Formal versus Informal Labor Market Segmentation in Turkey in the course of Market Liberalization

Erdal Aydın, Mehtap Hisarcıklılar, İpek İlkkaracan[1]

Key Words: Labor Market, Informal Labor

JEL Code: O53, O17, J23

I. Introduction

The labor market in Turkey has been characterized by increasing segmentation into formal and informal sectors. Alongside the momentum of economic growth and development in the post-1980 market liberalization period, the informal sector continues to account for a substantial and growing segment of the labor market, as high as 56 per cent non-agricultural employment and 36 per cent of non-agricultural wage earners in 2007.

The growth of the informal labor market in Turkey has been deemed inevitable by demand-and supply-side factors simultaneously. On the demand side, increasing integration of Turkey into global markets, has intensified price competition and the pressures to minimize production costs in the tradables sectors. This has lead to a demand-lead growth in informal sector employment. On the supply side, massive rural-to-urban migration patterns, combined with privatization and declining share of public sector employment, has provided a work force ready to work under the dire conditions of informal sector employment.

This paper attempts to explore the current nature of labor market segmentation in Turkey into formal and informal sectors, and also to trace its transformation through time in a period of integration into global markets. We use Household Labor Force data for the 1988-2007 period, covering two decades of liberalization policies in Turkey. Based on this data, the paper explores the transformation in the formal versus informal sector shares of non-agricultural employment, in particular wage and salary earners, the worker profiles in the respective sectors with respect to age, education, tenure and gender; as well as the distribution of formal versus informal sector employment across different industries, occupations and regions.

[1] Erdal Aydın (aydinerda@gmail.com), Tillburg University, Center of Economic Research, Tillburg, the Netherlands, Mehtap Hisarcıklılar (hisarciklilar@itu.edu.tr) and İpek İlkkaracan (ilkkaracan@itu.edu.tr) are both at İstanbul Technical University, Faculty of Management, Maçka, Istanbul 34367, Turkey.

The paper explores the changes in the size of the wage gap between the two sectors through time, as well as any structural transformation in the dynamics of wage determination in the respective sectors. Finally using the Oaxaca decomposition method, we analyze the extent to which the formal-informal sector wage gap can be accounted for by *productivity differences* as reflected in human capital endowments, as well as industry and geographical distribution, versus *unexplained differences*.

The following section of the paper first addresses the concept of informality in labor markets and its different working definition. Section III provides a theoretical background of the treatment of formal versus informal sectors in labor markets, which has been explored for most part in the context of the segmentation literature, followed by an analytical summary of empirical findings from different countries as well as Turkey. Section IV introduces our data and methodology. Section V presents the results regarding informal versus formal sector transformations and wage differentials in the Turkish labor market from 1988 to 2007. Section VI concludes.

II. Theoretical Framework for the Formal – Informal Divide

Although the "formal" versus the "informal" divide has been first put forth by Hart (1971) in his analysis of the Ghanaian economy,[2] the origins of this concept can be traced back to the so-called *developmentalist* or *modernist* economists of the 1950s, whose characterization of developing economies rested on "economic dualism", the coexistence of "traditional" and "modern" sectors side by side. According to Lewis (1954), a member of this school of thought, the excess supply of labor that exists in the traditional (rural agricultural) sector in developing countries constitutes the main source of their economic dynamism. This excess supply of labor would be captured by the modern sector (urban industry) as the industrialization process proceeds, allowing industrial wage rates to remain low so long as the traditional sector exists. Lewis assumed this would result in high industrial profits and high rates of investment and accumulation. Hence, he pointed out the hidden potential of developing economies. As the labor surplus of the traditional sector is absorbed by the modern sector through the course of development, Lewis foresees that the average wage rate

[2] Hart (1971) defines the informal sector as the category which consists of self-employed workers.

would gradually start to increase, and differences between the two sectors would erode; or in other words, the traditional sector would be eliminated through the process of development.

While the elimination of the traditional rural agricultural sector in the course of development can be said to have taken place to a limited degree, what most developing economies have experienced instead was the emergence of a new economic dualism in the urban industrial context: The coexistence of a low-productivity, poor working conditions, low-income urban production sector side by side and in interaction with a high-productivity, relatively better working conditions, high-income production sector. As such the conceptualization in development economics of a dualistic economy entailing the "traditional" and the "modern" sectors evolved in time into discussions of "formal" and "informal" sectors of production and employment.

There have been several conceptualizations and definitions of the dividing line between the formal and the informal. A seminal ILO Report (1972) on Kenya introduces the first definition of "informal" sector production which entails subsistence level economic activities carried out by rural-to-urban migrants who have been unable to access entry into the modern urban labor markets. The report characterizes the informal sector as follows (ILO, 1972: quoted by Bromley, 1978): Unregulated and competitive markets where workers can enter easily; it relies on indigenous resources; family ownership of enterprises, small scale of operation with labor intensive and adapted technology; and labor skills acquired outside the formal school system.

As the ILO definition of informality included some level of ambiguity, the search for alternative definitions continued. The Fifteenth International Conference of Labor Statisticians which was held in 1993 characterized the informal sector as the part of the economy consisting of the categories of family enterprises with unpaid family and self employed workers, small scale enterprises (number of workers below some level) and the enterprises which do not have a legal status or which employ unregistered workers. In course of time, varying definitions of informal sector have commonly made use of the two criteria suggested in this above description; namely, the size of the enterprise (usually defined by the number of workers)[3] and the legal standing of the enterprise (non-tax paying) or the legal status of employment, i.e. the social security registration status of the workers. While the

[3] The number of employees working in the enterprise which is used to identify the scale of the workplace differs by the aim of the research and the country specific economic conditions.

scale of the enterprise is considered as an indicator of informality at level of the enterprise, the social security status is taken as a measure of informality at the level of the worker.

While the social security status of employment is a straightforward measure of informal sector, the scale of operation deserves more consideration. The reason for using the scale of enterprise as a measure of informality lies in the difficulty of monitoring and controlling small-scale economic units. These firms can employ unregistered workers or avoid certain legal obligations with much more ease than larger enterprises. On the other hand, it is also commonly observed that large scale enterprises revert to employment of unregistered workers as means for cost minimization and the increasingly relevant practice of subcontracting has become a suitable tool for these enterprises to perform informal economic activities. Because of this reason, the scale of enterprise is usually regarded as a necessary but not sufficient indicator of informality.

Economic Dualism and the Labor Market Segmentation Models

Interacting with the literature on the dualistic structure of developing country economies and the formal-informal divide, there has been a surge of literature in developed country contexts, suggesting the structural segmentation of their labor markets into primary sectors with good jobs and secondary sectors with bad jobs. These labor market segmentation theories which originated from "*the dual theory*" of Doeringer and Piore (Doeringer and Piore 1971; Piore 1975) strived to provide answers for a number of policy concerns of the 1960s and 1970s on labor market discrimination, employment and training of disadvantaged workers (immigrants, racial minorities, women), technological change and structural unemployment.

The analytical framework usually considers the labor market consisting of two main categories, the primary and secondary segments. The primary segment is characterized by highly qualified, permanent and upwardly mobile jobs in large-scale enterprises which enjoy higher wage levels, including social security, labor law protection and better working conditions. The secondary segment, on the other hand, is characterized by the reverse job characteristics, with little qualification requirements, temporary positions, no career ladders attached, low wage levels, limited access to social security coverage and labor law protective measures if any, and poor working conditions. A basic proposition of the segmentation theories has been that wage and employment setting mechanisms in the primary sector are ruled by a protective institutional structure while that in the secondary sector they are subject

to the raw forces of supply and demand. An additional proposition is the presumed lack of mobility of workers from the secondary to the primary sector jobs. As such the dualistic nature of the labor market provides an additional explanation for the part of the wage differentials unexplained by the human capital variables alone.

The empirical studies analyzing wage differentials based on the dual / segmented labor market approach use different categorical measures in order to define the segments.[4] These measures are based on job characteristics rather than human capital variables as the theory implies. In developed country applications, job characteristics have been typically defined on the basis of industry, product market, occupation characteristics, training requirements as well as institutional factors such as collective bargaining coverage (Leontaridi 1998). Applications of segmentation theory in developing economy contexts, on the other hand, have commonly made use of the informal versus the formal sector divide in defining primary and secondary segment jobs. Hence jobs were assumed to be allocated to different segments based on the size and legal status of the firm and social security registration status of workers.

This common methodology used in the empirical work is based on a priori segment determination, i.e. the number of segments in the labor market are predetermined by the researcher on the basis of job or industry characteristics. Then tests are conducted for differences in the wage equations for each segment using an augmented human capital earnings function. The expectation is that the returns to human capital, workplace and job characteristics will exhibit structural differences between the two sectors; and possibly that human capital variables will perform less well in secondary labor markets. The method of a priori segmentation has been subject to a critique of truncation or selection bias. Accordingly, distribution of workers among the different segments of the labor market, such as formal and informal sectors for example, might not necessarily be a random distribution but rather reflective of unobserved worker characteristics and choices such as abilities and motivation. Ignoring this selection mechanism would potentially cause a bias in wage estimation results. Hence the non-random allocation of workers across the different sectors must be taken into account in the estimation of the wage equations. As explained further in Section IV, this critique has been commonly addressed through employment of an additional selection term to correct for the so-called selectivity bias.

[4] This refers to applied empirical work which is based on the method of a priori segment determination where the number of segments in labor market are predetermined by the researcher on the basis of job or industry characteristics.

III. Findings on Formal- Informal Labor Market Segmentation in Developing Countries

While there is a wide array of empirical work on labor market segmentation in developed economies, primarily the U.S. and U.K. labor markets, for the purposes of this paper we will limit our scope to studies on developing economies' labor markets where segmentation and resulting wage differentials is commonly explored along the formal-informal sector divide.

In a comprehensive study on three Latin American countries (Argentina, Mexico, Venezuela) and three transition countries (Albania, Georgia, Ukraine), Pages and Stampini (2007) explore the labor market segmentation across formal and informal sectors and self-employment The skilled and unskilled labor markets are analyzed separately in order to see if the segmentation is an exclusive feature of the unskilled labor force. Using longitudinal data, the study also investigates mobility patterns and the wage differentials across the segments. Their results suggest that there is a wage premium in the formal sector compared to the informal sector in Latin American countries while there is no wage differential in transition countries. They also found evidence of mobility from informal jobs to formal jobs while the mobility between the formal sector and self-employment is limited. Finally relying on the obtained results they concluded that there is no significant difference between skilled and the unskilled labor in the contexts of wage differentials and mobility.

Another study with mixed results for different countries is by Marcouiller, Castilla and Woodruff (1997) using survey data from urban areas in El Salvador, Mexico and Peru. The paper analyzes the determination of sectoral allocation and whether informal sector workers earn lower than the observationally identical workers in the formal sector. They find that that there exists a wage premium associated with working in the formal sector in El Salvador and Peru, yet that the wage advantage is observed for the informal sector in Mexico.

A number of studies use more complicated layers of segmentation than simply the formal-informal divide. Gindling (1991) for instance, in her study of labor market segmentation in San Jose, Costa Rica, identifies the segments as the public and private formal sectors and the private formal and informal sectors. First using a chow test, the study compares the estimated wage equations for different sectors and then tests the hypothesis that based on the observed characteristics, identical workers have higher expected wages in the upper sector than in the lower sectors. Gindling (1991) reports that for 100% of workers in the public and private-formal sectors, the expected wage in the public sector is higher than private-formal sector and

for 91% of the private sector workers the expected wage in the private-formal sector is greater than the informal sector.

Heintz and Posel (2008) set out on an investigation of the puzzle of high unemployment co-existing with relatively low level of informal employment in South Africa. Using 2004 Labor Force Survey data, they estimate earning equations and report a substantial earning gap between formal and informal sectors as well as an earnings differential between the types of informal employment. They consider these results as an indication of complex segmentation in the South African labor market. Similarly, Günther and Launov (2006) investigate the hypothesis that the informal labor market also has a dual structure with one part of it being competitive to the formal sector and the other part being the result of segmentation. Taking into account the selection bias induced by the employment decision, they estimate wage equations for the upper and lower segments of informal sector for the urban labor market in Cote d'lvoire. They found that the upper segment in the informal labor market has a wage premium. Relying on the results they concluded that the informal sector entails both competitive and segmented employment.

Empirical Work on Formal-Informal Segmentation in the Turkish Labor Market

There are only a handful of studies exploring the formal-informal labor market segmentation in the Turkish labor market, and each study uses cross-section data belonging to different years. The first empirical work on the subject is by Ercan and Tunalı (1997), which uses the 1988 Household Labor Force Survey data to analyze the segmentation in the labor market by examining the wage differentials. They define the segments as the primary segment which consists of the labor force who work in the large-scale firms (more than 10 employees) and the secondary segment representing the part of labor force working in small-scale firms (10 or fewer employees). In order to identify the effect of segmentation on the wage levels they included the firm size variable as an additional explanatory variable in the estimated wage equations. The results show that the average monthly wage level in the large-scale firms is 27% greater than the small scale firms.

Tansel (1999a) analyzes wage differentials between formal and informal sectors in the Turkish labor market by using 1994 Household Expenditure Survey. The sectors are identified according to the social security status of the labor force; the wage earners who are covered by a social security program constitute the formal sector and the wage earners who are not

covered by any social security program make up the informal sector. In order to take account of sample selection bias in the wage estimations, the study first estimates the allocation of individuals in different sectors; this is followed by estimation of wage equations for both sectors; and for men and women separately. The results suggest that when controlled for observational characteristics and sample selection, the wages in the formal sector are at least twice as high as the wages in the informal sector at all education and experience levels.

The most recent study is by Levent, Taştı and Sezer (2004) which uses the 2003 Household Labor Force Survey. The study employs social security registration status of the worker as well as the legal structure and the size of the firm in order to identify the formal and informal sectors. To analyze the effect of segmentation on wage levels they estimated wage equations including dummy variables for different sector categories. Besides they estimated separate wage equations for the corresponding sectors. The results indicate the existence of a substantial wage premium in the formal sector after controlling for observable human capital and job related variables.

IV. Data and Methodology

In order to explore whether there is a segmented structure of the Turkish labor market across the formal and informal divide, this paper focuses particularly on non-agricultural wage and salary workers. The characteristics of these two sectors are highly consistent with the features of the primary and secondary segments defined within the dual labor market approach. The working definition of informal sector employed in this paper makes use of both the scale of workplace operation and worker social security status criteria discussed in Section II above. We define informal sector wage and salary earners as all workers who are employed without social security registration independent of the size of the workplace plus all those workers who are employed at workplaces with 10 or less workers, independent of their social security coverage. As shown by the data in Appendix 1, these two categories overlap to a large extent.

We adopt a two-stage estimation suggested by Trost and Lee (1984) to analyze the wage differentials between formal and informal sectors in the Turkish labor market for the years 1988 and 2007. The underlying idea of this two-stage modeling is the fact that the distribution of workers among formal and informal sectors is not random and that the unobserved worker characteristics influencing the sectoral allocation also have an influence on their wages. To

avoid the potential bias that arises from ignoring the non-random selection of workers to these sectors, a selectivity bias correcting term must be employed in estimation of the wage equations (Heckman and Hotz, 1986).

Assuming an individual faces M mutually exclusive alternatives to choose from, the market wage level in the s^{th} alternative and the maximum utility attainable from choosing the s^{th} alternative are given by the following equations (Lee, 1983; Trost and Lee, 1984; Bourguignon *et al*. 2001):

(1) $W_s = x_s \beta_s + u_s$

(2) $V = z_s \gamma_s + \eta_s \quad , \quad s=1,2,...,M$

where W and V denote, respectively, the wage level and the maximum utility. All variables (x_s and z_s) are assumed to be exogenous with $E(u_s \mid x, z) = 0$ and $Var(u_s \mid x, z) = \sigma_s^2$. The wage level for the s^{th} category is observed if and only if the individual chooses the s^{th} category, which happens when the maximum utility they obtain from choosing the s^{th} category is higher than choosing any other alternative.

(3) $V_s > \max_{j \neq s} V_j$

A selectivity bias occurs in wage regression if the disturbances in the wage and utility equations are correlated, in which case Ordinary Least Squares (OLS) estimates of β_s will be inconsistent.

Note that the expression in Eq. (3) is equivalent to

(4) $z_s \gamma_s > \varepsilon_s$

where $\varepsilon_s = \max_{j \neq s}(V_j - \eta_s)$.

Assuming that the stochastic parts of the utility functions (η_s) are independent and identically distributed with a Gumbel distribution, McFadden (1974) shows that this specification leads to multinomial logit model, where the probability that the s^{th} alternative will be chosen is given by

(5) $$P(z_s \gamma_s > \varepsilon_s) = \frac{\exp(z_s \gamma_s)}{\sum_{j=1}^{M} \exp(z_j \gamma_j)}.$$

Parameter estimates for the utility function ($\hat{\gamma}_j$) are obtained by maximising the likelihood function for this model.

In order to obtain the selectivity corrected estimates for the wage regression parameters, β_s, Lee (1983) proposes to apply the transformation $\varepsilon_s^* = \Phi^{-1}[F(z_s\gamma_s)]$, where Φ is the standard normal cumulative distribution function, and $F(z_s\gamma_s)$ is the cumulative distribution function for ε_s, which is given by

$$(6) \qquad F(z_s\gamma_s) = \frac{\exp(\varepsilon_s)}{\exp(\varepsilon_s) + \sum_{j=1, j\neq s}^{M} \exp(z_j\gamma_j)}$$

Note that this transformation is strictly increasing, and the random variable it transforms (ε_s^*) has a standard normal distribution. Assuming that the random variables u_s and ε_s are jointly normally distributed, the expected value of the disturbance term, u_s, conditional on the s^{th} category being chosen is given by the following expression

$$(7) \qquad E(u_s \mid z_s\gamma_s > \varepsilon_s) = -\sigma_s\rho_s \frac{\phi\left(\Phi^{-1}[F(z_s\gamma_s)]\right)}{F(z_s\gamma_s)}$$

where ϕ is the standard normal density and ρ_s is the correlation between u_s and ε_s^*. The wage equation (Eq.1) then takes the following form:

$$(8) \qquad W_s = x_s\beta_s - \sigma_s\rho_s \frac{\phi\left(\Phi^{-1}[F(z_s\gamma_s)]\right)}{F(z_s\gamma_s)} + v_s$$

where v_s is an independent random term. In the second part of this equation, the selectivity term (λ_s) is calculated by using the results of the multinomial logit estimations:

$$(9) \qquad \lambda_s = -\frac{\phi\left(\Phi^{-1}[F(z_s\gamma_s)]\right)}{F(z_s\gamma_s)} = -\frac{\phi(H_s)}{\Phi(H_s)}$$

where $F(z_s\gamma_s) = \frac{\exp(z_s\gamma_s)}{\sum_{j=1}^{M} \exp(z_j\gamma_j)}$, i.e. the probability of the individual selecting the s^{th} alternative.

A consistent estimate for wage equalition parameter vector (β_s) could be obtained by including this term in the wage equation, which is then estimated by OLS.

The second term of the wage equation (Eq.8) shows the difference between the wage level of an individual who is self-selected into a particular sector ($\lambda \neq 0$) and an individual in the same sector with the same observed characteristics, but is assigned randomly into that sector ($\lambda = 0$). Sign of the coefficient of the selection term ($\sigma_s \rho_s$) will therefore signal the dynamics of the selection mechanism. Noting that the sign of the selection term is negative by definition, a significant negative parameter estimate for this term will imply a positive sign for ρ_s[5], the correlation between u_s and ε_s^*. This could be interpreted as follows: Unobserved characteristics that are increasing the probability of an individual being in a particular sector also have an increasing impact on the wage that the individual receives in that sector. Similarly, a significantly positive sign for the selection term will imply a negative sign for ρ_s, which signals that unobserved characteristics that are increasing the probability of an individual being in a particular sector have a decreasing impact on the wage that the individual receives in that sector.

In order to identify the sources of wage differentials between sectors, we use the Oaxaca decomposition, which in the most general form could be written as:

$$(10) \qquad \overline{\ln w}_f - \overline{\ln w}_i = \bar{x}'_f(\hat{\beta}_f - \beta^*) + \bar{x}'_i(\beta^* - \hat{\beta}_i) + (\bar{x}_f - \bar{x}_i)'\beta^*$$

where *f* and *i*, respectively, stand for the formal and informal sectors, $\overline{\ln w}$ denote the mean log wage, $\bar{x}'$'s are vectors of mean values of the explanatory variables in the wage regressions, $\hat{\beta}$'s are the estimated coefficients, and β^* is the estimated non-discriminatory wage structure.

In his original work, Oaxaca (1973) suggests the adoption of the wage structure either for the advantaged or the disadvantaged group as the non-discriminatory wage structure (i.e. β^*) for the decomposition. Following Oaxaca (1973), various studies seek to find the appropriate representation for the wage structure in the absence of discrimination. Reimers (1983), for example, uses the arithmetic mean of the structures for the two groups while Cotton (1988) takes a simple weighted average of the observed structures for the two groups where the weights are proportions of the groups in the labour market. Neumark (1988), on the other hand, suggests to use the wage structure obtained from a pooled sample of both. After comparing four alternative approaches, Oaxaca and Ransom (1994) obtain that Neumark's

[5] Note that σ_s is always positive.

(1988) approach of using the pooled sample yields the smallest estimated standard errors for every estimated differential.

Following Oaxaca and Ransom (1994), we use the following expression for decomposition:

(11)

$$\overline{\ln w}_f - \overline{\ln w}_i = (\bar{x}_f - \bar{x}_i)'\hat{\beta}_p + \left[\bar{x}'_f(\hat{\beta}_f - \hat{\beta}_p) + \bar{x}'_i(\hat{\beta}_p - \hat{\beta}_i)\right] + (\hat{\lambda}_f - \hat{\lambda}_i)\hat{\theta}_p + \left[\hat{\lambda}_f(\hat{\theta}_f - \hat{\theta}_p) + \hat{\lambda}_i(\hat{\theta}_p - \hat{\theta}_i)\right]$$

where p stands for the pooled sample for all non-agricultural wage earners. $\overline{\ln w}$ denote the mean log wage, $\bar{x}'$'s are vectors of mean values of the explanatory variables in the wage regressions, $\hat{\beta}$'s are the estimated coefficients, $\hat{\lambda}$'s are the selectivity terms that are calculated using multinomial logit estimations, and $\hat{\theta}$'s are the parameter estimates for the selectivity terms.

The first term on the right hand side represents the total wage differential due to differences in the characteristics of workers (differences in education level, experience, occupation, etc.) and the second term in the brackets is the part of the wage differential that cannot be explained with the variation in the individual characteristics. This unexplained part is accepted as being due to differences in wage setting behavior of the two sectors. The other terms on the right hand side represent the wage differential due to the sample selection correction and they include both explained and unexplained parts of the wage differential.

We use micro-level data obtained from 1988 and 2007 Household Labor Force Surveys (HLFS) which are carried out by TURKSTAT. The 1988 HLFS is the first nationwide survey which implemented ILO standards and was conducted with 22,320 households. The 2007 HLFS, on the other hand, has a much wider sample of 129,527 households, and was the most recent survey data available at the time we started this study.

We restricted the dataset to individuals who are aged between15-65.[6] Agricultural workers as well as casual employees are also excluded from the data set. We defined the informal sector as including all non-agricultural wage earners who are not registered in a social security program (independent of size of workplace) and all workers who are working in a workplace with 10 or fewer employees. Since the 1988 and 2007 HLFS do not include any information about the ownership structure of the workplace, unfortunately, we cannot distinguish the

[6] The lower age limit is chosen to be 15 as it is the minimum legal age that a person can be employed. 65 is the upper limit as it is the retirement age in Turkey.

private sector from the public sector. The ownership of the workplace may affect the wage setting behavior and we pay attention to this issue in interpreting the results.

V. Findings

An overview of labor market transformations in Turkey

The transformation of the dualistic structure of the economy through the industrialization process as predicted by Lewis can be observed to some extent in Turkey as well. While the overwhelming majority of total employment used to be in agriculture in the 1950's (as high as 85% in 1950), by the 2000's, it had declined to as low as a quarter (25% in 2008). Nevertheless, industrial expansion seems to have generated only limited absorption capacity for the agricultural labor surplus. These limitations exert themselves primarily through two mechanisms. While segmentation in terms of the traditional versus the modern employment sectors is gradually being phased out, it is being replaced by segmentation by gender and by the urban, modern formal-informal sector divide.

In regards to the increasing gender segmentation of the labor market, the mechanism of industrial or urban modern sector absorption of the agricultural labor surplus can be said to have worked to a large extent for men but not women. Women have instead increasingly opted for non-participation.[7] Hence an important structural characteristic of the labor market in Turkey has been a very low and declining labor force participation rate from an already low 57.5 per cent in 1988 to an even lower 46.2 per cent in 2007. This is below the OECD average participation rate of 52.5 per cent (2007) of which Turkey is a member; and substantially lower than the EU-27 average of 65.4 per cent (2007), of which Turkey is an aspiring candidate member. The reason for low and declining average participation rates has to do with very low female participation, typically observed in the Middle Eastern Region. While with the male participation rate of 70.9 per cent (2007) is in line with the OECD and EU-27 male average participation rates; the 25.1 per cent female participation rate (2007) ranks Turkey as at the bottom of not only OECD and EU leagues but also amongst the bottom ten of world nations (UNDP 2008).

The gender disparity in participation rates is closely intertwined with disparity in the distribution of the employed according to work status (*Table 1*). While the majority of men (51%) in 2007 are in the category of wage and salary earners, followed by the self-employed

[7] See Ilkkaracan and Tunalı (2009) for a detailed discussion.

category as the second largest (29%), the majority of women are divided equally between the two categories of unpaid family workers, predominantly agricultural workers (40%) and wage and salary earners (40%). Hence the "traditional" versus "modern" dualism a la Lewis continues to exist for the female labor force well into the 2000's.

Nevertheless the category of *unpaid (agricultural) family workers* has constituted a declining share of total employment from 14 and 66 per cent for men and women respectively in 1988, to 6 and 40 per cent in 2007 parallel to the declining share of agricultural employment in total employment as mentioned above (*Table 1*). Despite the substantial contraction in this traditional form of employment however, we observe only a very limited decline in the share of the informal sector in overall employment from a high of three quarters in 1988 to a lower but still substantially high share of 69 per cent in 2007 (*Table 2*). The continued predominance of unpaid agricultural work for women accounts for some of the substantially high share of the informal sector in total employment. Yet another source has been the segmentation of the so-called modern, non-agricultural labor market into formal and informal sectors. A stable 59-60 per cent of men's *non-agricultural* employment has been in the informal sector over the past two decades, and amongst the *non-agricultural male wage and salary workers*, again a stable 36 to 38 per cent (*Table 2*). As far as women's *non-agricultural employment* is concerned, the share of the informal sector has been on a rise from 40 to 51 per cent; and for *non-agricultural female wage and salary workers* from 25 to 36 per cent, eleven percentage points increase in a span of two decades.

While the share of male informal sector employment amongst non-agriculture wage earners has remained a substantial but stable 36-37 per cent, *Table 3* shows that the inter-sectoral wage differential has undergone a major transformation. In 1988, the average formal sector male employee earned 37 per cent more than his informal sector counterpart, while by 2007, the difference had almost tripled to 92 per cent. For women the inter-sectoral wage differential was already substantial in 1988; the average female formal sector wage worker earned 91 per cent more than her informal sector counterpart. By 2007, the already high female inter-sectoral wage differential had increased even more, to a high of 113 per cent. Alongside the increasing wage disadvantage of the informal sector, it also suffers from substantially longer working hours than in the formal sector (*Table 3*). The average weekly working hours have increased for all categories of workers from 1988 to 2007, for men and women both in formal and informal sectors. There is a substantial gap of 8 to 9 hours of extra working hours for informal sector men; with only a slight increase from 1988 to 2007. While

for women, the inter sectoral gap in working hours has almost doubled from 3.6 hours in 1988 to 6.4 hours in 2007.

Figure 1 shows the educational profile of the two sectors. As expected, the formal sector in both years enjoys relatively better educated workers; and the educational level of the average worker has increased for both men and women in both the formal and the informal sectors through these 20 years. It is interesting to note here, however, that the informal sector is not the exclusive realm of the uneducated. There is a non-negligible share of high school and university graduates who are employed in the informal sector. Particularly in the case of women, as high as 34 per cent of female high school graduates and 14 per cent of female university graduates are in informal sector employment. The rest of the changes in the typical formal versus informal worker profiles namely age, occupation and industry are provided in Appendix 2.

Figures 2 through *7* explore the changes from 1988 to 2007 in the inter-sectoral wage and working hours differentials as well as the share of informal sector employment by education, age, industry, occupation, rural-urban location and region. When explored by education level, the largest inter-sectoral wage differential is for the secondary school graduates (formal wage 80 per cent more than the informal wage), followed by high school graduates 67 per cent), both of which also have the largest differential in working hours. By contrast in 1988, the largest gaps were in the lowest education category of illiterate (39 per cent), and the highest level of university (47 per cent) both of which remained stable to 2007 (*Figure 2*).

As expected the share of informal sector employment is largest in the youngest age category of 15-24 (a stable 57 per cent) followed by the oldest age category 55-64 (40 per cent in 1988, and as high as 54 per cent in 2007). Yet of the prime working age 25-34 employees as high as 36 per cent are also employed in the informal sector (*Figure 3*). The oldest category of 55-64 also has the highest wage gap (121 per cent) followed by the next oldest 45-54 (101 per cent).

As far as the industrial distribution is concerned, the three sectors of trade (64 per cent), construction (46 per cent) and transportation (40 per cent) have the largest shares of informal sector employment where approximately half or more of the wage works are in the informal sector. The wage gap in the trade and transportation sectors are 58 and 59 per cent respectively, while construction suffers from one of the highest wage gaps at 82 per cent. The largest industry wage gap is in the service sector at 98 per cent (*Figure 4*). The occupational distribution proceeds in a manner related to industries. The sales workers have the largest participation in informal sector amongst all occupations (58 per cent) with a wage differential

of 103 per cent. Yet it is also worth noting here that as high as 32 per cent of managers (with the highest wage differential of 130 per cent) and 26 per cent of associate professionals are also in the informal sector (*Figure 5*).

Wage regressions and the Oaxaca Decomposition Analysis

As explained in Section III, in the first stage of our analysis, we estimate the sectoral allocation of individuals by using multinomial logit modeling. We assume that there are five mutually exclusive alternatives that the individuals face:[8]

$$Y_i = \begin{cases} 0 & \text{if not working in the labor market} \\ 1 & \text{if working in the formal sector as a wage earner} \\ 2 & \text{if working in the informal sector as a wage earner} \\ 3 & \text{if self - employed or an employer} \\ 4 & \text{if an unpaid family worker} \end{cases}$$

In the model, education level of the individual is taken as a proxy for their human capital and is measured by six dummy variables for illiteracy, literacy without a diploma, primary, secondary, high school graduations and a university degree. The other variables considered to explain the distribution of individuals among the sectors are; dummies for gender, geographical location, residing in urban versus rural area, marital status, age category, being the head of household, sectoral status of the head of the household, and the numbers of children in the household who are aged 0-4 and 5-14. The models are estimated for the whole sample and also separately for male and females. The multinomial logit regression results are given in Appendix 3. The estimation results are to a large extent consistent with our expectations. As opposed to not working in the labor market, increasing levels of education have an increasing impact on the probabilities of being observed in all the other alternatives for both male and females, the impact being higher for the formal sector employment. Being married increases the probability of males working while it has a decreasing impact, if not insignificant, for females. People living in a rural area are more likely to be not working in the labor market as opposed to the ones in urban areas.

In the second stage of the analysis, we use the multinomial logit estimations to calculate the selection terms. We then estimate wage equations for the formal and informal sectors

[8] The self-employed and employer status are merged in one category due to the small sample size for employers, particularly fort he females.

including the estimated selection terms as one of the independent variables. The wage equations are specified based on the traditional human capital framework (Mincer 1974). Natural logarithm of wages is regressed on a set of human capital and some other individual and locational characteristics. One of the most important variables in this respect is the education level of the individual, which is represented by dummy variables for various levels of educational attainment. Job tenure is another variable included in the regressions as a measure of productivity. Due to data limitations, age of the individual is represented by categorical dummy variables as a proxy for experience.[9] The remaining explanatory variables in the equations are dummy variables for gender, the region of residence, residing in a rural versus urban area. Industry and occupation dummies are also included in the wage estimations for the entire sample while a dummy variable for the individual working in a high-qualified occupation replaced the occupational dummies in the gender disaggregated regressions.[10,11]

Table 4 shows the results of the wage regressions for the entire sample of formal and informal sector non-agricultural wage and salary workers for 1988 and 2007. *Tables 5* and *6* repeat the same set of estimations for the male and female samples separately. The results in the latter two tables entail a complex web of variations in wage determination across the three dimensions of formal-informal, time and gender, and a full set of cross comparisons across all dimensions would generate a long list of interpretations. For a more clear exposition, we primarily focus on the estimation for the total sample (*Table 4*).

The set of coefficients on education, age and tenure for 1988 (first two columns of *Table 4*), show that the returns to the human capital variables are substantially higher in the informal sector than in the formal sector. Holding all other factors constant, being a high school graduate, for instance, increased returns to wages by 53 per cent in 1988 as compared to an illiterate worker in the informal sector, versus 32 per cent in the formal sector.[12] Similarly, each additional year of tenure enhanced the wage rate by 1.3 per cent in the informal sector versus 0.9 per cent in the formal sector. The 25-34 age category in the informal sector enjoyed

[9] The 2007 data only reports the age category that the individual is in.
[10] The "high-qualified" occupation entails legislators, senior officials, managers, professionals, technicians and associate professionals.
[11] Industry and occupation dummies are excluded in the gender disaggregated regressions due to few number of observations in each category.
[12] As distinct from continuous explanatory variables, the impact of a dummy variable in a semi-logarithmic regression is obtained by subtracting 1 from the antilog of the parameter estimate and then multiplying the result by 100. For the impact of high school graduation in the formal sector, for example, its impact is calculated as (exp(0.423)-1)*100.

a wage advantage by 57 per cent relative to the 15-24 base category age group, versus only a 10 per cent premium for the same age category in the formal sector.

The finding of relatively higher informal sector returns to human capital variables, is in part, contrary to the hypothesis of the segmentation model. The model suggests that returns to education, experience and tenure would matter less in the informal sector, because here jobs do not have the skill and training requirements that primary sector jobs have. Yet this finding can also be pointing towards the heterogenous nature of the informal sector. As mentioned in Section II above, a number of studies have argued that the informal sector itself consists of two layers; a lower segment with the types of jobs void of skill requirements, and an upper segment that is competitive with the formal sector.

It might also be one of the consequences of the inability of the dataset to distinguish between private and public sector within the formal labor market. While public sector jobs have the advantage of job security, human capital based wage differentials are narrower than in the private sector, with a relatively higher starting wage but a lower cap on maximum pay levels. Hence the lower returns to education, experience and tenure in the formal sector, might be in part reflective of the effects of the public sector. [13]

Comparing the results on the human capital variables across the two years, we observe that returns to education are reduced through time for both formal and informal sector workers, yet informal sector returns continue to be superior. A university graduate in the informal sector expects to earn 80 per cent higher than an illiterate informal sector worker (holding all other factors constant), while her formal counterpart would expect a wage differential of 39 per cent. Job tenure seems to have diminished effect in the formal sector, and not significant any more in the informal sector. As for the age variable (indicative of work experience), we observe a substantial increase in formal sector returns and a decrease in informal sector returns such that the gap is reduced for the prime working age (25-44) and reversed for the more experienced workers 45-64 such that formal sector workers enjoy higher returns than their informal sector counterparts.

The coefficients on the industry and occupation dummies in 1988 are indicative of substantially wider occupational and industrial wage differentials in the informal sector than in the formal sector. The service, trade and manufacturing sectors, where more than half of all

[13] To account for the effect of the public sector, we replicated the estimates with a restricted dataset for 1988 where we excluded the individuals who are covered by the government retirement fund (as this variable is available in the 1988 data set). We observed only a negligible change in the estimated results.

employment is in the informal sector as noted above, penalize informal sector workers by substantial wage reductions. Holding all other factors constant, an informal service industry worker in 1988 expected to earn 71 per cent lower wages as compared to the base category of mining and quarrying. The informal sector wage penalty for the trade and manufacturing industries were as high as 64 and 59 per cent respectively. Similarly occupational categories of service-sale workers and elementary occupation workers in the informal sector suffered high wage penalties.

Looking at industry coefficients for 2007, the situation is somewhat different. This time formal sector industry wage differentials are substantially higher than in 1988; and also with a wider dispersion than in the informal sector in 2007. Formal sector trade and manufacturing workers suffer as much as 50 and 31 per cent wage penalties compared to the base industry. While trade, service and manufacturing industries still penalize informal sectors the worst, the dispersion has narrowed down substantially. It is possible that the substantial and consistent presence of informal sector workers in these three industries have also had a diminishing effect on formal sector wages, pulling them down closer to the informal sector levels.

A similar observation holds for regional wage differentials; the regional coefficients point to a much wider wage dispersion in the informal sector than in the formal sector in both years. This is particularly the case in 2007 as formal sector regional coefficients seem to have undergone a substantial reduction.

The female dummy, while statistically insignificant in 1988 and for the formal sector in 2007, exhibits a negative effect for the informal sector in 2007; informal sector women expect to earn 14 per cent lower wages than their identical yet male counterparts. This emerging negative informal sector female wage effect is observed alongside a 10 percentage point increase in the share of informal sector amongst female wage and salary earners. Working in a rural area had a negative wage effect only in the informal sector in 1988, while in 2007 this held true for both formal and informal rural wages.

The selectivity terms are statistically significant and positive for both the formal and informal sectors in 1988, for the formal sector in 2007; and negative for the informal sector in 2007. The parameter for the informal sector is higher than the one obtained for the formal sector in 1988, implying that in both sectors, the workers who are self-selected into sectors had lower wages than those who are randomly assigned. This reducing impact is higher in the informal sector. The correlation between the error terms of the wage and sectoral allocation regressions is negative, signaling that the unobserved individual characteristics that increase the

probabilities of being in these sectors have a decreasing effect on the wages of the individuals that are in this sector. The selectivity term for the informal sector in 2007 is negative, suggesting that the workers who are self-selected into this sector receive higher wages than the randomly selected ones. The correlation between the error terms of the wage and sectoral allocation regressions is positive, which indicates that the unobserved characteristics that increase the probability of being an informal sector worker have an increasing impact on their wage level as well. Yet in 2007, the substantially higher constant term for formal sector workers is also indicative of head start as compared to the informal sector workers.

Looking at the wage estimations for the male and female samples separately (*Tables 5 and 6*), we observe that most of the observations we made for the total sample hold for the male sample as well.[14] Yet in the case of the female sample, we note a number of exceptions. By contrast to what we observed for the total and the male sample, the returns to both education and age-experience seem to perform better in the formal versus the informal sector. That the age variable would perform relatively better for women in the formal sector is to be expected given the continuous nature of employment for women in the formal sector versus the intermittent entry-exit-re-entry type of employment for women in the informal sector due to family responsibilities. The constant term for the informal sector is clearly indicative of a disadvantaged start.

The male selectivity term for both sectors in 2007 are positive and statistically significant, and the parameter estimate for the formal sector is higher than the estimate for the informal sector suggesting that the decreasing effect of the unobservables is higher for the formal sector this time. For females, the estimate for the informal sector is negative, suggesting that the female workers who are self-selected into this sector receive higher wages than the randomly selected ones. The correlation between the error terms of the wage and sectoral allocation regressions is positive, which indicates that the unobserved characteristics that increase the probability of being a female worker in the informal sector have an increasing impact on their wage level as well.

[14] Note that in running the gender disaggregated wage regressions, the occupational dummy has been reduced to only one category of "high-qualified" occupation and industries have been left our as the small sample size in 1988 drove most of them to statistical insignificance.

The Oaxaca decomposition results:

In the final part of our analysis, we use the Oaxaca decomposition method in order to identify the sources of wage differentials between sectors. In this decomposition method we use the findings of wage estimations and explore the relative weights of different factors in observed wage differentials between formal and informal segments. There assumed to be two main sources of the wage differentials; one – called the "explained" portion of the wage differential is associated with the variation in the human capital endowments of workers, namely education level, experience, and job tenure; as well as their distribution across the industries, occupations and geographic regions . The other source of the wage differential, the so-called "unexplained" part entails the differences in the wage setting behavior of these sectors. In other words, it stems from differences in the returns to human capital variables, as well as the returns to industry, occupation and regional affiliations.

Comparing the mean log wages in these two sectors (*Table 7*), in 1988, formal sector workers on average earn 51 per cent higher than their counterparts in the informal sector. The gap between these two sectors increase substantially in 2007, formal sector employees earning 89 per cent higher. For females (*Table 8)*, this wage differential is even wider in both years, formal sector female workers earning 80.58 per cent higher in 1988 and 103.2 per cent higher in 2007.

As far as the explained and unexplained components of the inter-sectoral wage differentials are concerned, we observe a substantial change from 1988 to 2007. In 1988, an important part of the wage differential between the formal and the informal sectors is explained by the different human capital endowments working in favor of the formal sector wage, namely education (0.114 of the total explained part of 0.212), age-experience (0.092) and tenure (0.031).

The unexplained components on returns to education (-0.118) and age-experience (-0.242) on the other hand, work in favor of the informal sector wages, contributing to a closing of the gap along with the constant term (-0.387). The unexplained components on returns to industry (0.497), occupation (0.163) and geographic region (0.080) affiliation of the worker, on the other hand, are also large, yet work to disadvantage informal sector wages. Hence the two unexplained components of the wage differentials cancel each other's effects out, leaving only a small unexplained component of the total differential (-0.019). Consequently, in 1988 the major source of inter-sectoral wage differential has to do with differences in human capital endowments.

In 2007, by contrast, the unexplained component (0.624) serves as the more important source of the total adjusted differential (0.927). Returns to education (-0.163) and age-experience (-0.100) continue to narrow the wage gap as in 1988, yet their total effect has been reduced in time. Returns to occupation (-0.303) has transformed from being a substantial source in widening the gap in 1988 to becoming a factor in narrowing the gap in 2007. The constant term (1.146) makes the largest contribution to the observed wage differential between the sectors. The explained part in 2007 (0.302) is smaller yet non-negligible. Here industrial (0.062) and occupational distribution (0.068) of formal versus informal sector workers contribute to widening the wage gap; as well as education (0.106) and age-experience (0.062) endowments.

VI. Conclusions

Exploring the Household Labor Force data in Turkey from 1988 to 2007, we find that in these two decades of liberalization and market-lead growth, the non-agricultural informal sector becomes an increasingly stable and structural characteristic of the urban labor market. The gradual erosion of the rural traditional agricultural versus the urban modern industrial divide, has turned into a different type of segmentation of the modern formal versus modern informal sector, with an additional layer of gender segmentation. In these two decades, the overall share of the informal sector in total employment declined somewhat due to the falling share of traditional agricultural production. Yet the growth of the informal sector in non-agricultural employment has served as a new source of informal employment. Women in particular have seen their share of informal sector employment increase by as much as ten percentage points.

In the meantime the wage differential between the two sectors has doubled in the period under investigation; and the sources of the wage differences have turned increasingly from human capital endowment differences in 1988 to differences in occupational and industrial distribution. Another transformation has been that the returns to industry and occupation have changed from being a source of the gap in 1988 to factors narrowing the gap in 2007. Moreover, the unexplained component that has to do with the constant term has become the largest contributor to the wage gap. This is indicative of a substantial enhancement of the head start that the formal sector wages get ahead of the informal sector wages. These point to an increasing segmentation of the labor market into its formal and informal components.

Yet our results with respect to the wage regressions are not necessarily supportive of the typical expectations of segmentation theory. Namely, that the informal – secondary sector with "bad", unstable, transitional and "dead-end" jobs does not provide well defined returns to human capital productivity related worker endowments. While this expectation is confirmed to some extent with the female sample, we find the opposite for the male sample. For men, human capital returns are higher in the informal sector than in the formal. This can be interpreted as a utility maximizing behavior by informal sector workers, who negotiate higher current returns in compensation for lack of long-term social security premiums. Yet it is debatable to what extent one could call this a choice rather than enforced segmentation. Alternatively, we have also suggested the possibility of multiple layers within the informal sector, an upper segment with mobility into the formal sector and a lower segment without mobility. The next step in expanding the work here would be an expansion of the pursuing analysis to allow for heterogenity of the informal sector.

References

Bourguignon, F., Fournier, M., and Gurgand, M. (2001) *Selectivity bias correction based on the multinomial logit model*. Available at: http://www.crest.fr/pageperso/lmi/gurgand/selmlog.htm.

Bromley, R. (1978). The urban informal sector: why is it worth discussing? *World Development , 6*, pp. 1033-1039.

Cotton, J. (1988) On the decomposition of wage differentials. *The Review of Economics and Statistics*, 70(2), pp. 236-243.

Doeringer, P. and Piore, M.(1971). *Internal Labor Markets and Manpower Analysis*, Lexington, Mass: D.C. Heath.

Gindling, T. (1991). Labor Market Segmentation and the Determination of Wages in the Public, Private-Formal, and Informal Sectors in San Jose, Costa Rica. *Economic Development and Cultural Change , 39* (3), pp. 584-605.

Günther, I., & Launov, A. (2006). Competitive and Segmented Informal Labor Markets. *IZA Discussion Papers* .

Hart, K. (1971). Informal Income Opportunities and Urban Employment in Ghan. *The Journal of Modern African Studies , 11* (1).

Heckman, J., & Hotz, V. J. (1986). The Sources of Inequality for Males in Panama s Labor Markets. *The Journal of Human Resources , 21* (4), s. 507-542.

Heintz, J., & Posel, D. (2008). Revisiting Informal Employment and Segmentation in the South African Labour Market. *South African Journal of Economics , 76* (1), pp. 26-44.

Ilkkaracan, I. and I. Tunali. (2009). Agricultural Transformation and the Rural Labor Market in Turkey, *in Karapinar, B., F. Adaman, G. Ozertan (ed.s), Rethinking Structural Reform in Turkish Agriculture,* New York, NY: Nova Publishers.

International Labour Office (ILO) (1972). *Employment, Incomes and Equality: a strategy for increasing productive employment in Kenya,* Geneva.

Lee, L. (1983) Generalized econometric models with selectivity. *Econometrica*, 51(2), pp. 507-512.

Leontaridi, M. R. (1998). Segmented Labour Markets: Theory and Evidence. *Journal of Economic Surveys , 12* (1), pp. 63-101.

Levent, H., Taştı, E., & Sezer, D. (2004). İşgücü Piyasasının Katmanlı Yapısı. *Türkiye'de İşgücü Piyasasının Kurumsal Yapısı ve İşsizlik* (pp. 27-63). TÜSİAD.

Lewis, W. (1954). Economic Development with Unlimited Supply of Labour. *The Manchester School , 22* (2), pp. 139-91.

Marcouiller, D., Castilla, V. R., & Woodruff, C. (1997). Formal Measures of the Informal Sector Wage Gap in Mexico, El Salvador, and Peru. *Economic Development and Cultural Change , 45*, pp. 367-392.

McFadden, D. (1974), Mincer J. (1974). Progress in Human Capital Analysis of the Distribution of Earnings, *National Bureau of Economic Research, Inc. NBER Working Papers:0053*

Neumark, D. (1988) Employers' discriminatory behaviour and the estimation of wage discrimination. *Journal of Human Resources*, 23, pp. 279-295.

Oaxaca, R. (1973) Male-female wage differentials in urban labor market. *International Economic Review*, 14(3), pp. 693-709.

Oaxaca, R. L., & Ransom, M. R. (1994). On discrimination and the decomposition of wage differentials. *Journal of Econometrics* , pp. 5-21.

Pages, C., & Stampini, M. (2007). No Education, No Good Jobs? Evidence on the Relationship between Education and Labor Market Segmentation. *IZA Discussion Papers* .

Piore, M. (1975). "Notes for a Theory of Labor Market Stratification" in Edwards, R. et.al. (eds), *Labour Market Segmentation*, Lexington, Mass: D.C. Heath.

Reimers, C. (1983) Labor market discrimination against Hispanic and black men. *Review of Economics and Statistics*, 65, pp. 570-579.

Tansel, A. (1999a). Formal Versus Informal Sector Choice of Wage Earners and their Wages in Turkey. *Economic Research Forum* .

Trost, R., & Lee, L. (1984). Technical Training and earnings: A Polytomous Model with Selectivity. *Review of Economics and Statistics , 66*, pp. 151-156.

Tunalı, İ., & Ercan, H. (1997). Labor Market Segmentation in Turkey. *Main Characteristics and Trends of the Turkish Labour Market* (pp. 85-127)

Turkish Statistical Institute (TURKSTAT). (1988). Household Labor Force Survey

Turkish Statistical Institute (TURKSTAT). (2006). Household Labor Force Survey

United Nations (2008). Development Programme, Annual Report 2008. Capacity Development: Empowering People and Insttutions, New York

Table 1: Distribution of workers by employment status: 1988-2007 (%)

Employment Status	Year	Male	Female	Total
Regular	**1988**	42	22	36
	2007	53	43	50
Casual	**1988**	9	5	8
	2007	8	6	7
Employer	**1988**	5	0	4
	2007	7	1	6
Self Employed	**1988**	31	7	24
	2007	27	12	23
Unpaid Family Worker	**1988**	14	66	28
	2007	5	38	14

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

Table 2: Share of the informal employment in total, non-agricultural and non-agricultural wage employment by gender: 1988-2007 (%)

	Year	Male	Female	Total
Total Employment	**1988**	71	83	75
	2007	66	72	67
Non-Agricultural Employment	**1988**	59	41	57
	2007	58	48	56
Non-Agricultural Wage Earners	**1988**	36	25	34
	2007	37	35	36

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

Table 3: The average wage level and working hours in the formal and informal employment

	Year	Male			Female			Total		
		Formal	Informal	Diff.	Formal	Informal	Diff.	Formal	Informal	Diff.
Average Hourly Wage	**1988**	1,15	0,88	%37	1,22	0,67	%91	1,16	0,85	%43
		(1,157)	(2,585)		(2,247)	(0,551)		(1,436)	(2,429)	
	2007	4,67	2,43	%92	4,91	2,30	%113	4,73	2,40	%97
		(3,506)	(2,217)		(4,376)	(2,083)		(3,732)	(2,189)	
Average Weekly Working Hours	**1988**	45,2	52,5	%16	41,4	45	%9	44,5	51,6	%16
	2007	49,4	58,0	%17	45,3	51,7	%14	48,5	56,6	%17

*Diff. denotes the differences between the average hourly income levels and average weekly working hours of the sectors
Wage difference: "Diff.=(Formal-Informal)/Informal"
Working hours difference: "Diff.=(Informal-Formal)/Formal"

*Standard errors in parentheses

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

Figure 1: Formal and Informal Employment by Education Level (%)

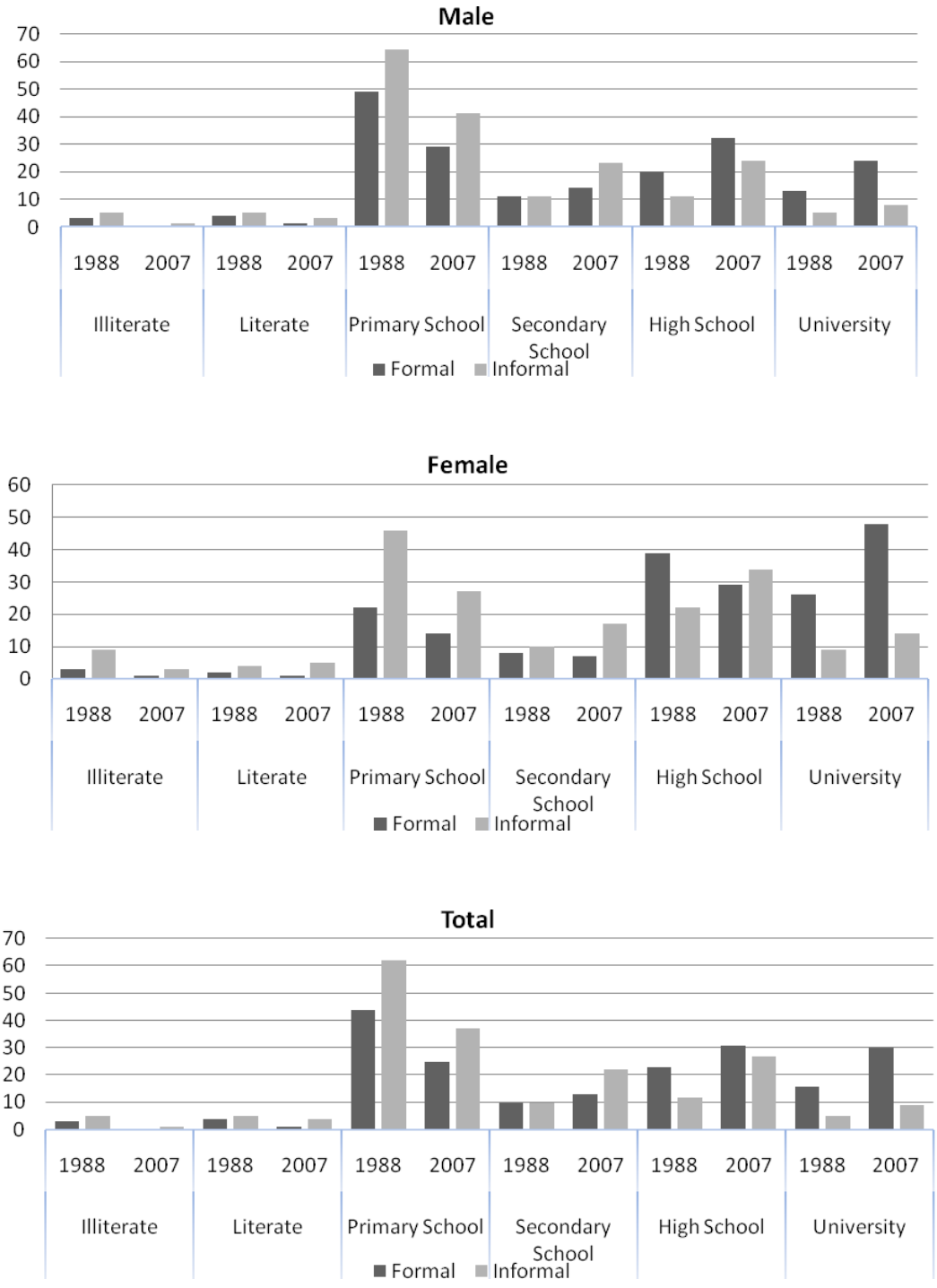


Figure 2: Comparison of the formal and informal employment based on education level

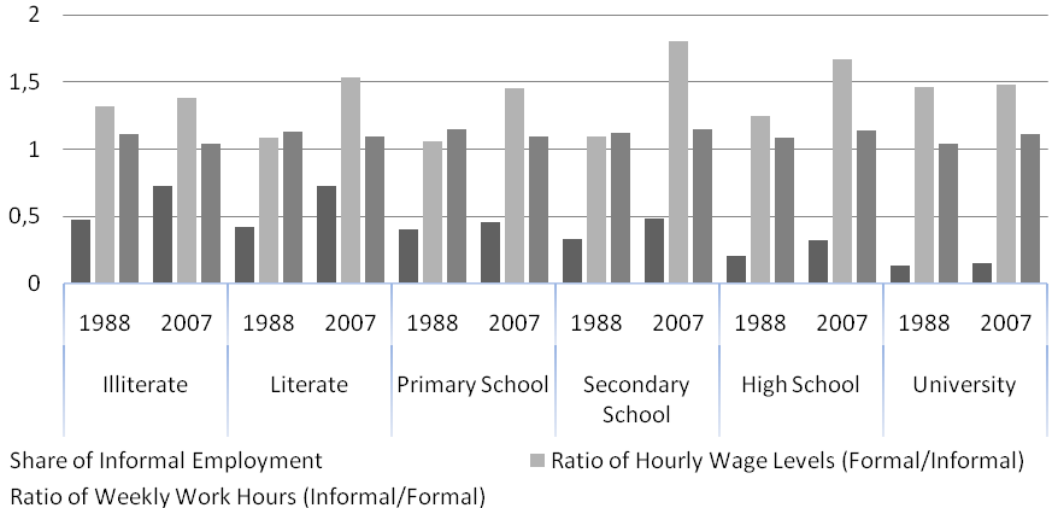


Figure 3: Comparison of the formal and informal employment based on age

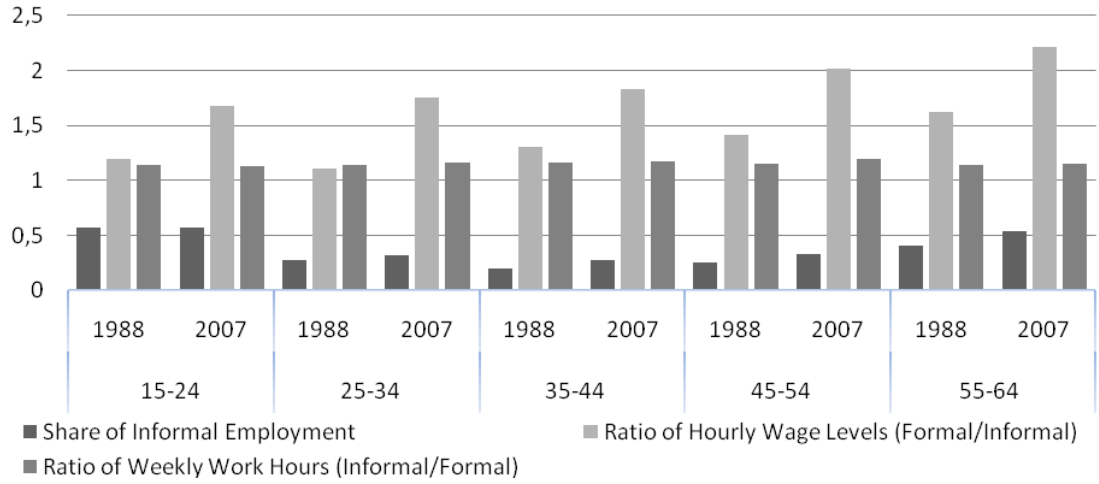


Figure 4: Comparison of the formal and informal employment based on industry

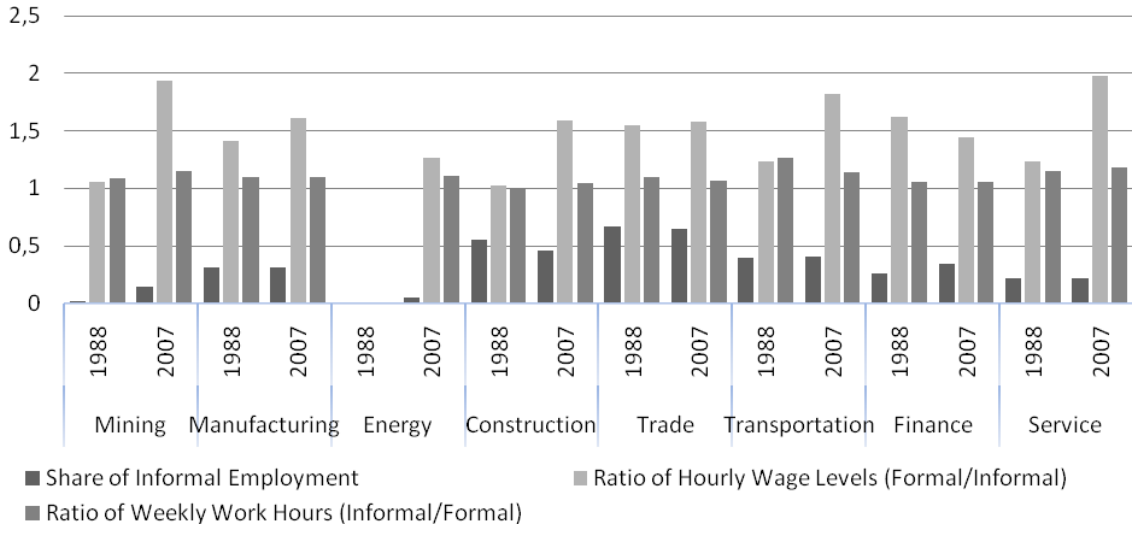


Figure 5: Comparison of the formal and informal employment based on occupation

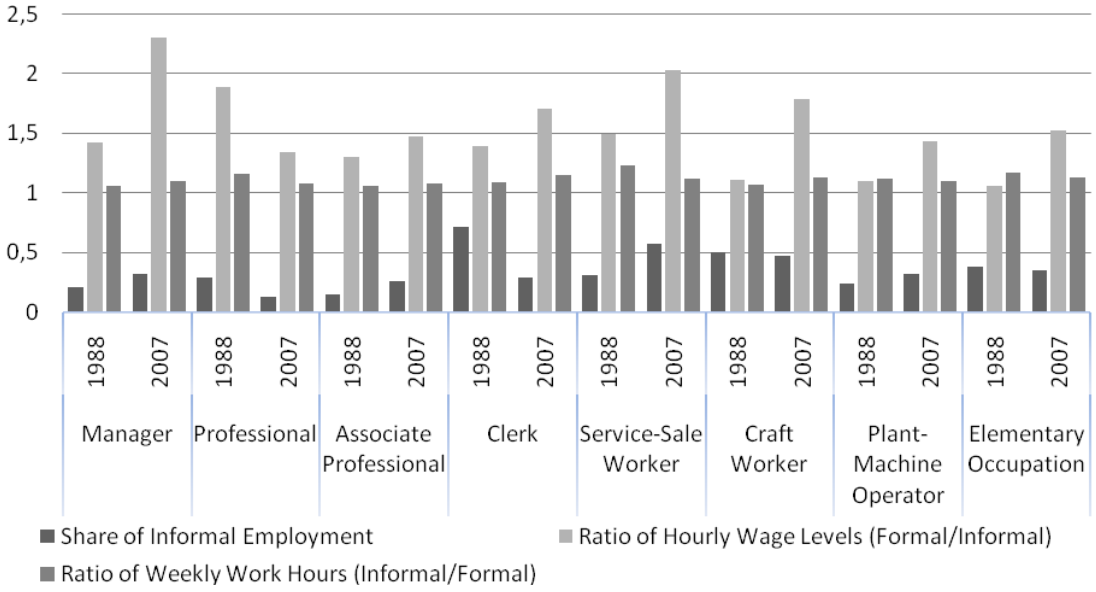


Figure 6: Comparison of the formal and informal employment based on geographic region

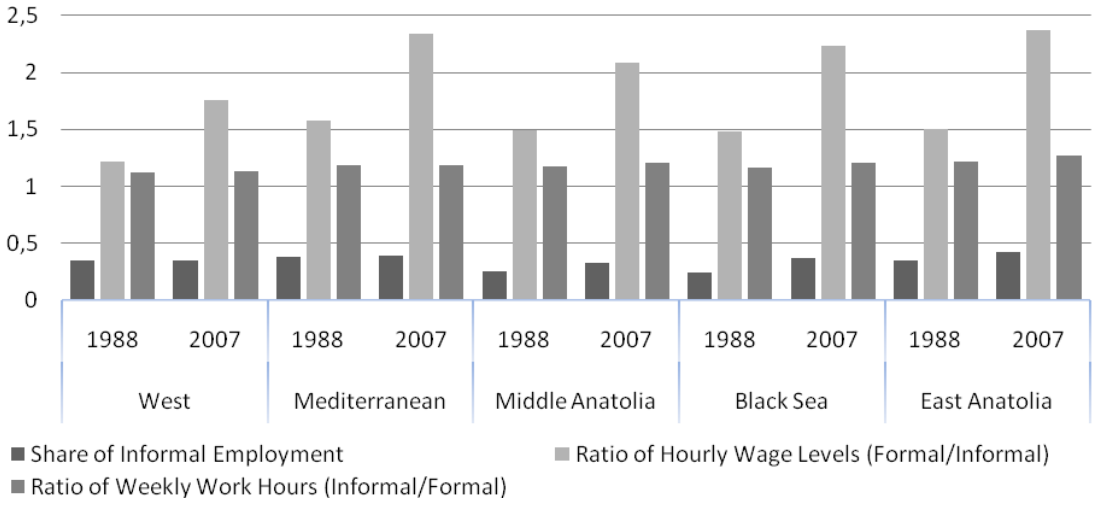


Figure 7: Comparison of the formal and informal employment based on urban-rural and gender

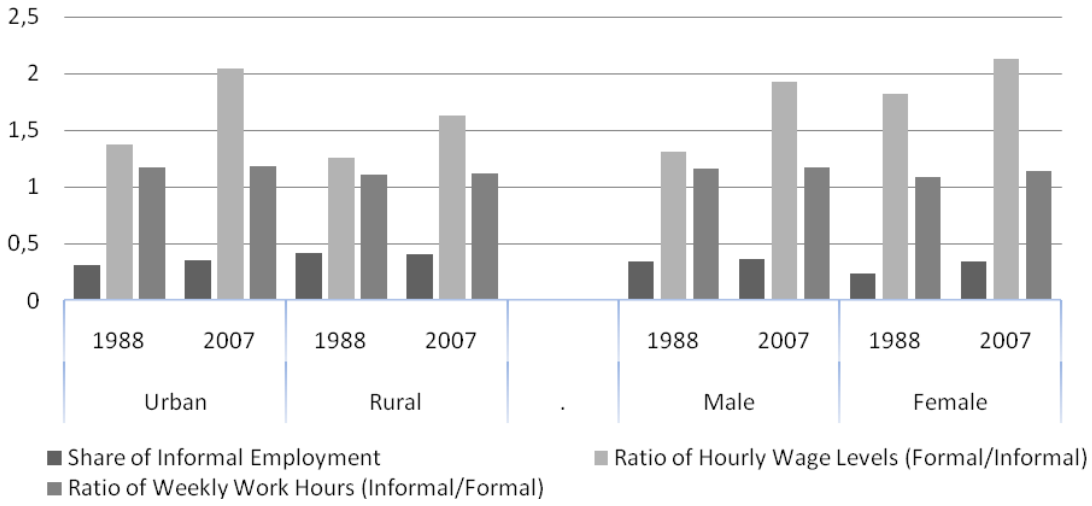


Table 4

WAGE ESTIMATIONS : TOTAL SAMPLE

	1988		2007	
VARIABLES	**FORMAL**	**INFORMAL**	**FORMAL**	**INFORMAL**
Literate	0.050	0.151**	0.053	0.126***
	(-0.028 - 0.129)	(0.036 - 0.266)	(-0.033 - 0.140)	(0.063 - 0.188)
Primary School	0.025	0.122***	0.007	0.134***
	(-0.038 - 0.089)	(0.034 - 0.211)	(-0.068 - 0.083)	(0.078 - 0.190)
Secondary School	0.149***	0.316***	0.059	0.110***
	(0.078 - 0.220)	(0.206 - 0.426)	(-0.018 - 0.136)	(0.054 - 0.166)
High School	0.280***	0.423***	0.155***	0.298***
	(0.204 - 0.355)	(0.312 - 0.533)	(0.076 - 0.233)	(0.242 - 0.354)
University	0.671***	0.736***	0.327***	0.588***
	(0.584 - 0.758)	(0.599 - 0.873)	(0.244 - 0.410)	(0.528 - 0.647)
Tenure	0.009***	0.013***	0.000***	0.000
	(0.007 - 0.011)	(0.009 - 0.016)	(0.000 - 0.000)	(-0.000 - 0.000)
Female	-0.004	0.055	-0.002	-0.133***
	(-0.043 - 0.036)	(-0.055 - 0.166)	(-0.018 - 0.013)	(-0.159 - -0.107)
Age(25-34)	0.099***	0.452***	0.121***	0.308***
	(0.057 - 0.141)	(0.403 - 0.501)	(0.103 - 0.139)	(0.292 - 0.325)
Age(35-44)	0.167***	0.521***	0.289***	0.427***
	(0.119 - 0.215)	(0.445 - 0.597)	(0.270 - 0.308)	(0.408 - 0.446)
Age(45-54)	0.241***	0.515***	0.454***	0.409***
	(0.190 - 0.291)	(0.412 - 0.618)	(0.437 - 0.471)	(0.384 - 0.434)
Age(55-64)	0.373***	0.494***	0.628***	0.270***
	(0.298 - 0.448)	(0.354 - 0.634)	(0.593 - 0.664)	(0.228 - 0.313)
Manufacturing	0.047*	-0.463**	-0.308***	-0.152***
	(-0.009 - 0.103)	(-0.901 - -0.024)	(-0.338 - -0.277)	(-0.236 - -0.069)
Energy	-0.083	0.000	0.103***	0.268***
	(-0.212 - 0.046)	(0.000 - 0.000)	(0.060 - 0.146)	(0.094 - 0.443)
Construction	0.127***	-0.165	-0.282***	-0.122***
	(0.055 - 0.199)	(-0.606 - 0.277)	(-0.320 - -0.245)	(-0.210 - -0.035)
Trade	0.081**	-0.495**	-0.416***	-0.229***
	(0.008 - 0.154)	(-0.934 - -0.055)	(-0.449 - -0.384)	(-0.313 - -0.145)
Transportation	0.057*	-0.227	-0.139***	-0.135***
	(-0.011 - 0.126)	(-0.670 - 0.216)	(-0.173 - -0.105)	(-0.221 - -0.049)
Finance	0.240***	-0.377*	-0.213***	-0.159***
	(0.171 - 0.309)	(-0.824 - 0.071)	(-0.247 - -0.180)	(-0.245 - -0.072)
Service	0.016	-0.535**	-0.043***	-0.150***
	(-0.042 - 0.074)	(-0.975 - -0.096)	(-0.074 - -0.012)	(-0.235 - -0.066)
Professional	0.227***	-0.050	-0.058***	0.467***
	(0.165 - 0.289)	(-0.189 - 0.089)	(-0.079 - -0.037)	(0.422 - 0.512)
Associate Professional	-0.164***	-0.237***	-0.251***	0.187***
	(-0.201 - -0.127)	(-0.344 - -0.131)	(-0.272 - -0.230)	(0.151 - 0.224)
Clerk	-0.187***	-0.295***	-0.363***	-0.061***
	(-0.270 - -0.104)	(-0.405 - -0.186)	(-0.384 - -0.341)	(-0.098 - -0.023)
Service-Sale Worker	-0.168***	-0.432***	-0.463***	-0.229***
	(-0.210 - -0.125)	(-0.528 - -0.336)	(-0.485 - -0.441)	(-0.261 - -0.196)
Craft Worker	-0.113***	-0.237***	-0.393***	-0.162***
	(-0.161 - -0.065)	(-0.341 - -0.132)	(-0.415 - -0.370)	(-0.197 - -0.127)
Plant-Machine Operator	-0.228***	-0.239***	-0.460***	-0.092***
	(-0.278 - -0.178)	(-0.359 - -0.119)	(-0.483 - -0.438)	(-0.129 - -0.056)
Elementary Occupation	-0.093***	-0.370***	-0.579***	-0.223***
	(-0.136 - -0.051)	(-0.467 - -0.272)	(-0.602 - -0.556)	(-0.258 - -0.188)
Rural	-0.002	-0.079***	-0.022***	-0.018**
	(-0.031 - 0.027)	(-0.129 - -0.028)	(-0.033 - -0.011)	(-0.034 - -0.002)
Mediterranean	-0.136***	-0.333***	-0.018**	-0.225***
	(-0.168 - -0.105)	(-0.389 - -0.278)	(-0.032 - -0.004)	(-0.245 - -0.205)
Middle Anatolia	-0.102***	-0.209***	-0.013**	-0.136***
	(-0.127 - -0.076)	(-0.264 - -0.153)	(-0.025 - -0.001)	(-0.155 - -0.117)
Black Sea	-0.136***	-0.204***	0.027***	-0.163***
	(-0.178 - -0.094)	(-0.302 - -0.106)	(0.014 - 0.041)	(-0.183 - -0.143)
East Anatolia	-0.043**	-0.238***	0.025***	-0.229***
	(-0.076 - -0.010)	(-0.302 - -0.174)	(0.010 - 0.041)	(-0.249 - -0.208)
Lambda	0.162***	0.253***	0.196***	-0.048**
	(0.112 - 0.211)	(0.145 - 0.360)	(0.174 - 0.219)	(-0.087 - -0.010)
Constant	-0.170**	0.216	1.735***	0.589***
	(-0.306 - -0.034)	(-0.256 - 0.689)	(1.636 - 1.835)	(0.465 - 0.713)

Observations	7781	3784	43383	23751
R-squared	0.418	0.336	0.541	0.354

Confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5

WAGE ESTIMATIONS DISAGGREGATED BY GENDER (1988)

	MALE		FEMALE	
VARIABLES	**FORMAL**	**INFORMAL**	**FORMAL**	**INFORMAL**
Literate	0.059	0.187***	0.039	0.175
	(0.045)	(0.066)	(0.105)	(0.154)
Primary School	0.033	0.127**	0.031	0.104
	(0.037)	(0.051)	(0.073)	(0.108)
Secondary School	0.147***	0.463***	0.194**	0.169
	(0.041)	(0.067)	(0.089)	(0.135)
High School	0.312***	0.584***	0.331***	0.286**
	(0.042)	(0.069)	(0.104)	(0.132)
University	0.782***	0.887***	0.833***	0.877***
	(0.047)	(0.081)	(0.127)	(0.161)
Tenure	0.007***	0.014***	0.020***	0.018***
	(0.001)	(0.002)	(0.002)	(0.006)
Age(25-34)	0.064**	0.542***	0.061	0.267***
	(0.031)	(0.028)	(0.038)	(0.070)
Age(35-44)	0.141***	0.718***	0.101**	0.129
	(0.035)	(0.047)	(0.048)	(0.101)
Age(45-54)	0.274***	0.726***	0.072	0.333**
	(0.031)	(0.064)	(0.064)	(0.159)
Age(55-64)	0.454***	0.818***	0.101	-0.118
	(0.042)	(0.089)	(0.110)	(0.195)
High Qualified Occupation	0.067***	0.124***	0.032	0.323***
	(0.016)	(0.036)	(0.038)	(0.076)
Rural	0.003	-0.098***	-0.024	-0.001
	(0.017)	(0.028)	(0.039)	(0.077)
Mediterranean	-0.152***	-0.353***	-0.110***	-0.237***
	(0.018)	(0.031)	(0.040)	(0.088)
Middle Anatolia	-0.132***	-0.171***	-0.023	-0.369***
	(0.015)	(0.031)	(0.029)	(0.083)
Black Sea	-0.164***	-0.129**	-0.183***	-0.406***
	(0.023)	(0.056)	(0.052)	(0.145)
East Anatolia	-0.070***	-0.198***	0.003	-0.210
	(0.018)	(0.034)	(0.048)	(0.136)
Lambda (Male)	0.217***	0.594***		
	(0.039)	(0.081)		
Lambda (Female)			0.064	-0.035
			(0.054)	(0.101)
Constant	-0.177**	-0.170	-0.521***	-1.077***
	(0.082)	(0.107)	(0.161)	(0.235)
Observations	6264	3317	1516	467
R-squared	0.381	0.297	0.455	0.344

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6

WAGE ESTIMATIONS DISAGGREGATED BY GENDER (2007)

	MALE		FEMALE	
VARIABLES	**FORMAL**	**INFORMAL**	**FORMAL**	**INFORMAL**
Literate	0.021	0.038	0.177**	0.217***
	(0.059)	(0.043)	(0.073)	(0.051)
Primary School	-0.012	0.028	0.110*	0.157***
	(0.052)	(0.040)	(0.062)	(0.043)
Secondary School	0.054	0.020	0.217***	0.149***
	(0.053)	(0.039)	(0.065)	(0.045)
High School	0.150***	0.238***	0.454***	0.347***
	(0.054)	(0.039)	(0.067)	(0.045)
University	0.422***	0.660***	0.866***	0.723***
	(0.056)	(0.040)	(0.078)	(0.049)
Tenure	0.000***	0.000	0.019***	0.025***
	(0.000)	(0.000)	(0.001)	(0.002)
Age(25-34)	0.019	0.318***	0.257***	0.207***
	(0.015)	(0.010)	(0.014)	(0.017)
Age(35-44)	0.238***	0.480***	0.319***	0.231***
	(0.015)	(0.011)	(0.017)	(0.022)
Age(45-54)	0.523***	0.513***	0.284***	0.138***
	(0.012)	(0.015)	(0.020)	(0.031)
Age(55-64)	0.816***	0.423***	0.265***	0.171***
	(0.021)	(0.028)	(0.052)	(0.064)
High Qualified Occupation	0.312***	0.305***	0.330***	0.447***
	(0.007)	(0.011)	(0.010)	(0.020)
Rural	0.008	-0.002	-0.005	-0.027
	(0.007)	(0.009)	(0.012)	(0.020)
Mediterranean	0.025***	-0.226***	-0.016	-0.253***
	(0.009)	(0.012)	(0.015)	(0.022)
Middle Anatolia	0.014*	-0.143***	0.042***	-0.111***
	(0.007)	(0.011)	(0.013)	(0.024)
Black Sea	0.089***	-0.155***	0.036**	-0.215***
	(0.008)	(0.012)	(0.014)	(0.022)
East Anatolia	0.136***	-0.208***	0.049**	-0.229***
	(0.009)	(0.011)	(0.019)	(0.034)
Lambda (Male)	0.344***	0.198***		
	(0.017)	(0.035)		
Lambda (Female)			-0.036	-0.178***
			(0.024)	(0.030)
Constant	1.233***	0.651***	0.217**	-0.189**
	(0.066)	(0.071)	(0.092)	(0.076)
Observations	33108	18582	10275	5169
R-squared	0.460	0.320	0.593	0.381

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7

OAXACA DECOMPOSITION: TOTAL SAMPLE *(based on wage regression in Table 4)*

	1988			2007		
VARIABLES	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**
Education		0.114***	-0.118*		0.106***	-0.163***
		(0.006)	(0.056)		(0.002)	(0.045)
Tenure		0.031***	-0.024		0.000*	0.000
		(0.003)	(0.014)		(0.000)	(0.000)
Female		-0.006***	-0.001		-0.002***	0.030***
		(0.001)	(0.008)		(0.000)	(0.004)
Age		0.092***	-0.242***		0.062***	-0.100***
		(0.005)	(0.025)		(0.002)	(0.009)
Industry		-0.019***	0.497***		0.062***	-0.075
		(0.005)	(0.148)		(0.002)	(0.046)
Occupation		0.003	0.163**		0.068***	-0.303***
		(0.004)	(0.050)		(0.002)	(0.023)
Rural		0.003**	0.014*		0.002***	-0.002
		(0.001)	(0.006)		(0.000)	(0.002)
Region		-0.004*	0.080***		0.004***	0.090***
		(0.002)	(0.013)		(0.000)	(0.004)
Total		0.212***	-0.019		0.302***	0.624***
		(0.010)	(0.096)		(0.004)	(0.036)
Formal	-0.052***			1.363***		
	(0.006)			(0.003)		
Informal	-0.463***			0.725***		
	(0.012)			(0.004)		
Difference	0.411***			0.638***		
	(0.013)			(0.005)		
Adjusted	0.193*			0.927***		
	(0.096)			(0.036)		
Constant			-0.387*			1.146***
			(0.191)			(0.082)
Observations	11565			67134		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8

OAXACA DECOMPOSITION FOR MEN AND WOMEN SEPARATELY (1988) ***(based on wage regressions in Table 5)***

		MALE			FEMALE	
VARIABLES	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**
Education		0.100***	-0.141*		0.201***	-0.045
		(0.006)	(0.062)		(0.024)	(0.139)
Tenure		0.029***	-0.056***		0.076***	0.012
		(0.003)	(0.016)		(0.011)	(0.030)
Age		0.110***	-0.368***		0.044***	-0.083*
		(0.006)	(0.036)		(0.010)	(0.039)
High Qualified Occupation		0.013***	-0.011		0.039**	-0.133***
		(0.003)	(0.009)		(0.013)	(0.037)
Rural		0.003**	0.019**		0.004	-0.006
		(0.001)	(0.007)		(0.003)	(0.016)
Region		-0.003	0.055***		-0.014**	0.102***
		(0.002)	(0.014)		(0.005)	(0.030)
Total		0.251***	-0.508***		0.349***	0.403
		(0.009)	(0.139)		(0.028)	(0.227)
Formal	-0.055***			-0.040**		
	(0.007)			(0.016)		
Informal	-0.439***			-0.631***		
	(0.013)			(0.031)		
Difference	0.384***			0.591***		
	(0.014)			(0.035)		
Adjusted	-0.258			0.752**		
	(0.140)			(0.231)		
Constant			-0.007			0.556
			(0.147)			(0.291)
Observations	9581			1983		

OAXACA DECOMPOSITION FOR MEN AND WOMEN SEPARATELY (2007) ***(based on wage regressions in Table 6)***

		MALE			FEMALE	
VARIABLES	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**	**DIFFERENTIAL**	**EXPLAINED**	**UNEXPLAINED**
Education		0.109***	-0.084		0.200***	0.080
		(0.002)	(0.066)		(0.007)	(0.064)
Tenure		0.000*	0.000		0.080***	-0.031***
		(0.000)	(0.000)		(0.003)	(0.011)
Age		0.068***	-0.180***		0.051***	0.050***
		(0.002)	(0.013)		(0.003)	(0.015)
High Qualified Occupation		0.040***	0.002		0.110***	-0.034***
		(0.001)	(0.003)		(0.004)	(0.007)
Rural		0.001***	0.001		0.000	0.003
		(0.000)	(0.002)		(0.000)	(0.003)
Region		0.002***	0.121***		0.003***	0.088***
		(0.000)	(0.005)		(0.001)	(0.007)
Total		0.220***	0.442***		0.445***	0.562***
		(0.004)	(0.059)		(0.010)	(0.066)
Formal	1.356***			1.386***		
	(0.003)			(0.006)		
Informal	0.738***			0.677***		
	(0.004)			(0.009)		
Difference	0.618***			0.709***		
	(0.005)			(0.011)		
Adjusted	0.662***			1.007***		
	(0.059)			(0.067)		
Constant			0.582***			0.405***
			(0.098)			(0.108)
Observations	51690			15444		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 1

Table A1: Share of unregistered workers (without social security) (%).

	Year	Male	Female	Total
Total Employment	**1988**	47	79	56
	2007	42	64	48
Non-Agricultural Employment	**1988**	29	29	29
	2007	33	34	33
Wage Earners	**1988**	20	16	19
	2007	21	22	21

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

Table A2: Share of employment in workplaces with 10 or fewer employees (%)

	Year	Male	Female	Total
Total Employment	**1988**	66	78	70
	2007	60	66	62
Non-Agricultural Employment	**1988**	54	38	52
	2007	52	38	49
Wage Earners	**1988**	32	21	30
	2007	31	26	30

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

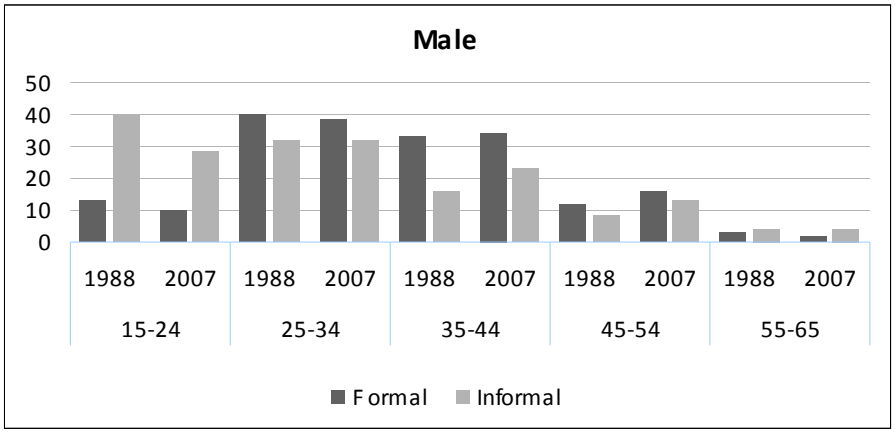
Table A3: Share of unregistered workers (without social security) by firm size (%)

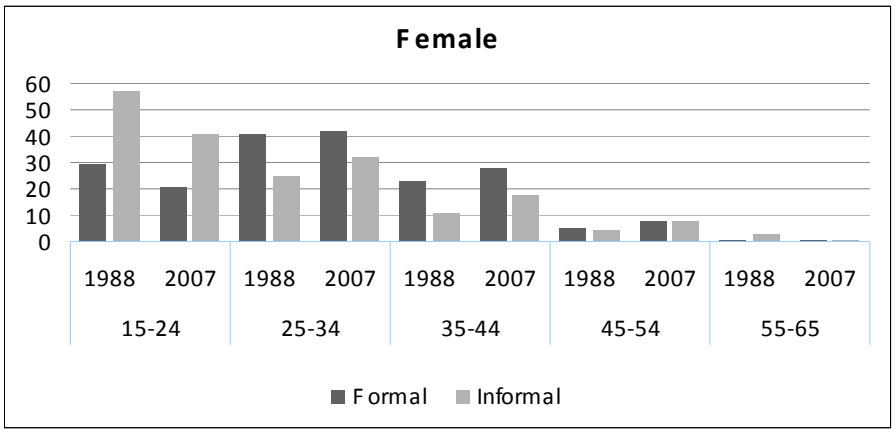
	Year	<10	>=10	Total
Total Employment	**1988**	74	17	56
	2007	69	14	48
Non-Agricultural Employment	**1988**	46	11	29
	2007	54	13	33
Wage Earners	**1988**	48	7	19
	2007	48	10	21

Source: TURKSTAT 1988-2007 Household Labor Force Surveys

Appendix 2: Formal and Informal Employment by Age, Occupation and Industry (%)

Figure A2.1: Formal and Informal Employment by age group





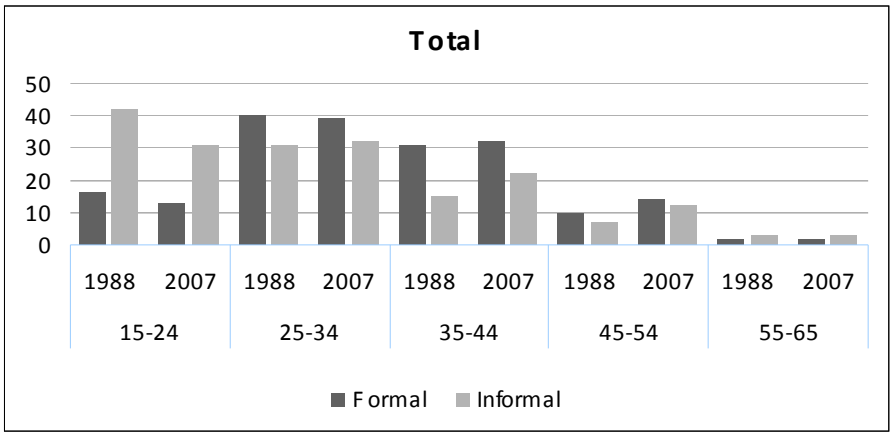
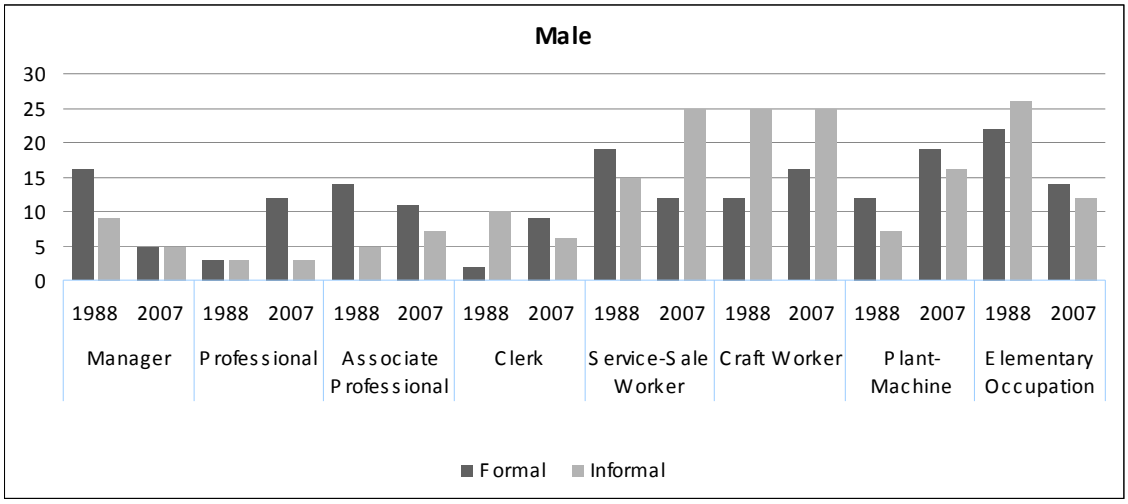
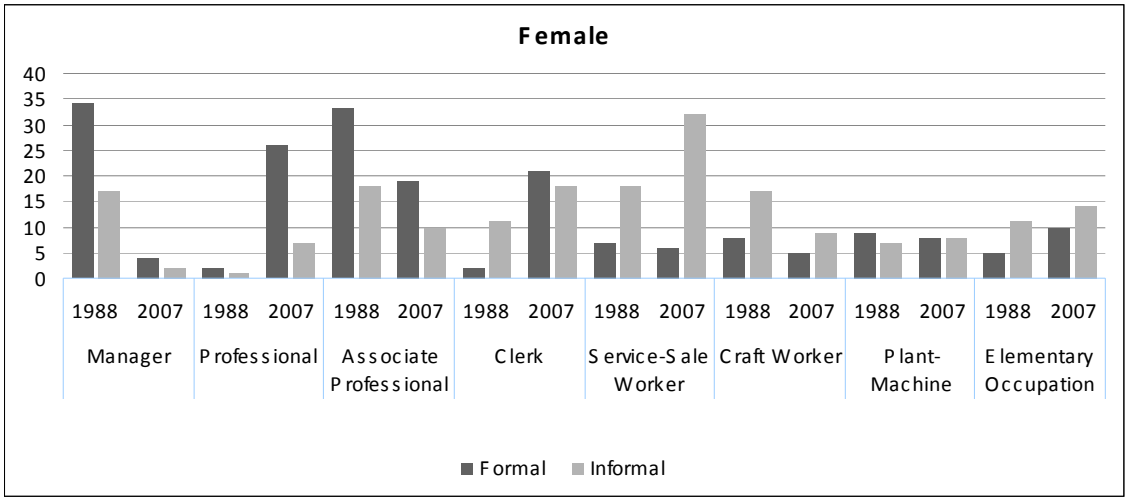


Figure A2.2: Formal and Informal Employment by occupation





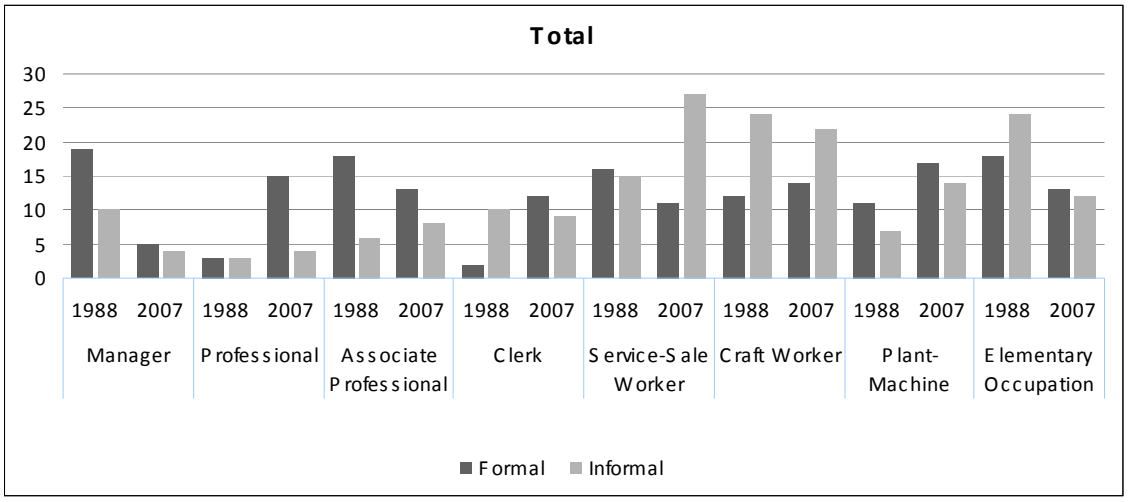
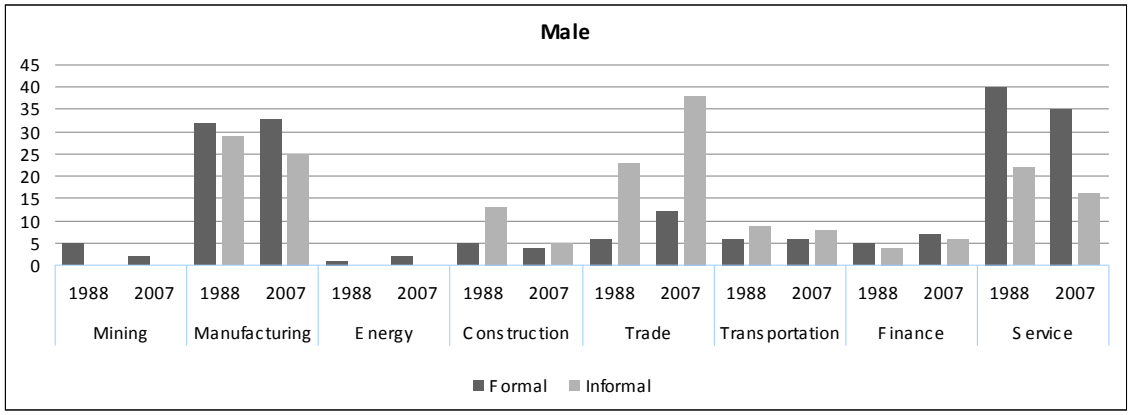
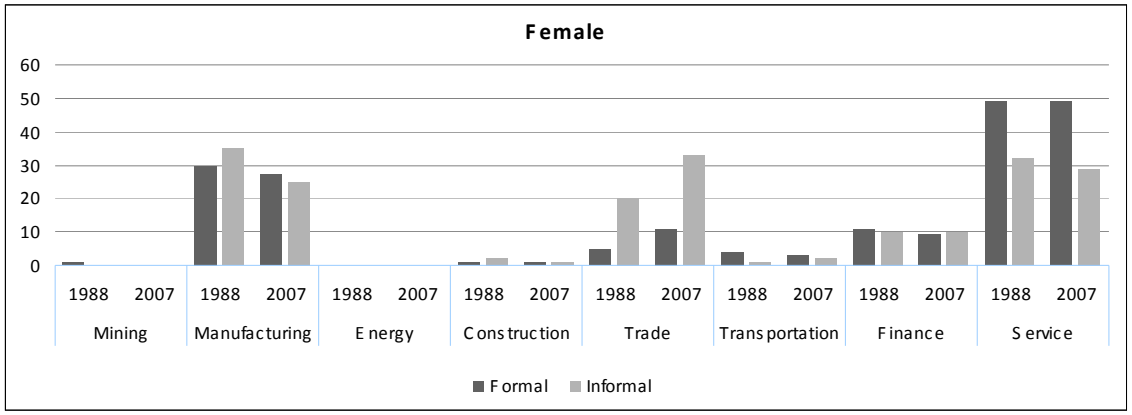
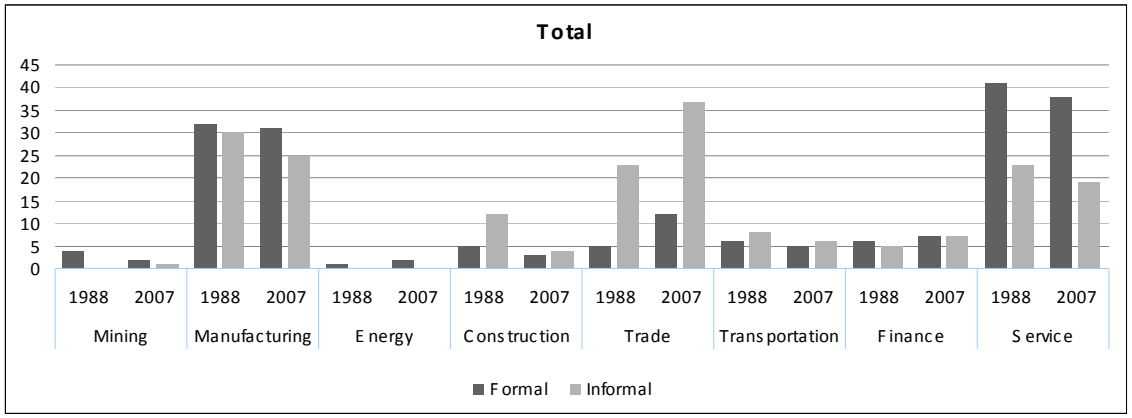


Figure A2.3: Formal and Informal Employment by industry







Appendix 3. Multinomial Logit Estimation Results

MULTINOMIAL LOGIT ESTIMATION (MALE-2007)

VARIABLES	FORMAL	INFORMAL	SELF-EMPLOYED/ EMPLOYER	UNPAID FAMILY WORKER
Literate	1.133***	1.069***	0.722***	1.684***
	(0.140)	(0.094)	(0.084)	(0.361)
Primary School	2.100***	1.406***	1.109***	1.889***
	(0.121)	(0.083)	(0.069)	(0.345)
Secondary School	2.377***	1.317***	1.059***	1.852***
	(0.122)	(0.084)	(0.072)	(0.344)
High School	2.979***	1.345***	1.249***	2.266***
	(0.121)	(0.084)	(0.071)	(0.343)
University	3.884***	1.577***	1.474***	2.263***
	(0.122)	(0.088)	(0.075)	(0.356)
Not Household Head	-0.819***	-0.468***	-0.726***	2.283***
	(0.033)	(0.034)	(0.038)	(0.167)
Married	1.281***	0.829***	1.182***	0.915***
	(0.034)	(0.036)	(0.041)	(0.080)
Rural	-0.274***	-0.201***	-0.153***	-0.712***
	(0.022)	(0.022)	(0.023)	(0.060)
Age(25-34)	1.552***	0.753***	1.890***	0.678***
	(0.031)	(0.031)	(0.046)	(0.070)
Age(35-44)	1.307***	0.303***	1.912***	0.288*
	(0.038)	(0.040)	(0.051)	(0.155)
Age(45-54)	-0.543***	-1.177***	0.690***	0.070
	(0.040)	(0.042)	(0.052)	(0.183)
Age(55-64)	-2.828***	-2.502***	-0.348***	-0.506**
	(0.056)	(0.052)	(0.056)	(0.203)
Mediterranean	-0.337***	-0.105***	-0.018	-0.098
	(0.029)	(0.030)	(0.031)	(0.090)
Middle Anatolia	-0.234***	-0.137***	-0.061**	0.027
	(0.026)	(0.028)	(0.029)	(0.080)
Black Sea	-0.309***	-0.126***	0.016	0.208***
	(0.028)	(0.030)	(0.030)	(0.076)
East Anatolia	-0.958***	-0.638***	-0.463***	-0.231***
	(0.027)	(0.028)	(0.028)	(0.073)
Number of Children(5-14)	-0.071***	-0.015	0.033***	0.004
	(0.010)	(0.010)	(0.010)	(0.024)
Number of Children(0-4)	-0.139***	-0.032*	0.039**	0.169***
	(0.017)	(0.017)	(0.017)	(0.039)
Household Head(Formal)	0.118***	-0.311***	-0.855***	-1.642***
	(0.040)	(0.040)	(0.086)	(0.287)
Household Head(Informal)	0.043	0.360***	-0.562***	-0.503**
	(0.057)	(0.046)	(0.106)	(0.254)
Household H(Employer/Self employed)	-0.316***	-0.166***	0.027	2.975***
	(0.041)	(0.035)	(0.051)	(0.077)
Household Head(Unpaid F.W.)	-0.259	-0.634	2.962***	2.851***
	(0.540)	(0.639)	(0.329)	(0.531)
Constant	-3.420***	-2.020***	-3.446***	-8.661***
	(0.126)	(0.091)	(0.086)	(0.384)
Number of observations	125129	125129	125129	125129

Notes: (*i*) Standard errors are reported in parentheses; (*ii*) *** p<0.01, ** p<0.05, * p<0.1;
(*iii*) Not working in the labor market is the base category

MULTINOMIAL LOGIT ESTIMATION (FEMALE-2007)

VARIABLES	FORMAL	INFORMAL	SELF-EMPLOYED/ EMPLOYER	UNPAID FAMILY WORKER
Literate	1.263***	0.891***	0.335**	0.674***
	(0.174)	(0.102)	(0.166)	(0.192)
Primary School	1.607***	0.555***	0.637***	0.693***
	(0.147)	(0.087)	(0.115)	(0.149)
Secondary School	2.160***	0.645***	0.887***	0.777***
	(0.150)	(0.092)	(0.138)	(0.173)
High School	3.242***	1.255***	1.182***	1.134***
	(0.146)	(0.089)	(0.125)	(0.160)
University	5.196***	1.998***	2.425***	1.177***
	(0.147)	(0.094)	(0.127)	(0.195)
Not Household Head	-0.402***	-0.185***	-0.846***	0.894**
	(0.048)	(0.057)	(0.082)	(0.373)
Married	-0.593***	-1.084***	-0.209***	-0.006
	(0.036)	(0.042)	(0.074)	(0.111)
Rural	-0.075**	-0.368***	-0.335***	-0.270***
	(0.035)	(0.041)	(0.071)	(0.075)
Age(25-34)	1.157***	0.608***	1.925***	1.053***
	(0.037)	(0.041)	(0.116)	(0.123)
Age(35-44)	1.201***	0.275***	2.243***	1.177***
	(0.042)	(0.051)	(0.119)	(0.132)
Age(45-54)	-0.169***	-0.697***	1.530***	0.962***
	(0.055)	(0.065)	(0.129)	(0.141)
Age(55-64)	-2.069***	-2.170***	0.258	0.406**
	(0.123)	(0.123)	(0.175)	(0.185)
Mediterranean	-0.513***	-0.285***	0.252***	0.329***
	(0.042)	(0.046)	(0.070)	(0.084)
Middle Anatolia	-0.508***	-0.668***	-0.256***	-0.741***
	(0.036)	(0.047)	(0.075)	(0.113)
Black Sea	-0.375***	-0.226***	-0.160*	0.177**
	(0.040)	(0.046)	(0.085)	(0.088)
East Anatolia	-1.071***	-1.529***	-0.723***	-1.786***
	(0.049)	(0.063)	(0.099)	(0.177)
Number of Children(5-14)	-0.213***	-0.127***	0.003	-0.099***
	(0.017)	(0.018)	(0.029)	(0.037)
Number of Children(0-4)	-0.525***	-0.584***	-0.325***	-0.386***
	(0.030)	(0.038)	(0.056)	(0.069)
Household Head(Formal)	0.411***	-0.164***	-0.163**	-0.882***
	(0.033)	(0.041)	(0.074)	(0.228)
Household Head(Informal)	0.046	0.343***	0.049	-0.455*
	(0.047)	(0.046)	(0.094)	(0.273)
Household H(Employer/Self employed)	-0.484***	-0.410***	0.171**	2.952***
	(0.040)	(0.044)	(0.071)	(0.112)
Household Head(Unpaid F.W.)	-72.413	-0.778	-57.976	-63.181
	(0.000)	(0.601)	(0.000)	(0.000)
Constant	-4.508***	-2.517***	-5.516***	-8.246***
	(0.154)	(0.106)	(0.173)	(0.401)
Number of observations	144837	144837	144837	144837

Notes: (*i*) Standard errors are reported in parentheses; (*ii*) *** p<0.01, ** p<0.05, * p<0.1
(*iii*) Not working in the labor market is the base category market is the base category

MULTINOMIAL LOGIT ESTIMATION (MALE-1988)

VARIABLES	FORMAL	INFORMAL	SELF-EMPLOYED/ EMPLOYER	UNPAID FAMILY WORKER
Literate	0.223*	0.136	0.329***	-0.447
	(0.132)	(0.134)	(0.107)	(0.464)
Primary School	0.898***	0.491***	0.536***	0.726***
	(0.105)	(0.104)	(0.088)	(0.279)
Secondary School	0.257**	-0.814***	-0.354***	-0.250
	(0.117)	(0.119)	(0.107)	(0.292)
High School	0.945***	-0.502***	-0.100	0.299
	(0.115)	(0.120)	(0.106)	(0.295)
University	1.843***	0.287*	0.591***	0.280
	(0.136)	(0.152)	(0.131)	(0.399)
Not Household Head	-1.274***	-1.139***	-1.318***	2.114***
	(0.092)	(0.097)	(0.103)	(0.371)
Married	1.210***	0.681***	1.259***	0.805***
	(0.082)	(0.085)	(0.093)	(0.142)
Rural	-0.519***	-0.093	-0.290***	-0.996***
	(0.056)	(0.057)	(0.056)	(0.110)
Age(25-34)	1.550***	0.633***	1.680***	0.715***
	(0.078)	(0.081)	(0.094)	(0.136)
Age(35-44)	1.050***	-0.382***	1.257***	0.058
	(0.102)	(0.110)	(0.114)	(0.321)
Age(45-54)	-0.921***	-2.095***	-0.037	-0.657
	(0.102)	(0.115)	(0.112)	(0.411)
Age(55-64)	-2.784***	-3.340***	-1.137***	-2.438***
	(0.122)	(0.134)	(0.117)	(0.618)
Mediterranean	-0.226***	-0.182***	-0.066	-0.429***
	(0.068)	(0.069)	(0.067)	(0.147)
Middle Anatolia	-0.073	-0.448***	-0.522***	-0.216*
	(0.057)	(0.063)	(0.062)	(0.127)
Black Sea	-0.032	-0.604***	-0.247***	0.120
	(0.090)	(0.105)	(0.095)	(0.164)
East Anatolia	-0.278***	-0.485***	-0.312***	-0.450***
	(0.069)	(0.073)	(0.071)	(0.138)
Number of Children(5-14)	0.034*	0.028	0.008	-0.020
	(0.020)	(0.021)	(0.021)	(0.042)
Number of Children(0-4)	-0.046	-0.013	0.035	0.094*
	(0.030)	(0.031)	(0.030)	(0.051)
Household Head(Formal)	-0.072	-0.171*	-1.053***	-1.198***
	(0.095)	(0.089)	(0.181)	(0.346)
Household Head(Informal)	-0.091	0.628***	-0.691***	-0.641
	(0.152)	(0.112)	(0.252)	(0.472)
Household H(Employer/Self employed)	-0.535***	-0.235***	-0.088	2.658***
	(0.093)	(0.080)	(0.108)	(0.147)
Household Head(Unpaid F.W.)	-94.897	-39.236	677.552	161.764
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.941***	0.314**	-1.120***	-5.649***
	(0.145)	(0.146)	(0.144)	(0.466)
Number of observations	21460	21460	21460	21460

Notes: (*i*) Standard errors are reported in parentheses
(*ii*) *** p<0.01, ** p<0.05, * p<0.1
(*iii*) Not working in the labor market is the base category

MULTINOMIAL LOGIT ESTIMATION (FEMALE-1988)

VARIABLES	FORMAL	INFORMAL	SELF-EMPLOYED/ EMPLOYER	UNPAID FAMILY WORKER
Literate	0.364	0.174	-0.000	0.672**
	(0.237)	(0.273)	(0.244)	(0.310)
Primary School	1.026***	0.350*	0.317**	0.270
	(0.160)	(0.183)	(0.161)	(0.252)
Secondary School	1.585***	0.021	0.462*	-0.833*
	(0.183)	(0.233)	(0.241)	(0.484)
High School	3.252***	1.061***	0.302	0.254
	(0.162)	(0.209)	(0.249)	(0.363)
University	4.777***	2.425***	1.670***	0.487
	(0.178)	(0.252)	(0.310)	(0.754)
Not Household Head	-0.828***	-0.492**	-0.987***	17.727
	(0.142)	(0.217)	(0.220)	(0.000)
Married	-0.808***	-1.566***	-0.236	-0.586**
	(0.095)	(0.143)	(0.171)	(0.238)
Rural	-0.409***	0.052	-0.260*	-0.011
	(0.097)	(0.127)	(0.153)	(0.192)
Age(25-34)	1.328***	0.380***	1.283***	-0.094
	(0.094)	(0.141)	(0.181)	(0.269)
Age(35-44)	1.246***	-0.120	1.008***	0.053
	(0.111)	(0.191)	(0.204)	(0.301)
Age(45-54)	0.070	-1.040***	0.331	-0.139
	(0.159)	(0.271)	(0.244)	(0.336)
Age(55-64)	-1.444***	-1.812***	-1.247***	-0.516
	(0.256)	(0.333)	(0.402)	(0.405)
Mediterranean	-0.294***	-0.693***	0.607***	0.349
	(0.100)	(0.152)	(0.150)	(0.214)
Middle Anatolia	-0.261***	-0.849***	-0.071	-0.439*
	(0.078)	(0.132)	(0.155)	(0.254)
Black Sea	-0.369***	-0.999***	-0.341	-0.660
	(0.135)	(0.250)	(0.296)	(0.472)
East Anatolia	-0.550***	-1.567***	0.192	-0.612**
	(0.123)	(0.223)	(0.186)	(0.296)
Number of Children(5-14)	-0.178***	-0.003	-0.117**	-0.030
	(0.036)	(0.047)	(0.053)	(0.073)
Number of Children(0-4)	-0.267***	-0.175**	-0.233***	0.009
	(0.057)	(0.083)	(0.083)	(0.102)
Household Head(Formal)	0.522***	-0.116	-0.005	-0.708*
	(0.085)	(0.130)	(0.151)	(0.401)
Household Head(Informal)	0.046	0.474***	0.006	-38.597
	(0.130)	(0.150)	(0.203)	(89863821.855)
Household H(Employer/Self employed)	-0.670***	-0.903***	-0.792***	1.545***
	(0.102)	(0.147)	(0.179)	(0.238)
Household Head(Unpaid F.W.)	-40.031	-41.412	2.190***	2.495**
	(5.250e+08)	(1.237e+09)	(0.638)	(1.047)
Constant	-3.324***	-2.171***	-3.665***	-22.977***
	(0.216)	(0.288)	(0.296)	(0.373)
Number of observations	25006	25006	25006	25006

Notes: (*i*) Standard errors are reported in parentheses
(*ii*) *** p<0.01, ** p<0.05, * p<0.1
(*iii*) Not working in the labor market is the base category