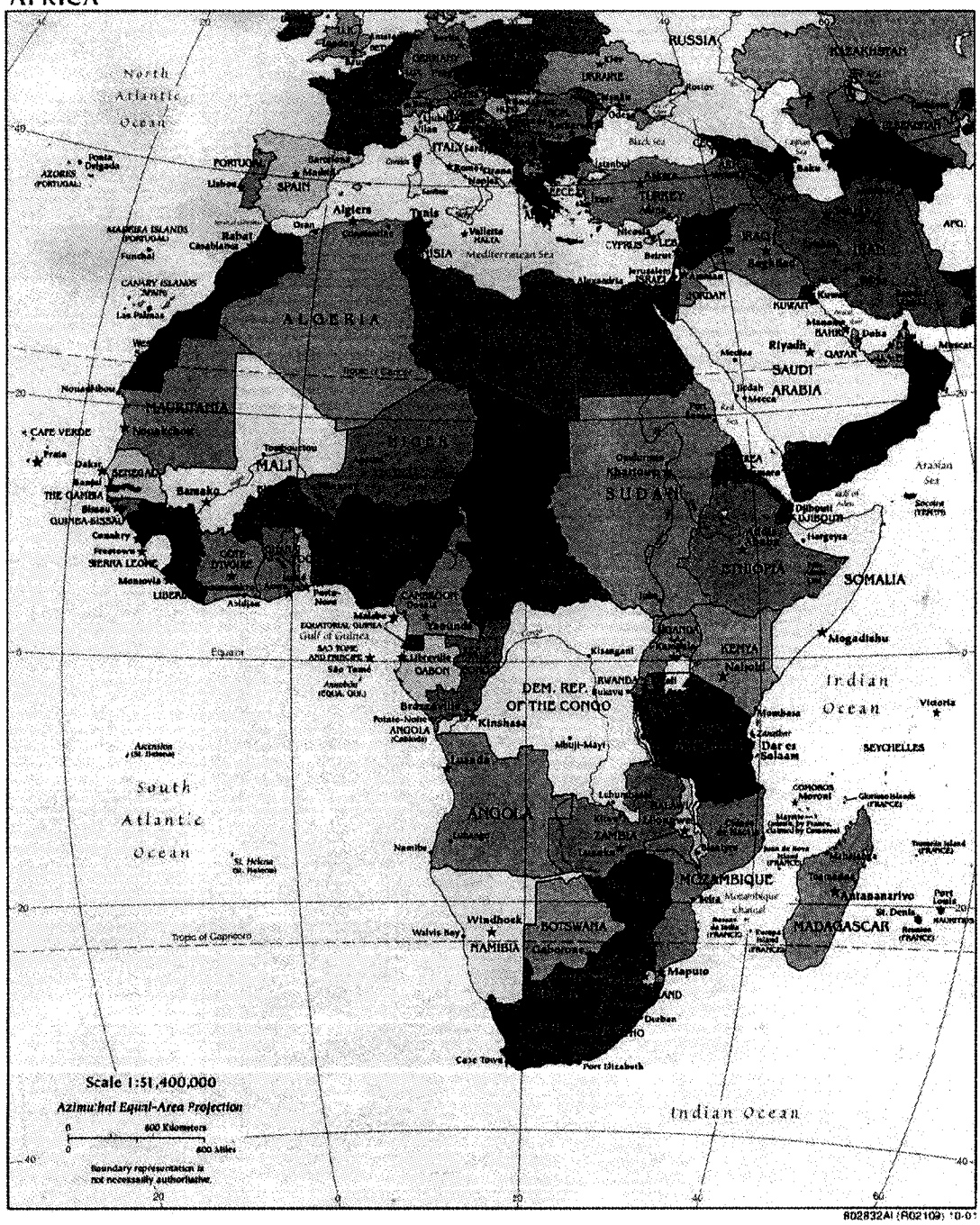
APPENDIX A-2.

Comparative Urban population growth rates (annual %)
1980-2000

Country	1980	1985	1990	1995	2000
Nigeria	5.73	5.55	5.33	5.28	4.47
Kenya	8.23	7.28	6.68	5.75	5.03
Tanzania	9.72	6.40	6.23	5.77	4.95
Zambia	5.87	3.52	3.62	3.17	2.76
Zimbabwe	5.88	6.14	5.39	4.08	3.91
Ethiopia	4.67	4.87	6.24	5.58	4.92
Mozambique	9.87	8.29	6.34	6.91	5.48
Sub-Saharan Africa	5.53	5.10	5.06	4.96	4.48
East Asia & Pacific	3.78	4.44	4.78	3.85	3.44
Middle East & North Africa	4.60	4.70	3.64	2.93	2.55
South Asia	4.36	3.36	3.23	2.91	2.78
High income: OECD	0.97	0.83	1.04	0.98	0.92
Latin America & Caribbean	3.41	2.96	2.71	2.33	2.05

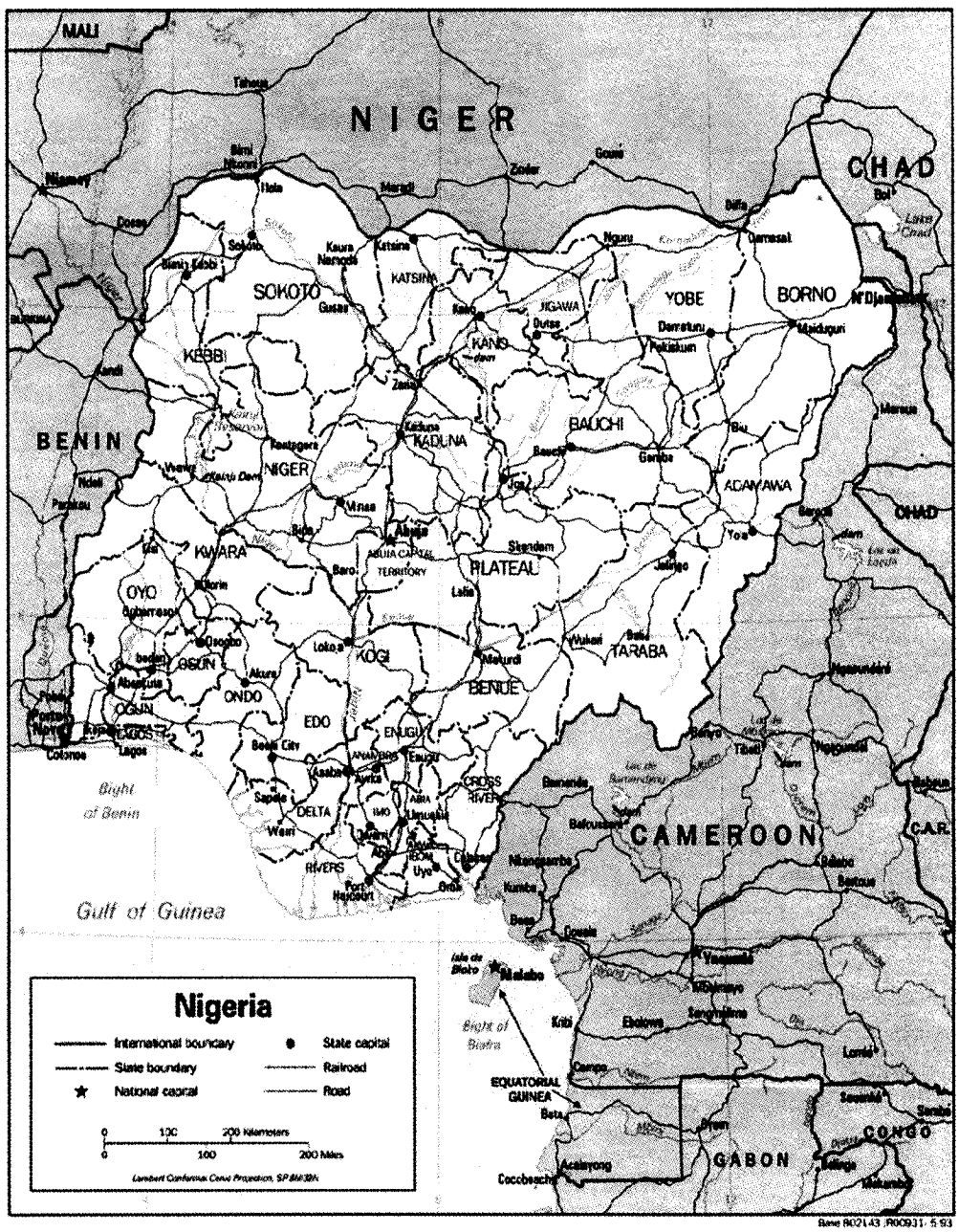
Source: World Bank, World Development Indicators, 2002

APPENDIX A-3.
Political Map of Africa

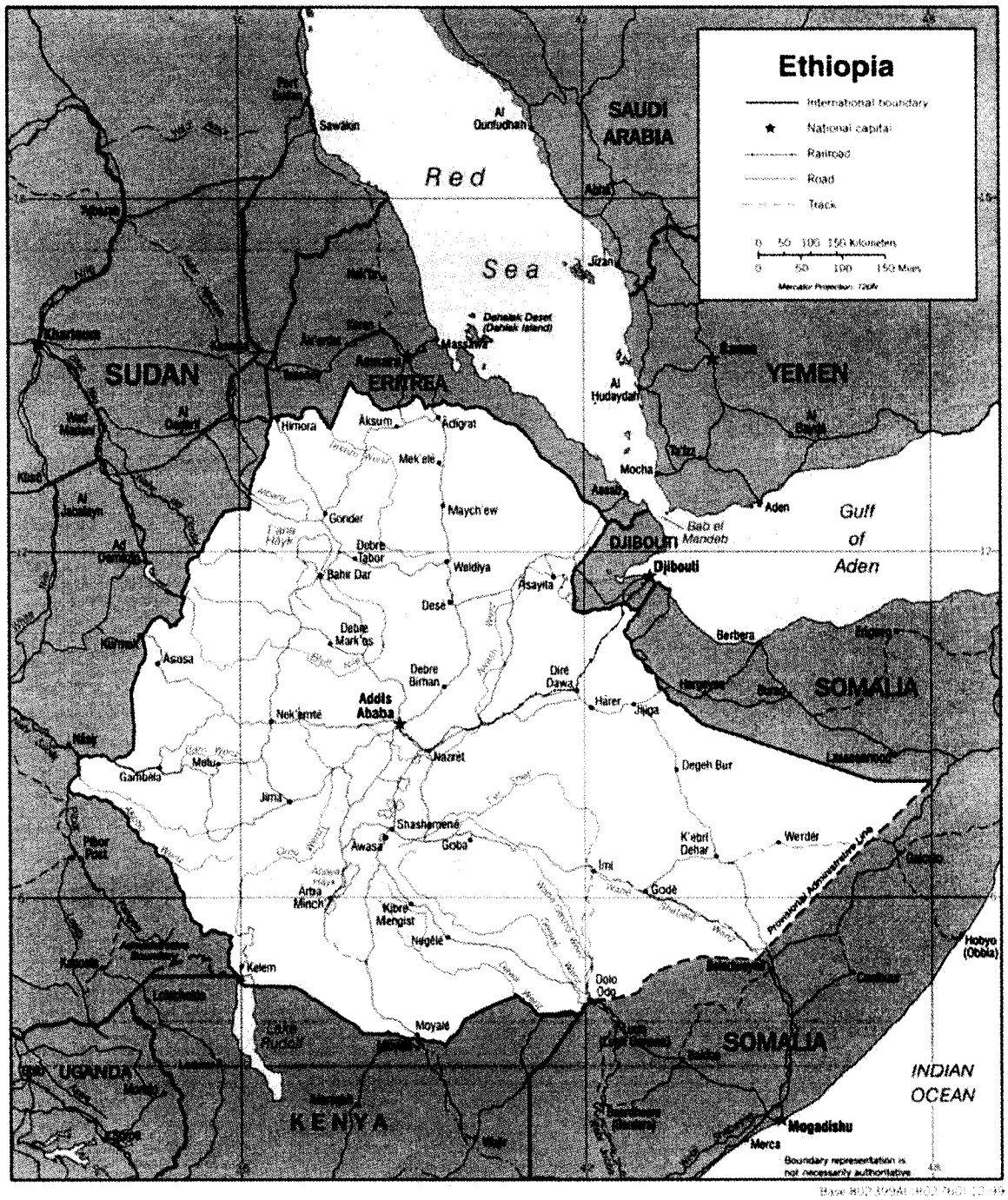


APPENDIX A-4.

Political Map of Nigeria



APPENDIX A-5.
Political Map of Ethiopia



APPENDIX B-1.

Definitions of variables used in empirical analyses

Variable Name	Definition
Female	Dummy equals 1 if worker is Female
lnhrwag	Log of hourly wages
Educyrs	Number of years of education attained by a worker
Expr	Total years of (potential) experience
Exprsq	Total Experience Squared
Tenure	Total years of tenure at current establishment
Tenuresq	Total tenure Squared
chemical	Dummy equals 1 if sector is chemical; 0 otherwise
pharmacy	Dummy equals 1 if sector is in pharmacy; 0 otherwise
pharmacy	Dummy equals 1 if sector is in pharmacy; 0 otherwise
plastics	Dummy equals 1 if sector is in plastics ; 0 otherwise
Metals	Equals one if firm is in the 'Metal' sector, zero otherwise
Food_bev	Equals one if firm is in 'Food and Beverages' sector, zero otherwise
Wood_fur	Equals one if firm is in the 'Wood and Furniture' sector, zero otherwise
tex_garm	Dummy equals 1 if sector is in textile or garments; 0 otherwise
Foreign	Dummy equals 1 if firm has a foreign ownership
Public	Dummy equals 1 if firm has public ownership
Leather	Equals one if firm is in the 'Leather' sector, zero otherwise
Foreign	Equals one if firm is foreign owned, zero otherwise
Mgt	Dummy variables equal to one if worker is in the management occupational category, and zero otherwise

Prof	Dummy variables equal to one if worker is in the professional occupational category, and zero otherwise
SkilledP	Dummy variables equal to one if worker is in the skilled production professional occupational category, and zero otherwise
UnskP	Dummy variables equal to one if worker is in the unskilled production professional occupational category, and zero otherwise
Nonprod	Dummy variables equal to one if worker is in the non-production professional occupational category, and zero otherwise
Apprent	Dummy variables equal to one if worker is in the 'apprenticeship production professional occupational category, and zero otherwise
Tech	Dummy variables equal to one if worker is in the 'apprenticeship production technician occupational category, and zero otherwise
offic_sal	Dummy variables equal to one if worker is in the 'office/sales' occupational category, and zero otherwise
service	Dummy variables equal to one if worker is in the 'services' occupational category, and zero otherwise
prod	Dummy variables equal to one if worker is in the production professional occupational category, and zero otherwise (for Nigeria)
health	Dummy variables equal to one if worker is in the 'health' field , and zero otherwise (for Nigeria)
Small	Size dummy equals 1 if firm has 10 to 60 (included) workers
Medium	Size dummy equals 1 if firm has 61 to 200 (included) workers
Large	Size dummy equals 1 if firm has more than 200 workers
Lagos	Equals one if firm is located in Lagos (for Nigerian data)
Addis	Equals one if firm is located in Addis Ababa (for Ethiopian data)
North	Dummy=1 if establishment is located in one of the northern regions of Nigeria, zero otherwise.
union_dummy	Equals one if worker is member of a union, zero otherwise.
unionzd_firm	Equals one if a labor union exists in the firm
un_rate	Percent of workers who are union members
train_op	Equals one if there are training opportunities in a firm (proxied by whether the firm has made investments for workers' training, and zero otherwise

APPENDIX B-2.

Regression outputs for the whole sample (Ethiopia)

	Individual character only		Full model With institutions and other Firm level controls
	Basic	With occupation Controls	
	(1)	(2)	(3)
Female	-0.1633	-0.1068	-0.1011
	(4.313)***	(2.691)***	(2.723)***
Educyrs	0.0986	0.0763	0.0532
	(22.110)***	(16.450)***	(11.930)***
Expr	0.0465	0.0385	0.0323
	(11.011)***	(9.805)***	(9.087)***
Exprsq	-0.0006	-0.0006	-0.0005
	(8.162)***	(8.239)***	(7.966)***
Tenure	0.0478	0.0469	0.0118
	(7.141)***	(7.290)***	(1.862)*
Tenuresq	-0.0011	-0.0011	-0.0004
	(5.364)***	(5.236)***	(2.043)**
Prof		-0.0509	-0.2384
		(0.615)	(3.096)***
SkilledP		-0.4909	-0.5042
		(6.707)***	(7.276)***
UnskP		-0.7551	-0.9064
		(9.188)***	(11.575)***
Nonprod		-0.6678	-0.8802
		(8.567)***	(11.993)***
Apprent		-1.0469	-1.1278
		(8.400)***	(9.522)***
union_dummy			0.1377
			(2.626)***
unionzd_firm			0.3262
			(3.150)***
un_rate			-0.0019
			(1.449)
food_bev			0.2399
			(5.130)***
leather			0.1336

			(2.296)**
wood_fur			0.211
			(4.815)***
foreign			0.1444
			(2.154)**
public			-0.0915
			(2.092)**
small			-0.5709
			(10.583)***
medium			-0.418
			(9.598)***
addis			0.143
			(4.228)***
Constant	-0.8804	-0.0608	0.5216
	(16.355)***	-0.623	(4.536)***
Observations	2220	2220	2094
R-squared	0.336	0.391	0.505

Robust t statistics in parentheses

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

APPENDIX B-3

Regression outputs for public enterprises sub-sample (Ethiopia)

	Individual character only		Full model With institutions and other
	Basic	With occupation Controls	Firm level controls
	(1)	(2)	(3)
Female	-0.0417	-0.0424	-0.0529
	(0.599)	(0.645)	(0.903)
Educyrs	0.0787	0.0569	0.0543
	(7.843)***	(5.143)***	(6.034)***
Expr	0.0315	0.0322	0.0264
	(3.578)***	(3.705)***	(2.878)***
exprsq	-0.0004	-0.0004	-0.0004
	(4.050)***	(4.526)***	(3.443)***
tenure	0.018	0.0272	0.0247
	(1.314)	(1.974)**	(1.655)*
tenuresq	-0.0006	-0.0009	-0.0007
	(1.339)	(2.118)**	(1.744)*
Prof		-0.0277	-0.0202
		(0.213)	(0.166)
SkilledP		-0.239	-0.2479
		(2.090)**	(2.362)**
UnskP		-0.6668	-0.5332
		(4.713)***	(3.925)***
Nonprod		-0.3573	-0.3972
		(3.095)***	(3.656)***
union_dummy			-0.0697
			(0.785)
unionzd_firm			-0.2645
			(0.900)
Un_rate			0.0056
			(1.701)*
food_bev			0.5774
			(4.172)***
leather			0.6836
			(4.544)***

Wood_fur			0.7182
			(5.046)***
small			0.3525
			(2.906)***
medium			-0.3776
			(2.882)***
addis			0.1964
			(3.132)***
Constant	-0.1124	0.3713	-0.3446
	(0.628)	(1.622)	(1.347)
Observations	245	245	219
R-squared	0.271	0.381	0.539

Robust t statistics in parentheses

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

APPENDIX B-4

Regression outputs for the women sub-samples (Ethiopia)

	Basic (1)	Individual character only With occupation Controls (2)	Full model With institutions and other Firm level Controls (3)
Educyrs	0.0987	0.0807	0.0709
	(11.161)***	(7.218)***	(6.143)***
Expr	0.0514	0.0445	0.0348
	(5.980)***	(5.231)***	(4.368)***
Exprsq	-0.0006	-0.0006	-0.0005
	(5.625)***	(5.045)***	(4.575)***
tenure	0.0529	0.0525	0.0197
	(3.986)***	(4.180)***	(1.595)
tenuresq	-0.0012	-0.0011	-0.0005
	(2.972)***	(3.165)***	(1.371)
Prof		0.283	-0.0369
		(1.524)	(0.215)
SkilledP		-0.3163	-0.4292
		(1.771)*	(2.455)**
UnskP		-0.3042	-0.571
		(1.540)	(2.882)***
Nonprod		-0.3373	-0.5937
		(1.989)**	(3.629)***
Apprent		-0.6177	-0.7907
		(2.081)**	(2.644)***
union_dummy			0.1032
			(1.031)
unionzd_firm			0.6883
			(2.445)**
un_rate			-0.006
			(1.816)*
food_bev			0.1793
			(2.092)**
leather			0.1765
			(1.688)*
wood_fur			0.0276
			(0.294)

foreign			0.326
			(2.059)**
public			-0.0166
			(0.205)
small			-0.6361
			(5.206)***
medium			-0.3464
			(3.693)***
addis			0.1532
			(2.302)**
Constant	-1.1369	-0.6352	-0.0664
	(10.712)***	(2.963)***	(0.252)
Observations	491	491	457
R-squared	0.357	0.405	0.529

Robust t statistics in parentheses

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

APPENDIX B-5.
Returns using firm fixed effect specifications
All sample versus by gender **(Ethiopia)**

	All Sample		Men	Women
	(1)	(2)	(3)	(4)
Female	-0.094			
	(2.76)**			
Educyrs	0.046	0.045	0.042	0.049
	(11.27)**	(11.08)**	(9.16)**	(3.93)**
Expr	0.026	0.027	0.024	0.016
	(8.04)**	(8.38)**	(6.70)**	(1.350)
Exprsq	0.000	0.000	0.000	0.000
	(6.52)**	(6.67)**	(5.27)**	(2.00)*
Tenure	0.016	0.015	0.011	0.019
	(2.52)*	(2.39)*	(1.510)	(1.080)
Tenuresq	0.000	0.000	0.000	0.000
	(1.450)	(1.380)	(0.440)	(0.480)
Prof	-0.212	-0.227	-0.240	-0.293
	(3.07)**	(3.30)**	(3.02)**	(1.270)
SkilledP	-0.475	-0.481	-0.505	-0.652
	(7.68)**	(7.77)**	(7.15)**	(2.97)**
UnskP	-0.907	-0.924	-0.988	-0.914
	(13.22)**	(13.50)**	(12.44)**	(4.01)**
Nonprod	-0.859	-0.895	-0.953	-0.865
	(13.25)**	(14.06)**	(12.34)**	(4.20)**
Apprent	-1.244	-1.255	-1.316	-1.047
	(11.53)**	(11.61)**	(10.97)**	(2.43)*
Constant	0.562	0.559	0.651	0.653
	(6.24)**	(6.20)**	(6.32)**	(2.17)*
Observations	2220	2221	1729	491
Number of id	344	344	337	197

Absolute value of t-statistics in parentheses
* significant at 5% level; ** significant at 1% level

APPENDIX B-6

Regression outputs for the whole sample (Nigeria)

	Individual character only		Full model With institutions and other	
	Basic	With Occupation Controls	Firm level Controls+	
	(1)	(2)	(3)	(4)
Female	-0.2374	-0.1885	-0.1525	-0.2303
	(2.931)***	(2.097)**	(1.777)*	(2.629)***
Educyrs	0.1384	0.1105	0.0913	0.0956
	(14.189)***	(9.536)***	(7.946)***	(8.264)***
Expr	0.0379	0.0352	0.0147	0.0246
	(3.013)***	(2.766)***	(1.225)	(2.049)**
Exprsq	-0.0005	-0.0005	0.000	-0.0002
	(1.847)*	(1.805)*	(0.093)	(0.997)
tenure	0.0502	0.045	0.035	0.0255
	(3.500)***	(3.141)***	(2.617)***	(1.838)*
tenuresq	-0.0005	-0.0004	-0.0003	0.0001
	(1.001)	(0.757)	(0.687)	(0.180)
Prof		-0.1379	-0.3026	-0.239
		(0.995)	(2.285)**	(1.772)*
Tech		-0.4475	-0.6214	-0.6056
		(3.459)***	(4.893)***	(4.824)***
Offic_sal		-0.3918	-0.5394	-0.4535
		(3.635)***	(5.111)***	(4.251)***
service		-0.6014	-0.8456	-0.6989
		(4.147)***	(6.176)***	(4.898)***
prod		-0.3352	-0.4903	-0.4559
		(3.453)***	(5.243)***	(4.679)***
health		-0.4115	-0.5986	-0.602
		(2.361)**	(2.869)***	(2.889)***
union_dummy			0.2002	0.2653
			(1.820)*	(2.442)**
unionzd_firm			0.6245	0.3382
			(3.152)***	(1.506)
un_rate			-0.0067	-0.0021
			(3.055)***	(0.809)

chemical			0.0742	0.1383
			(0.638)	(1.207)
food_bev			0.1838	0.1536
			(1.937)*	(1.524)
leather			0.0754	0.1445
			(0.492)	(0.875)
metals			-0.2994	-0.2733
			(2.936)***	(2.551)**
pharmacy			0.1774	0.3009
			(1.437)	(2.388)**
plastics			-0.2353	-0.0768
			(2.536)**	(0.724)
tex_garm			0.0689	0.0417
			(0.669)	(0.399)
wood_fur			-0.2945	-0.1531
			(2.458)**	(1.181)
foreign			0.1765	0.3302
			(2.490)**	(4.751)***
public			-0.074	-0.2867
			(0.979)	(3.565)***
small			0.0465	-0.0209
			(0.584)	(0.250)
medium			0.0154	-0.0924
			(0.209)	(1.206)
Lagos			0.9186	
			(14.126)***	
north				-0.8223
				(14.586)***
Constant	2.9344	3.6617	3.7274	4.0523
	(16.406)***	(15.331)***	(14.908)***	(15.779)***
Observations	1645	1645	1600	1600
R-squared	0.15	0.16	0.325	0.287

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%
+ Note: Regional control dummy in Column 3 is 'Lagos', and in column 4 it is 'north'.

APPENDIX B-7:

Regression outputs for public enterprises sub-sample (Nigeria)

	Individual Character only		**Full model With Institutions and other Firm level Controls+**	
	Basic	**With Occupation Controls**		
	(1)	**(2)**	**(3)**	**(4)**
FEMALE	-0.0584	-0.0859	-0.1233	-0.1325
	(0.502)	(0.738)	(1.139)	(1.103)
Educyrs	0.1621	0.1567	0.1268	0.1288
	(5.524)***	(3.488)***	(4.663)***	(3.989)***
Expr	-0.0114	-0.0165	0.0046	0.0031
	(0.436)	(0.534)	(0.162)	(0.109)
Exprsq	0.0006	0.0007	0.0003	0.0003
	(1.072)	(1.000)	(0.498)	(0.569)
tenure	0.0124	0.0095	0.0168	0.015
	(0.472)	(0.287)	(0.624)	(0.507)
tenuresq	0.0007	0.0008	0.0005	0.0006
	(0.718)	(0.692)	(0.470)	(0.466)
Prof		-0.0809	-0.1732	-0.1701
		(0.293)	(0.558)	(0.545)
Tech		-0.2014	-0.5499	-0.5507
		(0.764)	(2.098)**	(2.088)**
Offic_sal		-0.0783	-0.2522	-0.2435
		(0.254)	(0.868)	(0.785)
service		-0.1735	-0.4769	-0.4631
		(0.534)	(1.844)*	(1.643)
prod		-0.031	-0.4382	-0.4277
		(0.100)	(1.697)*	(1.606)
health		0.2027	-0.0987	-0.0742
		(0.458)	(0.252)	(0.180)
union_dummy			0.3151	0.3199
			(1.401)	(1.406)
unionzd_firm			-4.3482	-4.0912
			(2.811)***	(2.584)**
un_rate			0.0339	0.032
			(2.641)***	(2.410)**
chemical			0.6961	0.6488

			(1.568)	(1.456)
food_bev			-1.407	-1.3415
			(2.882)***	(2.800)***
leather			...	...
			...	...
metals			-0.2001	-0.1715
			(1.351)	(0.896)
pharmacy			0.2434	0.2753
			(0.477)	(0.511)
plastics			...	...
			...	...
tex_garm			-0.4221	-0.3933
			(2.088)**	(1.550)
wood_fur			1.0243	0.8989
			(2.049)**	(1.739)*
foreign			0.7551	0.6833
			(2.089)**	(1.934)*
public			...	...
			...	...
small			...	...
			...	...
medium			0.8953	0.805
			(2.229)**	(1.949)*
Lagos			...	
			...	
north				-0.0572
				(0.251)
Constant	2.7939	2.9921	3.5896	3.5975
	(7.290)***	(3.971)***	(5.325)***	(5.427)***
Observations	131	131	128	128
R-squared	0.331	0.337	0.493	0.494

Robust t statistics in parentheses

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

+ Note: Regional control dummy in Column 3 is 'Lagos', and in column 4 it is 'north'.

APPENDIX B-8

Regression outputs for women sub-samples (Nigeria)

	Individual character only		Full model With Institutions and other Firm level Controls+	
	Basic	With Occupation Controls		
	(1)	(2)	(3)	(4)
Educyrs	0.1842	0.1877	0.1695	0.1711
	(6.140)***	(5.198)***	(4.694)***	(4.615)***
Expr	0.0307	0.0331	0.0093	0.0252
	(0.860)	(0.918)	(0.265)	(0.659)
Exprsq	-0.0002	-0.0002	0.0003	-0.0001
	(0.226)	(0.253)	(0.316)	(0.129)
tenure	0.0832	0.076	0.0657	0.0641
	(2.448)**	(2.174)**	(1.825)*	(1.700)*
tenuresq	-0.0015	-0.0013	-0.0014	-0.0013
	(1.418)	(1.280)	(1.380)	(1.234)
Prof		-0.0351	-0.3021	-0.1312
		(0.099)	(0.872)	(0.355)
Tech		0.0516	-0.6184	-0.2084
		(0.181)	(1.186)	(0.448)
Offic_sal		-0.2119	-0.417	-0.2977
		(0.783)	(1.449)	(0.981)
service		-0.173	-0.6026	-0.4181
		(0.456)	(1.591)	(1.060)
prod		-0.0417	-0.3952	-0.2365
		(0.135)	(1.307)	(0.715)
health		-0.3535	-0.7475	-0.6075
		(1.202)	(2.087)**	(1.621)
union_dummy			0.329	0.3699
			(1.133)	(1.292)
unionzd_firm			0.147	0.1846
			(0.291)	(0.312)
un_rate			-0.0035	-0.0022
			(0.603)	(0.314)
chemical			-0.0731	-0.0029
			(0.285)	(0.011)
food_bev			0.2186	0.2764
			(0.845)	(1.047)

leather			0.6008	0.6118
			(1.657)*	(1.600)
metals			0.1989	0.2128
			(0.714)	(0.716)
pharmacy			-0.0084	0.18
			(0.033)	(0.673)
plastics			-0.2809	-0.1839
			(1.047)	(0.598)
tex_garm			0.1968	0.1414
			(0.759)	(0.520)
wood_fur			-0.2112	-0.0727
			(0.803)	(0.251)
foreign			0.2782	0.4457
			(1.384)	(2.267)**
public			-0.0251	-0.3032
			(0.164)	(1.760)*
small			0.1025	0.0117
			(0.512)	(0.055)
medium			0.1954	0.0897
			(1.094)	(0.475)
Lagos			0.8646	
			(5.066)***	
north				-0.5544
				(3.613)***
Constant	1.9964	2.1083	2.2757	2.331
	(4.493)***	(3.168)***	(2.937)***	(2.994)***
Observations	287	287	276	276
R-squared	0.188	0.194	0.345	0.285

Robust t statistics in parentheses

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

+ Note: Regional control dummy in Column 3 is 'Lagos', and in column 4 it is 'north'.

APPENDIX B-9
Returns using firm fixed effect specifications
All sample versus by gender **(Nigeria)**

	All Sample		**Men**	**Women**
	(1)	**(2)**	**(3)**	**(4)**
FEMALE	-0.118			
	(2.74)**			
Educyrs	0.075	0.079	0.064	0.111
	(11.21)**	(11.88)**	(9.23)**	(4.74)**
Expr	0.032	0.037	0.039	-0.019
	(5.22)**	(6.11)**	(6.14)**	(0.890)
Exprsq	0.000	0.000	0.000	0.001
	(2.66)**	(3.24)**	(3.74)**	(1.630)
Tenure	0.049	0.046	0.037	0.059
	(6.16)**	(5.84)**	(4.38)**	(2.55)*
Tenuresq	-0.001	-0.001	-0.001	-0.001
	(3.82)**	(3.57)**	(2.43)*	(1.950)
Prof	-0.253	-0.250	-0.243	-0.332
	(3.86)**	(3.79)**	(3.68)**	(1.380)
Tech	-0.472	-0.440	-0.509	-0.723
	(6.70)**	(6.22)**	(7.44)**	(1.660)
offic_sal	-0.495	-0.521	-0.535	-0.792
	(8.97)**	(9.65)**	(9.13)**	(4.14)**
Service	-0.835	-0.824	-0.890	-0.903
	(11.50)**	(11.32)**	(11.86)**	(3.46)**
Prod	-0.656	-0.634	-0.647	-0.998
	(13.02)**	(12.54)**	(12.88)**	(4.79)**
Health	-0.361	-0.436	-0.330	-1.044
	(2.80)**	(3.46)**	(1.470)	(3.83)**
Constant	4.325	4.197	4.482	4.277
	(31.64)**	(31.26)**	(31.84)**	(9.17)**
Observations	1645	1647	1358	287
Number of id	216	216	216	164

Absolute value of t-statistics in parentheses
* significant at 5% level; ** significant at 1% level

APPENDIX B-10

Basic Statistics of variables used in regressions

	Ethiopia			Nigeria		
Variable Name	No. of Obs	Mean	Std. Dev.	No. of Obs	Mean	Std. Dev.
Female	2300	0.22	0.41	1757	0.18	0.38
lnhrwag	2245	0.73	0.92	1736	5.44	1.34
educyrs	2294	10.19	3.88	1756	12.58	3.23
expr	2302	12.88	11.15	1754	17.37	9.63
exprsq	2302	290.36	575.12	1754	394.49	442.41
tenure	2271	7.62	7.88	1673	7.83	6.54
tenuresq	2271	120.11	231.63	1673	104.12	174.51
mgt	3900	0.03	0.17	1774	0.14	0.35
Prof	3900	0.06	0.23	1774	0.07	0.25
SkilledP/Tech	3900	0.25	0.44	1774	0.06	0.24
UnskP / Offic_sal	3900	0.10	0.30	1774	0.18	0.38
Nonprod / service	3900	0.13	0.34	1774	0.09	0.28
Apprent / prod	3900	0.02	0.12	1774	0.44	0.50
health	...	...	...	1774	0.01	0.12
union_dummy	2284	0.23	0.42	1756	0.37	0.48
unionzd_firm	3780	0.18	0.38	1712	0.51	0.50
un_rate	3740	14.14	32.89	1721	42.87	44.30
chemical	...	...	...	1760	0.11	0.32
food_bev	3900	0.28	0.45	1760	0.14	0.35
leather	3900	0.06	0.24	1760	0.02	0.15
metals	...	...	...	1760	0.14	0.35
pharmacy	...	...	...	1760	0.08	0.27
plastics	...	...	...	1760	0.09	0.28
tex_garm	3900	0.04	0.19	1760	0.13	0.33
wood_fur	3900	0.53	0.50	1760	0.06	0.23
foreign	3830	0.05	0.21	1760	0.44	0.50
public	3900	0.07	0.25	1760	0.08	0.27
small	3870	0.46	0.50	1760	0.28	0.45
medium	3870	0.35	0.48	1760	0.35	0.48
large	3900	0.19	0.39	1760	0.38	0.49
Lagos	...	...	...	1760	0.42	0.49
north	...	...	...	1760	0.22	0.41
addis	3900	0.44	0.50	...	...	...

APPENDIX C-1.

Determinants of firm level gender wage gaps

	Nigeria			Ethiopia	
	(1)	(2)	(3)	(4)	(5)
chemical	-0.0038	-0.0042	-0.0037	...	...
	(0.580)	(0.616)	(0.545)	...	...
food_bev	-0.0039	-0.0046	-0.0047	0.1728	0.131
	(0.668)	(0.786)	(0.802)	(2.580)**	(1.901)*
leather	-0.0093	-0.012	-0.0111	0.1465	0.1663
	(0.477)	(0.647)	(0.598)	(1.720)*	(1.887)*
metals	0.0045	0.0037	0.0046	...	...
	(0.739)	(0.616)	(0.780)	...	...
pharmacy	-0.0099	-0.0101	-0.0091	...	...
	(1.274)	(1.304)	(1.201)	...	...
plastics	-0.0074	-0.0112	-0.0099	...	...
	(0.630)	(0.920)	(0.858)	...	...
tex_garm	0.0105	0.0092	0.0092	...	...
	(1.632)	(1.462)	(1.475)	...	...
wood_fur	0.0192	0.0191	0.0204	0.2071	0.1711
	(2.452)**	(2.444)**	(2.539)**	(2.945)***	(2.541)**
unionzd_firm	0.0193	0.0199	0.0176	0.5112	0.5103
	(2.055)**	(2.113)**	(1.897)*	(0.814)	(0.842)
un_rate	-0.0003	-0.0003	-0.0003	-0.0069	-0.0068
	(2.721)***	(2.806)***	(2.422)**	(1.109)	(1.149)
foreign	-0.0078	-0.007	-0.0066	-0.0846	-0.0253
	(1.652)	(1.454)	(1.400)	(1.597)	(0.489)
public	-0.0135	-0.0154	-0.0176	-0.1339	-0.1151
	(2.306)**	(2.465)**	(2.776)***	(2.910)***	(2.488)**
small	-0.0063	-0.0055	-0.006	0.5021	0.4496
	(1.171)	(1.021)	(1.089)	(4.606)***	(4.248)***
medium	-0.0045	-0.0034	-0.0039	0.122	0.1255
	(0.987)	(0.742)	(0.860)	(1.829)*	(1.878)*
train_op	-0.0084	-0.0082	-0.0084	-0.0444	-0.0459
	(1.988)**	(1.973)*	(2.046)**	(0.848)	(0.877)
north	...	0.007	...	...	...
	...	(1.462)	...	...	...
Lagos	...	...	-0.0074	...	...
	...	...	(1.945)*	...	...

addis	...	...	...	...	-0.1954
	...	...	...	...	(3.498)***
Constant	-0.0128	-0.0143	-0.0105	0.0895	0.2312
	(1.989)**	(2.199)**	(1.499)	(1.058)	(2.721)***
Observations	162	162	162	284	284
R-squared	0.199	0.211	0.218	0.236	0.260

Robust t statistics in parentheses

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

Dependent variable=Fitted firm level men-women wage gap

APPENDIX C-2
Summary of specifications and decomposition results

a) Summary of wage decomposition specifications

	Decomposition Method	Specification	Equation number
1	Oaxaca-Blinder – I *(Using female Coefficients)*	$(\overline{X'}_m - \overline{X'}_w)\hat{\beta}_w + \overline{X'}_m(\hat{\beta}_m - \hat{\beta}_w)$	12
2	Oaxaca-Blinder – II *(Using male Coefficients)*	$\hat{\beta}_m(\overline{X'}_m - \overline{X'}_w) + \overline{X'}_w(\hat{\beta}_m - \hat{\beta}_w)$	13
3	Non-Discriminatory *(Cotton-Neumark)*	$\sum\hat{\beta}^*(\bar{x}'_m - \bar{x}'_w) + \sum\bar{x}'_m(\hat{\beta}_m - \beta^*) + \sum\bar{x}'_w(\hat{\beta}^* - \hat{\beta}_w)$	14

b) Results Summary: Gender wage gap components (with worker characteristics only).

	Etiopía				Nigeria			
Eq. No.	Explained*	Un-explained**	Men's Treatment Advantage	Women's Treatment Disadvantage	Expl.*	Un-explained*	Men's Treatment Advantage	Women's Treatment Disadv.
12	69%	31%	…	…	18%	82%	…	…
13	64%	36%	…	…	55%	45%	…	…
14	57%	43% (16+27)	16%	27%	48%	52 % (14+38)	14%	38%

c) Results Summary: Gender wage gap components (worker and firm characteristics).

	Etiopía				Nigeria			
Eq. No.	Explained*	Un-explained**	Men's Treatment Advantage	Women's Treatment Disadvantage	Expl.*	Un-explained*	Men's Treatment Advantage	Women's Treatment Disadv.
12	58%	42%	…	…	14%	86%	…	…
13	60%	40%	…	…	23%	77%	…	…
14	60%	40 % (9+31)	9%	31%	22%	78% (15+63)	15%	63%

* Human Capital or Skill differential
** Treatment Differential (Discrimination)

APPENDIX C-3

Contributions of individual and firm characteristics to 'explained' and 'unexplained' components of total gender wage gaps **(Ethiopia)**

	Cotton-Neumark Procedure			**Oaxaca-Blinder Procedure**			
	Unexplained			Using women's Coefficients		Using men's Coefficients	
Variable Name	Men's Adv.	Women's Disadv.	**Explained**	**Unexpl.**	**Explained**	**Unexpl.**	**Explained**
educyrs	17%	63%	20%	82%	18%	73%	27%
expr	-58%	-165%	323%	-213%	313%	-256%	356%
exprsq	0%	0%	100%	0%	100%	0%	100%
tenure	20%	74%	6%	96%	4%	89%	11%
tenuresq	21%	74%	4%	96%	4%	94%	6%
Prof	24%	118%	-42%	153%	-53%	106%	-6%
SkilledP	8%	10%	83%	13%	87%	34%	66%
UnskP	27%	105%	-32%	136%	-36%	120%	-20%
Nonprod	-12%	-118%	229%	-152%	252%	-52%	152%
Apprent	11%	13%	77%	17%	83%	46%	54%
unionzd_firm	15%	70%	15%	90%	10%	65%	35%
un_rate	16%	77%	7%	100%	0%	70%	30%
food_bev	-51%	-283%	433%	-366%	466%	-223%	323%
leather	6%	35%	60%	45%	55%	25%	75%
wood_fur	21%	33%	46%	43%	57%	94%	6%
foreign	22%	77%	1%	100%	0%	99%	1%
public	25%	125%	-50%	162%	-62%	110%	-10%
small	-5%	-7%	112%	-9%	109%	-22%	122%
medium	68%	265%	-233%	343%	-243%	300%	-200%
addis	1%	5%	93%	7%	93%	5%	95%
Constant	23%	77%	0%	100%	0%	100%	0%
Average	**9%**	**31%**	**60%**	**40%**	**60%**	**42%**	**58%**

APPENDIX C-4

Contributions of individual and firm characteristics to 'explained' and 'unexplained' components of total gender wage gaps **(Nigeria)**

	Cotton-Neumark Procedure			**Oaxaca-Blinder Procedure**			
	Unexplained			Using women's Coefficients		Using men's Coefficients	
Variable Name	Men's Adv.	Women's Disadv.	**Explained**	**Unexpl.**	**Explained**	**Unexpl.**	**Explained**
educyrs	17%	81%	2%	98%	2%	96%	4%
expr	13%	40%	47%	49%	51%	74%	26%
exprsq	28%	66%	6%	80%	20%	161%	-61%
tenure	28%	103%	-31%	125%	-25%	159%	-59%
tenuresq	26%	83%	-8%	100%	0%	147%	-47%
Prof	-1%	-3%	104%	-3%	103%	-6%	106%
Tech	1%	0%	99%	0%	100%	4%	96%
Offic_sal	-3%	-62%	165%	-75%	175%	-19%	119%
service	24%	128%	-52%	155%	-55%	137%	-37%
prod	7%	18%	75%	22%	78%	38%	62%
health	1%	45%	54%	55%	45%	5%	95%
union_dummy	30%	115%	-45%	139%	-39%	175%	-75%
unionzd_firm	16%	63%	21%	76%	24%	95%	5%
un_rate	15%	57%	29%	69%	31%	83%	17%
chemical	15%	100%	-15%	121%	-21%	87%	13%
food_bev	7%	39%	54%	47%	53%	39%	61%
leather	19%	82%	-1%	100%	0%	108%	-8%
metals	20%	64%	16%	78%	22%	112%	-12%
pharmacy	17%	142%	-59%	171%	-71%	98%	2%
plastics	-9%	-27%	136%	-33%	133%	-52%	152%
tex_garm	27%	91%	-18%	111%	-11%	156%	-56%
wood_fur	13%	50%	37%	60%	40%	74%	26%
foreign	36%	133%	-69%	161%	-61%	209%	-109%

public	18%	87%	-5%	106%	-6%	102%	-2%
small	16%	81%	2%	98%	2%	94%	6%
medium	17%	83%	0%	100%	0%	98%	2%
Lagos	7%	28%	65%	34%	66%	39%	61%
Constant	17%	83%	0%	100%	0%	100%	0%
Average	**15%**	**63%**	**22%**	**77%**	**23%**	**86%**	**14%**

APPENDIX C-5: Selected Empirical Studies on Gender Pay Inequality

Author/s	Year	Country/survey year	Type of Data Used	Methodology Applied	Summarized Results	Gender Gap
Apleton, Simon; John Hoddinott and Pramila Krishnan	1999	Ethiopia (1990); Cote d'Ivoire (1985, 1986 and 1987); and Uganda (1992)	Survey of Adolescent Fertility, Reproductive Behavior and Employment Statistics of the Youth Population in Urban Ethiopia (1990); Living Standards Measurement Survey - LSMS - of Cote d'Ivoire (1985, 86 and 87); and Integrated Survey of Uganda (1992)	Mincerian Log Wage Equation with Oaxaca and Neumark Decompositions	Unexplained differences between men and women returns account for much of the gender wage gap in Ethiopia (119%) and Uganda (74%); but very much less in Cote d'Ivoire	24% for Ethiopia; 33% for Uganda and 3% for Cote d'Ivoire
Armitage, J. and R. Sabot	1991	Kenya	Manufacturing Survey of Kenya (1980)	Oaxaca decomposition methodology	No gender discrimination in both the Public and Private Sectors	NA
Horton, Susan	1996	India, 1987-88, Indonesia, 1980 and 1990 Indonesia, 1990 Thaiand, 1980 and 1990	A volume covering Seven East Asian countries	Oaxaca method, and Oaxaca-Neumark type methods	At least half of the gap in Earnings between men And women is due to differences in returns to characteristics (i.e. discrimination.)	Women' wage as a percent of men 58% for urban and 51% for rural employees (India) 38% for urban and 38.6% for rural employees (Indonesia 1980) and 54.4% for urban and 50.2% for rural employees (Indonesia 1990); and 84.3 in 1980 and 89.9% in 1990 for Thailand.

Author/s	Year	Country/survey year	Type of Data Used	Methodology Applied	Summarized Results	Gender Gap
Knight, J.B. and R.H. Sabot	1982 and 1991	Tanzania	Survey of manufacturing employees from (urban) establishment based survey of 1971	Oaxaca type	There are large differences in mean wages by both and race. Whereas the sex difference in mean wages can be explained mainly in terms of sex differences in personal characteristics, the race difference is mainly the result of wage and job discrimination	37%; but almost entirely explained by differences in economic characteristics
Majumder and Begum	2000	Bangladesh 1990 and 1997	Manufacturing survey datasets	NA	NA	Women garment Workers get About 58% of Men's.
Psacharopoulos and Tzannatos	1992	21 studies on 15 different Latin American countries.	A volume covering 15 Latin American countries	Oaxaca type methodology	About a third of the 30% Wage premium for men is Unexplained (discrim.)	Women get on Average 70% of Men's wages
Siphambe, Happy Kufigwa; and Malebogo Thokweng-Bakwena	2001	Botswana	Labor Force Survey (1995/96) of the formal Sector	Human Capital Model and the Oaxaca decomposition methodology	There is relatively less discrimination in the public sector; while in the private sector discrimination against women is a major factor in earnings differences	Gap (calculated as 1-wf/wm times 100) is 19% for Public sector, 33% of which is unexplained. The gap for private sector is 27% and more than 66% of that is unexplained (is attributed to discrimination).

Author/s	Year	Country/survey year	Type of Data Used	Methodology Applied	Summarized Results	Gender Gap
US Bureau of Labor Statistics	2000	US, 2000	Survey of different occupations across the US	NA	NA	Women full time workers get about 76% of men's. Result differs by occupation
Verner, Dorte	2001	Zimbabwe 1993	Manufacturing Survey data	Joint Estimation of wages and productivity where the LHS is a vector containing 2 dependent variables (wages and productivity); and the RHS is a vector of firm and worker level characteristics.	Female Employees are paid significantly less by about 13%; but no significant productivity gap between genders - and all the 13% gap (i.e. 100% of it) is attributed to discrimination	All the 13%
Blau, Francine D. and Lawrence M. Kan	2004	Data covering 22 European countries over the 1985-1994 period	Various micro datasets from household and labor force surveys	Oaxaca type for full time workers only.	In all the 22 countries considered, gender wage gap is substantial. The gap ranges from 14% for Slovania to 85% for Japan.	The unexplained gender wage gap (discrimination) is between 15% (for Slovania) and 78% (for Japan).

APPENDIX C-6

The Cotton-Neumark decomposition procedure

In what follows below, we will see that changing the basic Oaxaca-Blinder assumption of a differing wage structure into one that assumes *'no-discrimination'* in the labor market, and comparing the actual wage structures faced by men and women with this hypothetical labor market situation not only provides us with a single measure of '*discrimination*' component rather than a range, but it also enables us to decompose the 'discrimination' component further into men's advantage and women's disadvantage in the way they are treated in the labor market.

In the absence of discrimination, as pointed out, we would have equal wage structures (similar relationships between wages and each of these supply side factors) for both gender groups in the economy. In other words, had there been no discrimination in the labor market, the only reason for wage differences would only be differences in productivity characteristics. This implies that the wage structures faced by men and women should be the same if both gender groups are equally treated by labor market outcomes. If not, that is if discrimination exists, it may result from a combination of favoring one group, or doing the reverse for the other group by the employer. The discrimination component it self, therefore, can be decomposed further in to two parts that re-enforce each other – advantage of being in the favored group (men) and a disadvantage associated with being in the 'discriminated' group (women).

Let β^* be a non-discriminatory wage distribution that is common to both men and women in the economy. This shows a wage structure where equal remuneration would be paid to equal human capital characteristics, irrespective of gender. Therefore in such a non-discriminatory wage structure, we should get that $\beta^* = \beta_m = \beta_w$ where β_m and β_w refer respectively to the wage structures faced by men and women. The purpose here is to redefine the decomposition component with respect to β^*.

Becker, in the above mentioned work, defined a competitive labor market discrimination coefficient (D) for different labor with different productivity as the difference between observed wage ratio and the wage ratio that would prevail in the absence of discrimination. In his investigation of gender wage differences, Oaxaca (1973) defined this coefficient in percentage terms as follows:

$$D = \frac{\overline{Wm}/\overline{Ww} - MPm/MPw}{MPm/MPw} \qquad (1)$$

Where $\overline{Wm}/\overline{Ww}$ is the observed average wage ratio of men to women; while MPm/MPw is the ratio of their average marginal products. In the absence of discrimination, by assumption, this ratio of average marginal products is equal to the average wage ratio (and thus D would be equal to zero).

If we rewrite the above equation in terms of the ratio of wages of men to that of women, we will have:

$$\frac{\overline{Wm}/\overline{Ww}}{MPm/MPw} - 1 = D \qquad (2)$$

which implies that:

$$\frac{\overline{Wm}/\overline{Ww}}{MPm/MPw} = D + 1 \qquad (3)$$

which in turn is equivalent to:

$$\overline{W}m/\overline{W}w = \left(MPm/MPw\right)*(D+1) \qquad (4)$$

In logarithmic terms, equation (4) above can be expressed as the average wage differential between men and women as follows:

$$\ln \overline{W}m - \ln \overline{W}w = \ln MP_m - \ln MP_w + \ln(D+1) \qquad (5)$$

We can clearly see that the difference between the marginal products of the two gender groups in the right hand side of the above equation [$(ln(MP_m)\text{-}ln(MP_w))$] is a part of the total gender wage differential which is due to differences in productivity between men and women. The other part, [$ln(D+1)$], is what is termed as the 'discrimination' or 'treatment' component. Discrimination can happen both as a result of favoring one group over another or doing the reverse to the other group through unfavorable treatments. In most common definitions, including the O-B methodology, the latter is understood to be the case. In our augmented decomposition methodology here, we will decompose the treatment component it self further in to advantage of the favored group and disadvantage of the group 'discriminated against' compared with the condition that could have prevailed in the absence of discrimination.

Note that equation [5] above and equations [10, 12 and 13 of the OB procedure in the text] are equivalent in that they are all expressions of the measure of total gender wage gap (i.e. $\ln \overline{w}m - \ln \overline{w}w$). Recall that the first terms of the right hand sides of equations [12] and [13] of the OB measure the difference in wages due to differences in productivity (i.e. human capital) characteristics. They are, therefore, practically approximate estimates of [$LnMP_m - LnMP_w$]; while the second terms of equations [12] and [13] are estimates of the 'treatment' or discrimination component [Ln(D+1)] of equation [5], which technically measures wage differences due to differing 'returns to human capital'. The two alternative specifications of O-B (equations 12 and 13) also

represent two assumptions on the basis of which we can estimate the men-women wage ratio that would exist in the absence of discrimination.

As mentioned earlier, according to Oaxaca (1973), these assumptions are that, if there were no discrimination: a) The wage structure currently faced by women would also apply to men; and b) The wage structure currently faced by men would also apply to women. These mean that, in the absence of discrimination, women (men) would on average receive the same wages as they presently receive, but that discrimination takes the form of men (women) receiving more (less) than a non-discriminating labor market would have awarded them. Clearly, therefore, due to the prevalence of discrimination, these two specifications (above) result in to two different coefficients depending on which group's wage structure (men's or women's) we take as a basis. As pointed out earlier, Oaxaca treated this essentially as an 'index number' problem in his empirical works. He obtained estimates from both formulations and used these estimates to establish the range with in which the components' true values would presumably fall.

Rewriting the equation [12] of O-B discussed in the text by assuming that similar wage structures exist for both men and women in the absence of discrimination (i.e. $\beta^* = \beta_m^* = \beta_w^*$) instead of assuming varying wage structures ($\hat{\beta}_m > \hat{\beta}_w$), we will have:

$$\overline{LnWm} - \overline{LnWw} = \overline{X'}_m (\hat{\beta}^* - \hat{\beta}_w) + (\overline{X'}_m - \overline{X'}_w)\hat{\beta}^* \qquad (6)$$

The second term in the right hand side of the above equation (i.e., $\Sigma \hat{\beta}^* (\bar{x}'_m - \bar{x}'_w)$ represents the impact of current differences in men's and women's average productivity characteristics evaluated at the hypothetical market that would prevail in a no-discrimination case, and therefore is the true value of the '*skill*' component of the gender wage differential. With in this term, the first part ($\hat{\beta}^* \bar{x}'_m$) is the currently existing average pay off of men's productivity characteristics as they would be in a non-discrimination hypothetical scenario. Clearly, the difference between this term and the term in right hand side of the basic Oaxaca-Blinder specification (with no assumption of non-discriminatory wage structure) as put in equation [12] is a result due solely to

differences in the way men are currently treated (favorably) versus the way they would have been treated in the absence of discrimination, that is,

$$\sum \hat{\beta}_m \bar{x}'_m - \sum \hat{\beta}^* \bar{x}'_m = \sum \bar{x}'_m (\hat{\beta}_m - \beta^*) \qquad (7)$$

The whole term in equation [7] above, if positive, is clearly a part of the 'treatment component' of total wage differential between men and women which is due to men's '*treatment advantage*'.

On the other hand, there is another treatment component which is a mirror reflection of the above term which, if positive, measures women's pure '*treatment disadvantage*'. This treatment disadvantage of women is written as:

$$\sum \hat{\beta}^* \bar{x}'_w - \sum \hat{\beta}_w \bar{x}'_w = \sum \bar{x}'_w (\hat{\beta}^* - \hat{\beta}_w) \qquad (8)$$

From the above two equations, it then follows that the average of total wage differentials can be decomposed into three terms (as opposed to two as in the previous cases) as follows:

$$\ln \overline{W}_m - \ln \overline{W}_w = \sum \hat{\beta}^* (\bar{x}_m - \bar{x}'_w) + \sum \bar{x}'_m (\hat{\beta}_m - \beta^*) + \sum \bar{x}'_w (\hat{\beta}^* - \hat{\beta}_w) \qquad (9)$$

What the above specification is doing is basically to separate the treatment or discrimination component further into two elements: one the advantage (benefit) of being a male worker and the other, the disadvantage (cost) of being a female worker. In other words, the former measures the amount by which men's productivity characteristics are '*overvalued*' and the latter is the amount by which women's productivity characteristics are '*undervalued*'. Recall that in the Oaxaca (1973) specification discussed earlier, the term $\sum \hat{\beta}_m \bar{x}'_w$ measures the discrimination component with women's productivity characteristics hypothetically assigned with men's wage structure (that is what women would get with their human capital characteristics, if they were to face returns to these

characteristics similar to those of men). In the above reformulated specification (equation 9), on the other hand, the corresponding term ($\sum \hat{\beta} * \bar{x}'_w$) measures the values of women's returns to their human capital characteristics in a hypothetical situation where there is no gender discrimination (where both men and women face similar wage structures and returns to productivity characteristics).

What exactly is the difference between the basic O-B discrimination component (as represented in equations 12 and 13) and the one from the above extended specification? Recall again the general assumption that the wage structure for the advantaged group in the basic O-B specification ($\hat{\beta}_m$) is higher than the no-discrimination wage structure in the extended specification(β^*) – i.e. $\hat{\beta}_m > \beta^*$. Therefore, compared, for example, with the second specification of O-B method (equation 13) of the OB[1], the first term in the Right Hand Side (RHS) of the extended specification (representing wage gap due to differences in productivity characteristics) is smaller [for $\bar{x}'_m > \bar{x}'_w$]. Logically, therefore, it follows that the residual (representing the treatment component) which consists of the second and third terms of the RHS is larger than in the O-B specification. Compared with the extended decomposition specification, therefore, equation [13] version of the O-B procedure overestimates the 'true' productivity differences and underestimates the 'true' treatment (discrimination) components; while equation [12] version does the reverse.

Clearly, the above augmented (extended) specification goes a step forward in further decomposing the 'total discrimination component'. It is also worth noting here that this procedure overcomes the conventional 'index number' problem that was attributes to the O-B methodology. However, it also has its own limitations in its preferability for empirical analysis. This limitation is that the 'non-discriminatory' wage structure, $\hat{\beta}^*$, is a vector that is unobserved, and therefore has to be estimated. The usefulness of the whole specification for empirical work, therefore, depends of how this wage structure (distribution) is estimated. The estimation in general is based on the

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[1] The Oaxaca decomposition version as presented in equation 13 is:
$\ln \bar{w}w - \ln \bar{w}m = \beta_m(\bar{x}'_m - \bar{x}'_w) + \bar{x}'_w(\beta_m - \beta_w)$.

following three strong assumptions: 1) in the absence of discrimination, men would receive lower average wages than they currently do; while women would receive higher average wages than their current wages. This basically is saying like the '*treatment advantage'* of men and the '*treatment disadvantage'* of women would be removed or reduced, with the expected outcome of increased wages for women, and an opposite outcome for men (reduced wages).

Notationally, this assumption means that $\sum \hat{\beta}_m \bar{x}' > \sum \hat{\beta}^* \bar{x}' > \sum \hat{\beta}_w \bar{x}'$ (10)

2) The second assumption is that in the absence of discrimination, the market structure that would have prevailed will just be some function of the forces that currently determine the wage structures of the two gender groups. The simpler form of this assumption is that the wage structure that would have prevailed in the absence of discrimination $\hat{\beta}^*$ is just a linear function of the current wage structures (distributions) of men and women ($\hat{\beta}_m$ and $\hat{\beta}_w$ respectively).

3) The third assumption is that the non-discriminatory wage structure will be closer to the current wage received by men ($\hat{\beta}_m$) than to that received by women ($\hat{\beta}_w$). This last assumption can be taken care of by weighting the 'men' and 'women' wage structures by the respective proportions of men and women employed in the relevant labor force (i.e. manufacturing in our case). This weighting can take the average shares of men and women obtained from the managers or owners of the firms or, if we assume that the gender distribution of sampled workers is random and representative of the firm level distributions, we can use the gender distribution as obtained from our sample of workers data. Whichever weighting we use, the non-discriminatory wage structure therefore can be specified as:

$$\hat{\beta}^* = f_m \hat{\beta}_m + f_w \hat{\beta}_w \qquad (11)$$

where f_m and f_w represent the proportion of men and women respectively. In our survey data, 22.7 percent of the labor force working in our surveyed firms was female for Ethiopia and 18.7 percent were female for Nigeria. We will use these shares as weights to estimate the respective 'no-discrimination' wage structure ($\hat{\beta}^*$) using equation [11] above[2].

[2] It should be noted here that in the absence of discrimination, it is theoretically quite possible that more women would work. How more depends up on the elasticity of supply of women's labor. However, to make the analysis less complicated, we assume that such elasticity will not be that high to affect the current gender distribution of industrial workers in the two countries.

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