

Recent Trends in Informal Employment in Turkey

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Abstract

Using micro data from TurkStat's 2000, 2006, and 2012 Household Labor Force Surveys, we examine the recent trends in informal employment in Turkey. Our descriptive analysis of the incidence of informal employment across broad categories such as sectors, occupations, and age groups is followed by an econometric exercise which aims to uncover the main determinants of informality status. We find that the gender difference in the rate of informality is present even when the sectoral composition of employment is controlled for. Alternative versions of the empirical model are estimated to assess the idea that the gender difference has to do with the fact that many women have indirect access to social security benefits as the insured person's wife or daughter. While our findings are in line with this hypothesis, we point to the lack of survey items that would have been more instrumental in uncovering to what extent 'indirect access to benefits' and various government policies contribute to the persistence of informality.

Keywords: Turkey, Labor market, Informality, Household Labor Force Survey.

1 Introduction

Despite considerable improvements over the past decade, informality continues to be a major problem in the Turkish labor market. Informal jobs that do not provide any social security (i.e. eligibility for public health services and retirement payments) are characterized not only by low wages, but also by inferior working conditions that put employees' health, and even lives, at risk. In addition to the insufficiency of inspection mechanisms and penal sanctions, the persistence of informality is mainly believed to be due to various government policies that discourage formal employment. Among these are the high rates of income taxes, social welfare programs which the formally employed are ineligible for, and frequent tax amnesties granted to employers (Ministry of Development (2014); (Karadeniz, 2010)). Dissatisfaction with the quality of services provided by the social security system and the ability of workers to engage in collusive practices with employers to receive higher wages in exchange for unpaid social security premiums are also cited among factors that contribute to the high incidence of informality (Dereli, 2007).

The purpose of this paper is to examine the recent trends in informal employment in Turkey to uncover how this phenomenon relates with key factors such as the worker's level of education and the sector of employment. We also focus on gender differences in the prevalence of informal employment and observe whether these differences disappear once compositional factors are accounted for. The data sources for our empirical work are the 2000, 2006, and 2012 Household Labor Force Surveys (HLFS) conducted by the Turkish Statistical Institute (TurkStat). Micro data from these surveys allow us to carry out an individual level analysis that goes beyond what can be gathered from cross tabulations of informality and broad categories relating to worker or firm characteristics. Our detailed descriptive analysis of the incidence of informal employment is followed by the estimation of a multivariate empirical model with informality status as the dependent variable. The figures presented throughout the paper are

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obtained using the expansion factors provided in the nationally-representative HLFSS data sets, so that these ‘weighted’ numbers can be interpreted as figures that apply to the whole employed population.

We define informal employment based on whether or not a worker is registered with the Social Security Institution (SGK) in his/her main job. Kan and Tansel (2014) argue that registration status of the worker is a better measure of informality in the Turkish labor market than an alternative definition that is based on enterprise characteristics (such as being a small firm). The Kan and Tansel paper is also a useful source for a review of publications dealing with informal employment in Turkey including Aydın, Hırcıncılar, and Ilkaracan (2010), Bulutay and Taştı (2013), Levent, Taştı, and Sezer (2004), Tansel (1997, 1999, 2001), Togan (2001), and Tunalı and Ercan (1998). Extensive lists of relevant papers written in Turkish can be found in Ela (2013) and Fidan and Genç (2013).

Our period of analysis coincides with important developments in the Turkish economy. Uçer (2014) argues that Turkey’s macroeconomic journey over the past decade can be broken down into three periods. The first phase began with the currency and banking crisis of 2001 and lasted until the global crisis of 2008. In a period where most macroeconomic indicators improved, inflation dropped from around 70 percent to single digits. In the aftermath of the global financial shock, the economy contracted sharply in 2008, but recovery was quick. However, inflation and the current account deficit (as a percent of GDP) both remained high, at around 8 percent and 6 percent, respectively, during the past few years. Uçer believes that, as of 2014, Turkey has entered a third phase during which the growth rate is smaller and the economy is once again at the mercy of global developments.

Unfortunately, as in many parts of the world, periods of high economic growth during the past decade did not bring about equally-impressive improvements in employment opportunities. Gürsel (2013) reports that non-agricultural employment increased by 3 percent per annum between 2003 and 2008 (which might actually be large enough to refute the popular claims of “jobless growth” of the Turkish economy), and notes that the more recent increases in employment have come from non-productive and low-quality jobs in agriculture and services.

1.1 Why be concerned about informal employment?

Most papers on informality include a discussion on its consequences at the macro and micro levels. In an article on the informal economy, which informal employment is a key element of Mehmet Şimşek (Turkey’s Minister of Finance) notes that the biggest losers of the informal economy are ordinary citizens. According to Simsek (2014)

”informality inhibits long-term economic growth and productivity gains; creates unfair competition; hinders the growth of small and medium-size enterprises (the main sources of employment); and leaves millions of workers without basic rights, such as health insurance and pensions. It also leads to significant tax-revenue losses, reducing both the quality and quantity of public services. Income inequality and social injustice invariably increase as well.”

Having referred to comprehensive plans to reduce the scope of the informal economy, as a result of which informal employment in Turkey declined by around 15 percentage points from 2002 to 2013, Şimşek argues that

”governments should reduce the tax burden, simplify tax systems, and reduce regulatory compliance costs, while strengthening enforcement. Likewise, they should eliminate barriers to competition, simplify business registration processes, increase the transparency of public procurement, and improve access to credit.”

Commenting on the developments in informality in the Turkish labor market in recent years, Gürsel (2014) also argues that informal employment has various adverse consequences on economic growth, worker productivity, and social welfare. Gürsel notes that while some informal workers may have access to health services through other public coverage schemes, they will not receive any retirement pensions once they are out of the labor force in their old age. He also notes that almost 85 percent of informal wage earners are employed by small enterprises (employing less than 25 workers) where informality is more

common than in larger firms ((Salem, Bensidoun, and Pelek, 2011)). This is why Gürsel suggests that social security premium subsidies must aim specifically at small enterprises, and a reform in severance pay systems - which places a heavy burden especially on low-productivity small firms - must be considered. Elsewhere, Esen (2014) notes that informal employment harms the sustainability of the social security system by diminishing premium and tax gains, and compels governments to reduce benefits. He argues that the positive trend in the actuarial balance of the SGK has made it possible for AK Party governments to expand social insurance benefits and increase healthcare services that are covered by insurance schemes.

The papers cited above refer to several concrete steps taken by the Turkish government to combat informal employment. Among these measures are the partial subsidization of employers' security premiums (especially in the case of female employees and workers below the age of 30), elimination of the income-tax for minimum-wage earners (depending on marital status and number of children), stricter enforcement of regulations by the SGK, and free-of-charge complaint phone lines. In addition to these factors, the decline in informality is in part due to the change in the sectoral composition of the Turkish work force. The aim of our empirical work is to provide detailed information on participation and employment patterns to demonstrate how this may have happened.

2 Labor Force Participation and Informal Employment Turkey

The labor force participation, employment, and unemployment rates for Turkey for the years 2000, 2006, and 2012 are presented in Table (1). Although the 2000 figures are not entirely comparable with the rest due to a revision made in 2008 by TurkStat in population projections (which involved the revision of 2006 figures as well), these statistics provide important information on the basic trends in the Turkish labor market. One of the key findings here is that the overall labor force participation rate has remained around 50 percent, meaning that 1 out of 2 people in the working ages (i.e. 15 and above) is neither employed or seeking employment. The labor force participation rates by gender reveal that the corresponding figures in the male and female subpopulations are 7 out of 10 and 3 out of 10, respectively. The slight downward trend in male labor force participation appears to be a result of the relative decline in agricultural employment.

The three percentage-points increase in the female labor force participation rate during the 2000-12 period is due to increased participation in urban areas where the rate went from 17 to 26 percent, in contrast to rural areas where it declined from 40 to 37 percent. An examination of the labor force participation rate by the highest level of education completed reveals that much of the increase in the overall rate comes from the lower levels of schooling. The majority of high school and university graduates were already in the labor force to begin with. On the whole, 4 out of 5 higher education graduates are in the labor force as opposed to 1 out of 2 in the case of regular high school graduates and 2 out of 3 among vocational high school graduates.

Despite the fact that the urban female labor force participation rate is only around half the rate for males, the urban unemployment rate for women is persistently higher than the male urban unemployment rate. While part of this gap can be explained by skill differences and higher reservation wages among women, there is little doubt that discriminatory behavior on the basis of gender also hurts the labor market involvement of Turkish women. The employment rates indicate that only one out of 4 women in the working ages in Turkey had a job in 2012. According to results not reported here, the rate is maximized in the 35-44 age group with a figure of 37 percent. In urban areas, 61 percent of university graduates were employed in 2012, as opposed to only about 15 percent of those who completed primary education only. Also in urban areas, 42 percent of divorced women were employed in 2012, in comparison to 29 and 21 percent for single and married women, respectively. Female employment declines considerably beyond the age of 50 possibly due to retirement. However, given that the currently-employed work force will need to work longer to retire, this rate is expected to go up. Probably due to the nature of agricultural activities, employment remains relatively higher in rural areas among those above the age of 50.

	2000			2006			2012		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
LF Participation Rate (%)									
Urban	44.1	70.9	17.2	44.2	69.3	19.5	48.3	71	26.1
Rural	58.7	77.9	40.2	51.2	71.3	33.1	53.6	71.2	36.9
Total	49.9	73.7	26.6	46.3	69.9	23.6	50	71	29.5
Unemployment rate (%)									
Urban	8.8	7.8	13	12.2	11	16.4	11.1	9.4	15.5
Rural	3.9	4.9	2	6.2	7.4	3.9	5.5	6.5	3.5
Total	6.5	6.6	6.3	10.2	9.9	11.1	9.2	8.5	10.8
Employment rate (%)									
Urban	40.2	65.4	15	38.9	61.7	16.3	42.9	64.3	22
Rural	56.4	74.1	39.4	48	66	31.8	50.7	66.5	35.6
Total	46.7	68.9	24.9	41.5	62.9	21	45.4	65	26.3

Table 1: Key labor force indicators by gender

2.1 Composition of employment

According to the HLFS, at the end of 2012, Turkey had an actively employed population of nearly 25 million. About half of those workers were in the services sector while agriculture accounted for one-fourth of total employment (See Table 2). In comparison to that of men, the composition of the female workforce has gone through a greater transformation between 2000 and 2012. In terms of employment status, the transition out of agriculture has translated into a considerable increase in the share of female employees while the share of unpaid family workers declined from 52 to 34 percent. The sectoral composition also shows a remarkable change in the proportion of females employed in agriculture and services. In 2000, 60 percent of females employed were in the agricultural sector and 26 percent in services. By 2012, 39 percent of females were in agriculture while the share of services had gone up to 46 percent. According to Gürsel, Uysal, and Acar (2014) who work with detailed sectoral data for 2005-2012, the 56 percent increase in urban female employment during that period had to do with the increasing average retirement age and rapid growth in wage employment in services. They also argue that the employability of unskilled women in sectors such as "administrative and support service activities" and "accommodation and food service activities" has been a major contributor to this trend.

Changes in the occupational composition of the workforce (categorized according to a one-digit classification) are in line with the sectoral employment figures presented above such that the share of agricultural work among female workers dropped from 60 percent in 2000 to 29 percent in 2012¹. As the figures given in Table (2) imply, the occupational compositions of the male and female workforces are quite different, and there is a lot of variation across the ISCO subgroups (listed in Table (3)) in terms of the share of female workers in total employment. While some of this variation is understandable, the fact that only 12 percent of senior officials and managers in 2012 are female is not a good indication regarding the level of gender equality in the labor market. The group of legislators, senior officials, and managers accounts for only 3 percent of female employment while the corresponding figure for males is 10 percent. In contrast, women are still over-represented in low-quality elementary and clerical jobs as well as in agriculture. However, the gradual decline in the index of dissimilarity (from 0.403 in 2000 to 0.330 in 2006 and 0.297 in 2012) implies that the occupational composition of the male and female working populations have become more similar over time, which provides some hope that the position of women in comparison to men will continue to improve in the near future². If the decline in the so-called "occupational segregation" of women translates into better economic conditions and a greater say in social matters, this would be a good sign for a more modern and prosperous Turkish society.

Due to the prevalence of informal employment in agriculture, our subsequent analyses of informal employment will be carried out on the sub-sample of workers employed in industry, construction, and services. Therefore, the composition of non-agricultural employment is also presented here to provide the necessary background information. As would be expected, the exclusion of agriculture has the greatest impact on the composition of employment with respect to the size of the place of settlement and infor-

¹The numbers don't seem to add up here, but some agricultural workers must have been categorized under "elementary occupations".

²The index of dissimilarity introduced in (Duncan and Duncan, 1955) is defined (in our case) as $\frac{1}{2}$ times the sum of the absolute differences of the employment shares of the occupational groups in the male and female work forces.

	2000			2006			2012		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Place of settlement									
Rural	48.6	42.8	64.3	33.8	29.7	45.8	34.9	31.6	42.6
Urban	51.5	57.3	35.7	66.2	70.3	54.3	65.1	68.4	57.4
Age group									
15-24	21.8	19.6	27.7	17.3	15.7	22	14.7	13.9	16.6
25-34	30.7	31.7	27.9	31.4	32	29.6	30.4	30.7	29.7
35-44	23.7	24.9	20.5	26.6	27.3	24.5	27.1	27.2	26.9
45-54	13.6	14	12.6	15.9	16.4	14.5	17.6	17.9	16.8
55+	10.2	9.8	11.4	8.8	8.6	9.5	10.2	10.3	10
Education									
< Primary	64.9	62.4	71.8	51.2	49.1	57.2	44.7	42.1	51.1
Primary	9.8	11.8	4.2	14.2	16.1	8.7	17.3	19.5	12
Secondary	16.5	17.8	13.1	21.4	23	16.8	19.9	22	14.9
University and +	8.8	8	10.9	13.2	11.8	17.4	18.1	16.5	22
Marital status									
Never married	24.6	23	29	23.6	21.5	29.8	24	23.6	24.9
Married	73.2	75.9	65.8	73.7	77.3	63	72.5	74.6	67.4
Divorced	0.9	0.6	1.6	1.5	0.8	3.5	2.3	1.4	4.5
Widowed	1.4	0.5	3.6	1.3	0.4	3.6	1.3	0.5	3.2
Sector									
Agriculture	36	27	60.5	24	17.2	43.6	24.6	18.4	39.3
Industry	17.7	19.5	12.6	20.9	22.7	15.7	19.1	21.2	14.1
Construction	6.3	8.4	0.6	5.9	7.6	0.7	6.9	9.4	0.8
Services	40	45	26.4	49.2	52.4	40	49.4	50.9	45.8
Occupation									
1	7.9	7.1	10.2	9.5	11.7	3	7.7	9.7	3
2	2.3	2.9	0.8	6.9	5.9	9.6	7.8	6.6	10.7
3	6.1	5.1	8.8	6.3	5.8	7.7	6.3	5.9	7.3
4	10.6	13	4.1	6.3	5.2	9.6	7	5.5	10.6
5	9.3	10.8	5.2	11.9	12.8	9.1	12.8	13.2	11.9
6	35.9	26.9	60.4	20.3	15.1	35	19.6	15.8	28.7
7	27.1	33.5	9.9	14.8	17.8	6.1	12.9	16.5	4.4
8	0.7	0.7	0.6	10.8	13.1	4.2	10.2	13.1	3.4
9				13.3	12.4	15.7	15.6	13.8	20
Employment Status									
Employee	48.6	53.5	35.3	58.9	61.7	50.8	62.9	66.5	54.3
Employer	5.1	6.8	0.7	5.7	7.2	1.3	5	6.5	1.3
Self-employed	24.7	29.4	11.8	22.3	25.7	12.5	18.9	22.3	10.8
Unpaid fam. wk.	21.6	10.4	52.1	13.1	5.4	35.4	13.2	4.6	33.7
Firm size									
< 10	68.2	66.5	72.8	61	59.9	64	57.6	55.7	61.9
24-10	10	10.7	8.2	8.1	8.2	7.8	8.5	8.9	7.6
25-49	5.3	5.5	4.7	9.8	9.9	9.5	12.3	12.7	11.3
50 and +	16.5	17.3	14.4	21.2	22	18.8	21.7	22.7	19.1
Informality									
Formal	49.4	56.3	30.5	53	58.6	37.1	61	67.3	45.8
Informal	50.6	43.7	69.5	47	41.4	63	39	32.7	54.2

Table 2: The composition of male, female, and total employment (% shares)

mality status (See Table 4). While the share of rural employment in total drops from 35 to 18 percent in 2012, the informality rate drops from 39 to 25 percent. Since agriculture accounts for a larger share of female employment (39 percent vs. 18 percent for males in 2012), the reduction in the informality rate is much larger in the case of female workers.

Occupation	2000 (ISCO 68)	2006 and 2012 (ISCO 88)
1	Professional, Technical and Related Workers	Legislators, senior officials and managers
2	Administrative and Managerial Workers	Professionals
3	Clerical and Related Workers	Technicians and associate professionals
4	Sales Workers	Clerks
5	Service Workers	Service workers and shop and market sales workers
6	Agricultural, Animal Husbandry and Forestry Workers, Fishermen and Hunters	Skilled agricultural and fishery workers
7	Production and Related Workers, Transport Equipment Operators and Laborers	Craft and related trade workers
8	Laborers Not Elsewhere Classified	Plant and machine operators and assemblers
9		Elementary occupations

Table 3: List of occupational categories used in Tables 2, 3, and 4, and Probit estimations

2.2 Incidence of informal employment

In this subsection, we examine the incidence of informal employment in 2000, 2006, and 2012 across broad categorizations after the exclusion of the agriculture sector. The figures presented in Table (5) confirm that the proportion of those employed informally has declined from around 29 in 2000 to 25 percent to 2012. Despite the exclusion of agriculture, informal employment is more common in rural areas (41 percent vs. 25 percent in urban areas in 2012). Interestingly, when agricultural employment is taken out of the picture, the informality rates for male and female workers are quite similar. However, informality among female workers has changed little since 2000 while the rate for males has declined by nearly six percentage points. The work force composition figures presented in Table (4) suggest that this may have to do with the fact that, over time, a larger share of women have been employed in small firms in services where unregistered employment is more common.

According to figures from all three years, informal employment is the least common among workers who are between the ages of 25 and 44. This might partly be due to the fact that older workers who are already retired do not demand social security contributions from their employers in return for higher compensation or simply the opportunity to remain employed. Similarly, workers below the age of 25 may not have enough bargaining power to demand formal employment due to their lack of labor market experience. The informality rate for males is the lowest in the 35-to-44 group and among the married. In the case of females, on the other hand, the lowest rates are observed in the 25-to-34 group and among the never-married. Taken together, these findings suggest that marriage has the opposite effect on the strength of the preferences of males and females for having a formal job. While married men have a strong incentive to be formally employed so that all of their family members are eligible for public health benefits, women may be willing to get indirect access to benefits as the insured person's wife. In the econometric work, we will estimate an empirical model which might provide some clues as to whether this is a valid explanation.

As would be expected, informality is highly correlated with education, but the pattern is much clearer in the case of women. The rate of informal employment in 2012 is about 56 percent among female workers who haven't completed primary education while the figure for university graduates is only 4 percent. As in the case of educational categories, the difference between the informality rates for male and female workers can be quite large within a given broad category. In 2012, for instance, the informality rate among self-employed female workers is 82 percent as opposed to only 47 percent among males. To give another example, the informality rates in the construction sector for females and males are 14 and 46 percent, respectively. These figures imply that the nature of female and male employment can be very different even within an occupational category or an industry.

	2000			2006			2012		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Place of settlement									
Rural	22.7	23.7	17.6	16.9	18	12.5	17.6	19.2	12.7
Urban	77.4	76.4	82.4	83.1	82	87.5	82.4	80.8	87.3
Age group									
15-24	21.2	18.8	33.1	18	16.2	25.8	15.3	14.2	19
25-34	35.7	35.5	37.1	35.5	35.1	37.1	34.9	34.3	36.8
35-44	26.7	27.7	21.8	28.2	28.8	25.6	28.9	28.9	28.8
45-54	12.2	13.3	6.5	14.2	15.3	9.6	15.8	16.8	12.4
55+	4.1	4.6	1.6	4.1	4.6	1.9	5.1	5.8	3
Education									
< Primary	50.3	53.5	34.2	40.9	43.2	31.3	33.8	35.3	28.8
Primary	12.7	13.7	7.6	15.7	17	10.4	18.4	20.1	12.6
Secondary	23.5	22	30.8	26.3	25.9	27.8	24.3	24.9	22.7
University and +	13.5	10.8	27.4	17.1	13.9	30.5	23.6	19.7	35.9
Marital status									
Never married	26.4	22.9	44	26.2	22.7	40.9	26.9	25.1	32.6
Married	71.8	76.1	49.9	71.6	76.3	51.7	69.8	73.2	58.8
Divorced	1.1	0.7	3.5	1.7	0.8	5.3	2.7	1.5	6.7
Widowed	0.7	0.3	2.6	0.6	0.2	2.1	0.7	0.3	1.9
Sector									
Industry	27.6	26.7	31.9	27.5	27.4	27.8	25.4	26	23.2
Construction	9.9	11.6	1.4	7.7	9.2	1.3	9.1	11.6	1.3
Services	62.5	61.7	66.7	64.8	63.3	70.9	65.5	62.4	75.5
Occupation									
1	12.3	9.6	25.7	12.4	14.1	5.3	10.2	11.8	5
2	3.6	3.9	2	9	7.2	16.9	10.3	8	17.6
3	9.4	6.9	22.2	8.3	7	13.7	8.4	7.3	12
4	16.6	17.9	10.3	8.3	6.3	16.9	9.2	6.7	17.4
5	14.4	14.7	13.2	15.5	15.4	16.1	16.9	16.1	19.5
6	0.3	0.4	0.1	0.2	0.3	0.1	0.2	0.2	0
7	42.3	45.7	24.9	19.4	21.5	10.8	17	20.1	7.2
8	1.1	0.9	1.6	14.2	15.7	7.5	13.5	15.9	5.7
9				12.6	12.6	12.7	14.3	13.8	15.7
Employment Status									
Employee	72.8	70.6	84.1	74.8	72.4	84.9	80.2	78.8	84.6
Employer	7.4	8.6	1.7	6.9	8.1	2	6.2	7.5	1.9
Self-employed	15.8	17.4	7.7	15.3	17.1	7.6	11.2	12.1	8.5
Unpaid fam. wk.	4	3.4	6.6	3.1	2.5	5.6	2.4	1.6	5
Firm size									
< 10	52	55.5	34.7	49.8	52.4	38.6	44.9	46.6	39.3
24-10	14.5	13.8	17.9	9.9	9.4	12	10.7	10.5	11.3
25-49	8.1	7.4	11.4	12.6	11.8	16.3	15.9	15.3	18.1
50 and +	25.5	23.4	36	27.7	26.4	33.1	28.5	27.7	31.2
Informality									
Formal	70.8	70.5	72.1	65.9	66.2	64.7	75.5	76.3	72.9
Informal	29.2	29.5	27.9	34.1	33.8	35.3	24.5	23.7	27.1

Table 4: The composition of male, female, and total non-agricultural employment (% shares)

The timing of the surveys we are working with preclude us from observing the effects of the 2001 and 2008/9 economic crises on informal employment (but have the advantage of reflecting long term trends). Ercan (2011) reports that the 2001 crisis resulted in greater job losses in the formal sector which led to an increase in the informality rate. This is an outcome consistent with the Baltagi, Baskaya, and Hulagu (2013) finding that the wages of informal workers in Turkey have a higher elasticity with respect to unemployment. However, no such clear pattern emerged during the latter crisis as job losses in the informal sector and 'added-workers' engaging mainly in unregistered own-account work appeared to cancel each other out. Gürsel and Durmaz (2014) report that this period of stagnation lasted for about three years after which the informality rate resumed its decline.

3 Econometric analysis

In this section, we report the estimates from a multivariate empirical model with informality status as the dependent variable. Our aim here is to observe whether statistically significant differences exist between the likelihood of informal employment across the broad categorizations used earlier when other worker and firm characteristics are accounted for. Our probit estimates based on the sub-sample of those engaged in non-agricultural employment turn out to be largely in line with expectations as informal employment turns out to be more common in small firms, among younger workers, unpaid family workers, and those with less education (See Table (6)). The impact of marital status varies with gender, and the same can be said of occupation and the sector of employment. As alluded to earlier, this must be due to the fact that women are over-represented in certain sub-sectors of a given broad category.

The positive sign of the coefficient on the "female" dummy variable should be interpreted to mean that when all other factors in the model are accounted for, being a female increases the likelihood of informal employment. One way of quantifying this impact is to compute the marginal effect of the gender dummy, i.e. the change in the probability that a worker is informally employed when the value of the gender dummy changes from zero to one (while the other variables are held constant at their mean values). The marginal effects computed using the 2000, 2006, and 2012 estimates are 0.12, 0.11, and 0.09, respectively. These figures imply that the impact of gender is sizeable and persistent.

Given that the distribution of the female and male work forces within the sectors of employment are not identical, it might have been more appropriate to work with a more distinctive categorization of the sector of employment before reaching conclusions regarding gender differences in informality. Further disaggregation of especially the services sector - which is a very large and heterogeneous category - seems reasonable. Alternative specifications based on an 8-sector categorization in 2000 and 2006 and a 21-sector categorization in 2012 yielded marginal effect estimates that are very similar those reported above for the years 2000 and 2006, and a figure of 0.076 for the year 2012. The latter figure implies that differences in sectoral composition of male and female workers explains some of the gender gap in informality rates. Apparently, as of 2012, women were more likely to be employed in sub-sectors where informal employment is more prevalent.

One exercise we can carry out with the data at hand, however, is to check whether the impact of gender on informality differs by marital status or the relationship to household head. Our aim is to test the idea that part of the gender gap in informality may be due to the fact that many women get indirect access to social security benefits as a dependent, i.e. the insured's wife, mother or daughter. It makes sense to assume that these women have a relatively smaller incentive to seek formal employment and thus, are more likely to end up in unregistered work. To carry out this exercise, we estimated two probit models after replacing the gender dummy with separate dummy variables (i) for women in the four marital status categories and (ii) for women who are household heads, wives, daughters and 'other's³.

Our finding with respect to marital status is that the gender impact obtained earlier is absent in the case of never-married women and is larger than average for those who are married, divorced, or widowed. This is consistent with the "indirect access" argument assuming that single women in employment are more likely to gain coverage through their own registry in the social security system. The relationship-

³These results are available from the authors upon request.

	2000			2006			2012		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Place of settlement									
Rural	37.7	36.3	47.1	39.2	38	46.2	33.3	31.8	40.7
Urban	26.8	27.4	23.7	33	32.8	33.7	22.6	21.8	25.1
Total	29.2	29.5	27.9	34.1	33.8	35.3	24.5	23.7	27.1
Age group									
15-24	49	53.9	35.1	53.7	57.1	44.5	39	43.1	29.1
25-34	25	26.1	20.1	27.4	27.9	25.4	17.4	17	18.6
35-44	20.4	19.6	25.5	25.3	23.5	34	18.4	15.4	27.9
45-54	24.4	23.4	34.7	35.8	34.3	45.7	28.9	26.7	38.8
55+	35.6	33.7	63.5	59.1	58.3	67.4	51	49.1	63.4
Education									
< Primary	41.6	39.5	58	48.2	45.1	66.1	38.5	33.9	56.4
Primary	29	28.6	32.5	42.6	41.3	51.2	34.5	33.2	41.3
Secondary	17.4	17.9	15.3	23.7	23.1	26	16.3	15.7	18.5
University and +	4.1	4.6	3.2	8.4	9.3	6.6	5.2	5.9	4
Marital status									
Never married	41	46.3	27.2	43.1	47.5	32.8	28	31.3	19.9
Married	24.7	24.4	27.2	30.4	29.5	35.6	22.7	21	29.7
Divorced	33.1	38.8	27.7	41.5	42.6	40.9	28.4	25.4	30.5
Widowed	45.5	36.6	50.9	57.7	53.5	59.7	54.3	45.1	58.5
Sector									
Industry	25.5	21.1	43.7	31.6	27.7	47.9	21.6	17.6	36.2
Construction	65.5	66.4	29.9	61.3	62.5	23.1	45.4	46.4	13.9
Services	25.2	26.2	20.2	31.9	32.2	30.5	22.7	22.1	24.5
Occupation									
1	6.6	7.2	5.3	27.5	28	22.1	17.8	18.8	10.5
2	7	7.4	3.1	7.3	8	6.1	3.2	3.7	2.5
3	8.1	6.8	10	16.4	17.8	13.4	10.1	10.5	9.3
4	36.5	35.9	41.7	16	15.2	17.3	9.1	9.2	8.9
5	27.8	24.7	44.9	45.7	41.7	61.7	35.1	29.1	51
6	40.2	38.2	64.9	23.6	22.6	44.5	17.5	16.2	40.5
7	40.4	38.9	53.7	47.5	44.7	71.1	36.1	32.7	67.3
8	15	9.4	31.9	32.8	31.7	43.2	20.7	20.1	25.5
9	0	0	0	49.8	47.7	58.7	40.3	38.2	46.1
Employment Status									
Employee	26	27.4	20	29.4	29.6	28.9	19.6	19.7	19.3
Employer	11.2	11.2	10.9	23	22.9	24	16	16.2	13
Self-employed	41.3	38.3	75.8	52.4	50.1	73.9	53.4	47.2	81.6
Unpaid fam. wk.	74.8	74.1	76.8	80.9	78.9	84.6	74.7	77.7	71.8
Firm size									
< 10	46.5	44.9	59.5	54.5	52.4	66.7	45.2	42.2	56.4
24-10	21.8	22.8	18.1	28.7	28	31	16	15.7	16.7
25-49	8.9	8.1	11.6	17.3	17	18.3	9.2	9.3	9.1
50 and +	4.5	3.7	7.4	6.7	6.2	8.5	3.7	3.5	4.4

Table 5: Informality rate in non-agricultural employment by gender (%)

to-household-head information also provides corroborating evidence for this hypothesis such that the marginal effect estimate for wives is 0.13 while it is only 0.02 for daughters of household heads. It is also noteworthy that the overlap between female respondents who are never-married and those who are the daughter of the household head is quite large. Seventy-three percent of the nearly ten-thousand respondents who fall into at least one of these categories also falls into the other. In other words, females whose likelihood of formal employment is as large as that of men are typically single women who still live with their parents.

4 Concluding remarks

Our descriptive and econometric analyses of official survey data yielded results that are in line with the common knowledge that informal employment in Turkey has declined considerably since the year 2000. The exclusion of agricultural employment - which is more common among female workers - from the empirical work made it easier to observe whether a significant gender difference exists in informality rates. It turned out that female workers were more likely to be informally employed than males even after several worker and firm characteristics were controlled for. Our results also revealed that this pattern was partly due to the fact that women are more likely to be employed in sub-sectors where informal employment is more prevalent. Whether this is due to some kind of "sectoral segregation" or the nature of women's human capital as well as their preferences for formal employment is an interesting question that deserves further investigation using alternative techniques such as in-depth interviews.

Alternative versions of the probit model were estimated to check whether the relatively higher incidence of informal work among female workers might also have to do with the fact that some women do not seek formal jobs since they get indirect access to social security benefits as a dependent. Our finding that the likelihood of informal employment is especially large among married women was taken as evidence in support of this hypothesis. Obviously, it would have been preferable to verify the hypothesis using more directly-aimed survey items that inquire about whether women with informal jobs have indirect coverage through other family members and if so, whether that had an impact on their decision to take an informal job. Similar survey questions would also be instrumental in uncovering to what extent the government's social assistance programs that the formally employed are not eligible for contribute to the persistence of informality. Given the importance of the issue and the interest of many parties including public institutions and academics, it is difficult to understand how such research has so far been neglected.

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	2000			2006			2012		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Female	0.386 -0.019			0.321 -0.014			0.341 -0.012		
Place of settlement									
Urban	0.038 -0.015	0.087 -0.016	-0.24 -0.042	0.07 -0.012	0.081 -0.013	0.032 -0.035	-0.058 -0.012	-0.045 -0.013	-0.123 -0.029
Age group									
25-34	-0.453 -0.02	-0.478 -0.023	-0.364 -0.047	-0.51 -0.016	-0.528 -0.019	-0.474 -0.034	-0.508 -0.017	-0.554 -0.019	-0.415 -0.034
35-44	-0.591 -0.024	-0.637 -0.027	-0.356 -0.061	-0.637 -0.019	-0.686 -0.022	-0.459 -0.041	-0.586 -0.019	-0.655 -0.023	-0.436 -0.039
45-54	-0.501 -0.028	-0.53 -0.03	-0.332 -0.082	-0.262 -0.021	-0.291 -0.024	-0.194 -0.051	-0.239 -0.021	-0.247 -0.024	-0.291 -0.045
55+	-0.362 -0.035	-0.387 -0.038	-0.089 -0.14	0.269 -0.028	0.25 -0.03	0.168* -0.097	0.37 -0.026	0.351 -0.029	0.267 -0.071
Education									
Primary	-0.266 -0.019	-0.247 -0.02	-0.43 -0.058	-0.184 -0.014	-0.178 -0.015	-0.269 -0.038	-0.181 -0.013	-0.178 -0.015	-0.245 -0.032
Secondary	-0.501 -0.018	-0.454 -0.02	-0.695 -0.047	-0.505 -0.013	-0.48 -0.014	-0.64 -0.034	-0.494 -0.014	-0.449 -0.015	-0.685 -0.031
University and above	-0.844 -0.035	-0.757 -0.039	-1.079 -0.076	-0.783 -0.021	-0.703 -0.024	-0.96 -0.047	-0.724 -0.021	-0.657 -0.024	-0.903 -0.043
Marital status									
Married	-0.234 -0.02	-0.271 -0.022	-0.156 -0.048	-0.261 -0.015	-0.313 -0.017	-0.142 -0.033	-0.213 -0.015	-0.264 -0.017	-0.062 -0.031
Divorced	0.151 -0.059	0.227 -0.079	0.083 -0.096	0.14 -0.039	0.099 -0.06	0.199 -0.057	-0.013 -0.031	-0.137 -0.046	0.182 -0.047
Widowed	0.101 -0.073	-0.177 -0.114	0.023 -0.112	-0.036 -0.063	-0.237 -0.104	0.012 -0.086	0.091 -0.057	-0.159 -0.094	0.314 -0.078
Sector									
Industry	-0.015 -0.018	-0.122 -0.019	0.245 -0.058	0.165 -0.013	0.09 -0.015	0.356 -0.038	0.211 -0.014	0.115 -0.015	0.356 -0.033
Construction	0.901 -0.022	0.91 -0.023	0.152 -0.135	0.57 -0.019	0.607 -0.019	-0.025 -0.107	0.495 -0.017	0.519 -0.017	-0.029 -0.099
Employment status									
Employer	-0.774 -0.029	-0.788 -0.029	-0.811 -0.141	-0.451 -0.022	-0.461 -0.023	-0.3 -0.083	-0.332 -0.022	-0.357 -0.023	-0.277 -0.08
Self-employed	-0.027 -0.018	-0.095 -0.019	0.436 -0.066	0.014 -0.015	-0.017 -0.015	0.307 -0.05	0.389 -0.015	0.269 -0.016	0.963 -0.04
Unpaid family worker	0.587 -0.031	0.491 -0.036	0.645 -0.067	0.647 -0.029	0.537 -0.034	0.726 -0.055	0.763 -0.028	0.834 -0.039	0.6 -0.041
Firm size									
10-24	-0.663 -0.019	-0.606 -0.021	-0.926 -0.05	-0.663 -0.017	-0.633 -0.019	-0.755 -0.039	-0.716 -0.016	-0.688 -0.018	-0.77 -0.035
25-49	-1.116 -0.03	-1.113 -0.034	-1.215 -0.065	-1.023 -0.017	-0.992 -0.019	-1.13 -0.038	-1.036 -0.016	-1.01 -0.018	-1.109 -0.034
50 and above	-1.5 -0.023	-1.494 -0.026	-1.652 -0.053	-1.593 -0.016	-1.563 -0.018	-1.73 -0.036	-1.457 -0.016	-1.419 -0.019	-1.559 -0.035
Constant	0.081 -0.037	0.185 -0.042	0.572 -0.082	0.506 -0.025	0.601 -0.027	0.375 -0.077	0.044 -0.026	0.198 -0.029	-0.29 -0.076
Pseudo R2	64,475	53,408	11,067	103,069	83,344	19,725	123,584	93,972	29,612
No. of obser.	0.317	0.305	0.441	0.309	0.287	0.438	0.324	0.295	0.453

Table 6: Determinants of informal employment (Binary probit estimates)

Notes to Table (6): The coefficient estimates for occupation categories have been excluded from the table in the interest of brevity. The reference categories - for which there are no coefficient estimates - of the remaining variables are "male", "rural", "15-24", "less than primary", "never married", "services", "employee", and "less than 10".