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Overview of Firm-Size and Gender Pay Gaps in Turkey: The Role of Informal Employment*

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Abstract

This paper documents two new findings linking firm-size and gender pay gaps to informal employment using micro-level data from Turkey. First, we show that the firm-size wage gap, defined as larger firms paying higher wages to observationally equivalent workers, is greater for informal employment than formal employment. And, second, we find that the gender pay gap is constant across different firm-size categories for formal employment, while it is a decreasing function of firm size for informal employment. These two facts jointly suggest that the informality status of a job is a valuable source of information in understanding the underlying forces determining firm-size and gender wage gaps. We propose and discuss the relevance of alternative mechanisms that might be generating these facts.

JEL codes: C21, E24, J31, J71

Keywords: Informal employment, wage differentials, firm size, gender discrimination, THLFS Turkish Household Labor Force Survey

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1. Introduction

Observationally equivalent workers are paid different wages in the labor market. These wage differentials are multi-dimensional. For example, it is well documented that men are paid better than women even after controlling for education, tenure, age, marital status, etc.[1] Similarly, white Americans are paid better than observationally equivalent black Americans.[2] The residual wage differentials across gender and race categories are often attributed to discrimination in the labor market.[3] Wage differences are also documented for margins other than gender and race. For example, larger firms pay higher wages to observationally equivalent workers than smaller firms. In the literature, this fact is named the "firm-size wage gap."[4] Exporters pay higher wages compared to non-exporters, which is termed the exporter wage premium [Bernard and Jensen (1995)]. Finally, formal (i.e., tax-registered) employment yields, on average, higher wages than informal employment, controlling for observed variation [see, e.g., Heckman and Hotz (1986)].

In this paper, we contribute to the existing literature by documenting two new findings on firm-size and gender pay gaps along the formal-informal divide, based on micro-level data from Turkey. First, we show that the firm-size wage gap is larger for informal jobs in comparison to formal ones, meaning that the relative premium of working in a large firm is more pronounced for informal workers than formal workers. Second, the gender pay gap for informal workers is quite large in small firms; it gets smaller as firm size goes up; and it disappears in the largest firms. In other words, the gender pay gap is a decreasing function of firm size for informal employment. For formal employment, on the other hand, the gender pay gap is notable, but it does not depend on firm size.

In our empirical analysis, we use the Turkish Household Labor Force Survey (THLFS) micro-level data in yearly frequency for the period 2006–2012. THLFS is a nationally-representative dataset, and it surveys around 500,000 people each year. It aims to capture personal and work-related characteristics of household members, which allows us to estimate wage gaps controlling for a rich set of observed co-variates. Since approximately 25% of the workers

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1 See Altonji and Blank (1999) and Bertrand (2011) for excellent literature reviews on various aspects of the gender pay gaps.

2 See Lang and Lehmann (2012) for a recent survey of racial wage gaps.

3 Lang and Manove (2011) show that the racial wage differences persist even after controlling for proxies for unobserved ability.

4 See Oi and Idson (1999) for a detailed review of the literature.

are employed in informal jobs in Turkey, this dataset serves as a natural laboratory for studying labor-market issues related to informal employment.

We start our analysis by documenting formal-informal differences in firm-size wage gaps. In the literature, the firm-size wage gap is estimated by incorporating the firm-size variable into the standard Mincerian wage regressions.[5] We also perform a similar exercise. The only difference is that we estimate these wage regressions for formal and informal workers separately. These regressions include firm size as a key variable along with the other usual variables such as gender, age, and education, in addition to the dummy variables controlling for year, region, occupation, and industry effects. We separate firm size into five categories, with size 1 being the smallest firm and 5 being the largest. We find that a formal worker employed in a size-5 firm earns 16.8% more relative to an observationally-equivalent worker employed in a size-1 firm. In other words, the "size premium" in formal employment is 16.8%. However, the size premium is significantly greater among informal workers. Specifically, an informal worker employed in a size-5 firm gets paid 26.7% more than an observationally-equivalent informal worker employed in a size-1 firm. This is a sizable difference, and it deserves special attention.

We argue that four alternative mechanisms can potentially explain this disparity. First, formal jobs are subject to taxes, while informal jobs are not. Taxes impose a wedge between the size premium in informal jobs and that in formal jobs. Second, larger firms, on average, may have greater skill requirements, both for the formal and informal jobs they offer. However, informal jobs with higher skill requirements may fail to attract enough applicants, since skilled workers normally opt for formal jobs. This might lead to sharper wage increases in informal jobs as firm size goes up. Third, information on job opportunities in informal jobs is most likely exchanged within informal networks (such as relatives, friends, neighbors, and other acquaintances) rather than formal channels (such as public ads). This can potentially reduce the size of the applicant pool for informal jobs. Finally, applicants may be valuing other job-specific (pecuniary and/or non-pecuniary) amenities along with pay. This kind of amenity packages is weak in informal jobs, by definition. This weakness may itself lead to a smaller applicant pool in informal jobs if the weight assigned to these side amenities is high enough. Given a certain number of vacant informal jobs, a smaller pool of applicants would push the wage offers up.

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[5] See Mincer (1958, 1974), Heckman et al. (2006), and Lemieux (2006) for background information on Mincerian wage equations.

Next we document the formal-informal differences in the gender pay gap as a function of firm size. The coefficient of the gender dummy in the Mincerian wage regression is the key parameter in this exercise. Our regressions condition on five size categories along with the formality status of the worker, which means that 10 different regressions are performed. We find that, for formal workers, the coefficient of the gender dummy—which takes 1 for males and 0 otherwise—stays roughly constant (around 10-12%) across the size categories. This is equivalent to saying that the firm size does not significantly affect the gender pay gap for formal employment. For informal employment, however, the gender pay gap is around 24% for size-1 firms, while it monotonically declines with firm size and gets equalized to the gender pay gap for formal workers in size 5. Hence, unlike formal employment, the gender pay gap is a decreasing function of firm size for informal employment.

We then perform the same regressions conditioning separately on the pre- and post-crisis periods. We still observe the monotonically decreasing gender pay gap for informal employment in both periods. However, an interesting result emerges for the largest (i.e., size 5) firms. The gender pay gap for informal employment is no longer equal to the gender pay gap for formal employment in size-5 firms. For the 2006-2009 period, the gender pay gap in size-5 firms is much higher for informal jobs than formal jobs. For the 2010–2012 period, however, we see that the gender pay gap in size-5 firms is much lower for informal jobs than formal jobs. This means that, for the latter period, the widespread belief that informal jobs are more discriminatory against women than formal jobs is only partly true. To be specific, for the 2010-2012 period, we find that informal jobs discriminate against women in small firms, but, in large firms, they are less discriminatory against (or more liberal toward) women than formal jobs.[6] We argue later in this paper that the main reason for this pre- versus post-crisis difference might be the widespread implementation of employment-subsidy programs in Turkey in the post-crisis era.

Therefore, our contribution to the literature is two-fold. First, we show empirically that the firm-size wage gap is not homogeneous among formal and informal workers, being actually more pronounced for the latter. Then, we characterize the gender pay gap as a joint function of the formality status and firm size, and find that the gender pay gap is a decreasing function of the firm size for informal workers, while it stays roughly constant for formal ones.

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[6] In line with this observation, Tansel (1997) also shows that although there is a gender pay gap for formal workers, no such statement can be made for informal ones.

The plan of the paper is as follows. Section 2 provides a summary of the literature on firm-size and gender wage gaps. Section 3 describes our dataset and presents detailed summary statistics. Section 4 explains our empirical methodology and discusses the estimation results. Section 5 concludes with brief remarks on future work.

2. Related Literature

There is a consensus in the labor-economics literature that formal and informal labor markets are subject to segmentation, at least partially. In other words, the fundamentals determining wage and employment outcomes for informal jobs are structurally different from the fundamentals determining those for formal jobs. This is called the "dual labor markets" hypothesis, and various papers, including Stiglitz (1976), Dickens and Lang (1985), and Heckman and Hotz (1986), argue in favor of its relevance.[7] In this paper, we argue that duality leads to interesting patterns of firm-size and gender pay gaps along the formal-informal divide. Before we present our empirical findings on these patterns, we briefly review the literature on firm-size and gender pay gaps below.

2.1. Firm-Size Wage Gap

It is a well-documented fact that larger entities pay higher wages to observationally equivalent workers than smaller ones.[8] The finding that a firm-size wage gap exists is robust and invariably holds across studies for different countries, years, and job categories.[9] Several explanations are offered in the literature, ranging from unobserved worker heterogeneity [Idson and Feaster (1990)] to unobserved firm productivity [Idson and Oi (1999)], and from the need for better data [Troske (1999)] to firm-level variations in labor turnover due to differences in hiring and human-resource management practices [Idson (1996)]. However, none of these points fully explains the observed patterns,

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[7] See Magnac (1991) for an opposing view.

[8] See Oi and Idson (1999) for a comprehensive review of the early literature. Breakthrough papers in the literature that deserve attention include Mellow (1982), Brown and Medoff (1989), and Groshen (1991).

[9] For example, Tansel (1996) is the first paper showing that this fact holds for urban male employees in Turkey but is not statistically significant for women. For studies documenting firm-size wage gaps at the country level, see, for example, Marcouiller et al. (1997) for El Salvador, Mexico, and Peru, Tan and Batra (1997) for Colombia, Mexico, and Taiwan (China), Brunello and Colussi (1998) for Italy, Hollister (2004) for the United States, and Lallemand et al. (2007) for Belgium, Denmark, Ireland, Italy, and Spain. Baker et al. (1988) document sectoral differences in size-wage gaps for CEOs. Meagher and Wilson (2004) and Fox (2009) find that the size-wage gap is larger for jobs with managerial responsibilities.

so the firm-size wage gap still remains as a major empirical puzzle in labor economics.

Although the existence and magnitude of observed firm-size wage disparities are well known in the literature, there is no paper examining the firm-size wage differences along the formal-informal divide. We try to fill this gap in the literature by estimating firm-size wage gaps for formal and informal employment separately.

2.2. Gender Wage Gap

Early theoretical literature on labor-market discrimination suggests that larger businesses are more likely to discriminate against minorities or disadvantaged groups than smaller ones due to their higher market power [see, e.g., Becker (1971)]. However, the empirical literature suggests the opposite: small companies are more likely to discriminate. For example, Heinze and Wolf (2006) find that within-firm gender pay differentials are smaller than the average gender pay gap for the economy, and the gender gap is a decreasing function of the corporate size in Germany. Therefore, they implicitly show that large firms are more egalitarian in comparison to the small ones. This question is also studied in the racial-discrimination literature. Sorensen (2004) points to smaller firms being more racially segregated than larger ones. This observation also supports the idea that larger firms are more egalitarian than smaller firms. Other papers along these lines include Smith and Welch (1984), Chay (1998), and Holzer (1998).

Parallel to these papers, we also document, using Turkish micro-level data, that smaller firms are more discriminatory against women than larger ones. However, we make an interesting additional point: the negative correlation between gender pay gap and firm size is only observed for informal employment, with the gender pay gap being constant across firms of different sizes for formal employment. Our paper is the first in the literature documenting this phenomenon. Section 4 discusses the details of our findings.

3. Data and Summary Statistics

In this study, we use the Turkish Household Labor Force Survey (THLFS), conducted by the Turkish Statistical Institute (TurkStat) for the years 2006-2012. This nationally-representative survey provides rich micro-level information on personal and work-related characteristics of survey subjects, and it

covers all private households living in Turkey.[10] The sample we choose from this dataset consists of private-sector wage earners, age 15-65.[11] We take 2012 as the base year and deflate the wage observations from 2006 to 2011, according to the respective Consumer Price Indices. In other words, wages are measured in real terms and in 2012 prices.

In the THLFS dataset, the information on firm size is collected based on employee responses to the question, "How many workers are employed in the establishment where you are currently working?" The response is structured into six mutually exclusive size categories as follows: size 1 (1-10), size 2 (11-24), size 3 (25-49), size 4 (50-249), size 5 (250-499), and size 6 (500+). Since the degree of freedom is low, especially for informal workers, in the largest size category, we collapse the 250-499 and 500+ categories into a single category. After this normalization, the largest size category in our analysis becomes the size-5 firm (i.e., the firm with 250+ workers). In unweighted terms, there are approximately 79,000 observations in this new category. Accordingly, we convert the size variable into five dummy variables, one for each size category.

We define an informal worker in relation to the worker's social-security attachment, so the worker is deemed formal if s/he is registered with the social-security system and informal if not. The formality status of the worker is determined for the survey with the question, "Are you registered with the social-security system in your current job?" This will also be a dummy variable, taking 1 if the answer is yes and 0 if not. Note that this has nothing to do with the formality status of the enterprise; rather, we are interested in the formality status of the job.[12]

After putting together the 2006-2012 data and restricting the sample to private-sector wage earners, we have 585,769 observations in our unweighted sample, 446,416 of which are from formal workers and 139,353 from informal workers. We also observe personal characteristics, such as gender, education, age, marital status, and occupation; these are in addition to the work-related characteristics of industry, wage, job status, and workplace size, among others. Table 1 presents the summary statistics.

Age is represented as a continuous variable, which we restrict in our analysis to the working age, namely 15-65. The dummy variable for marital status

[10] Excluding the residents of schools, dormitories, kindergartens, rest homes for elderly persons, special hospitals, military barracks, and recreation quarters for officers.

[11] We drop public-sector workers because pay in the public sector is determined by the job rank, which itself is determined by law rather than firm size.

[12] See Rauch (1991) for a classical theoretical discussion of informal versus formal firms.

Table 1. Summary Statistics

Summary Statistics				
	Formal		**Informal**	
Variable	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Size 1	0.212	0.409	0.697	0.459
Size 2	0.126	0.331	0.121	0.326
Size 3	0.212	0.409	0.104	0.305
Size 4	0.275	0.446	0.063	0.242
Size 5	0.175	0.258	0.015	0.095
Female	0.234	0.424	0.245	0.430
Married	0.709	0.454	0.564	0.496
Full-time job	0.983	0.131	0.923	0.266
Permanent job	0.965	0.139	0.653	0.466
No degree	0.015	0.123	0.117	0.321
Primary school	0.260	0.439	0.408	0.492
Middle school	0.143	0.350	0.268	0.443
High school	0.141	0.348	0.093	0.290
Voc. High school	0.151	0.358	0.074	0.261
College & above	0.290	0.454	0.041	0.199
Age	34.26	9.110	32.42	12.691
Log Real Wage	7.054	0.526	6.408	0.593
Sample share	0.767		0.233	
# of Observ.	446,416		139,353	

Note: THLFS data for years 2006-2012 are used in the analysis. Statistics in the first two columns relate to formal employment and the last two columns to informal employment. Appropriate frequency weights are used in all calculations.

takes 1 if the person is married and 0 if not. Education falls into six categories: no degree, primary school, middle school, high school, vocational high school, and college and above. To capture the geographical differences, we add 26 regional dummies in the NUTS-2 detail. Occupation is represented according to ISSCO-88 classification, and industry dummies are created following the NACE Rev.2 classification. The reported wage is the monthly earnings in the main job.

A few of the more important summary statistics are worth highlighting. The share of informal workers is approximately 25% of total employment, which makes Turkish data a natural laboratory for studying informality-related employment issues. There are also several key empirical findings worth noting on the differences between informal and formal employment.

First, although the share of informality declines with firm size, it does not disappear completely, and even the biggest companies turn out to be employers of some informal workers. Informality is higher for younger workers, while more educated workers are underrepresented in informal employment, as expected. Finally, the unconditional mean of monthly earnings for informal workers is about two thirds of that for formal workers. Therefore, from the raw data, we can say that informal workers get lower salaries than formal workers, they are less educated, and their employment spells are shorter, on average, before controlling for observed worker characteristics.

4. Empirical Methods and Estimations

In this section, we briefly describe the empirical methods we employ in our regressions, report our findings, and then discuss the results.

4.1. The Firm-Size Wage Gap along the Formal-Informal Divide

Papers in the empirical literature estimate the firm-size wage gap based on the following standard regression equation:

$$\ln w_i = \alpha + \gamma L_i + \beta' X_i + \in_i, \quad (1)$$

where $\ln w_i$ is the natural logarithm of wages, L_i is a dummy variable taking the value 1 if the firm is "large" and 0 otherwise, X_i is a vector of observed co-variates for individual i, and $\in_i$ is an error term.[13] The coefficient γ is the firm-size wage gap. It is interpreted as follows: for example, if $\gamma = 0.25$, then observationally equivalent workers are paid, on average, 25 percentage points more in large firms than in small firms. Note that this is a Mincerian wage equation modified for the purpose of estimating the firm-size wage gap.

Unlike the simplified specification given in Equation 1, our "firm size" variable has five categories, as we describe in detail in Section 3. We run two separate least squares regressions: one for formal employment and one for informal employment, conditioning on a large set of observed co-variates. These co-variates are as follows: firm size, gender, marital status, age (as a quadratic polynomial), education categories, job permanency, full-time/part-time work status, as well as year, region, industry, and occupation dummies.[14]

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[13] Note that the firm-size variable has only two categories in this example for simplicity; but this simplification comes without loss of generality, and, in our estimations, firm size will have five categories.

[14] We are aware of the issue that larger firms may tend to be more productive and, therefore, pay higher wages to observationally equivalent workers. This means that firm size might be an endogenous variable in the size-gap regression (unobserved individual-level heterogeneity

So, we control for all the relevant individual-level, group-level, and job-specific characteristics. Note that, in our regressions, we omit the dummy variable for the smallest size category (i.e., size 1); thus, the remaining firm-size coefficients should be interpreted relative to size 1. In other words, the coefficients of the size dummies from size 2 to size 5 describe relative premia of working in such firms versus working in a size 1 firm. Table 2 reports our estimates.

According to our estimates, the wage gap is 16.8% between the smallest and largest firms for formal employment, whereas it widens to 26.7% for informal employment. Our estimates also suggest that the wage gap is a monotonically increasing function of firm size for both formal and informal employment. As the size of the firm gets larger, the wage gap increases at roughly constant rates, both for informal and formal workers. However, the slope of this function is steeper for informal employment than formal employment. Figure 1 depicts this fact graphically.

The upper panel of this figure shows the wage gap as a function of firm size for informal and formal employment, separately. As the dashed trend lines suggest, the firm-size wage gaps have different slopes along the formal-informal divide. Specifically, the slope is higher for informal employment than formal employment, which is reflected in the dashed plot in the lower panel. The term "differential size gap," mentioned in the *y*-axis of the lower panel, refers to the formal-informal differences in firm-size wage gaps.

In a companion paper, Balkan and Tumen (2013), we try to explain the theoretical foundations of this slope differential. Specifically, we develop a two-stage wage-posting game with market imperfections and segmented markets, the solution to which produces wages as a function of firm size in a well-defined subgame-perfect equilibrium. The model proposes two distinct mechanisms.[15]

First, setting high tax rates on formal activity generates a wedge between formal and informal wage gaps. Thus, government policy can potentially affect the magnitude of the firm-size wage gaps. The model is able to explain the stylized fact through a second mechanism—even when the tax dimension is shut down. Higher wages offered by a larger company for a formal job can attract a greater number of applicants than the same amount offered by the same organization for an informal job. The bigger pool of applicants for the

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can also cause endogeneity). Since we are concerned with suggestive correlations rather than causality, we do not attempt to address this problem in this paper.

[15] The model draws on the simple wage-posting game developed by Montgomery (1991), Lang (1991), and Lang et al. (2005).

formal job, in turn, enables the firm to keep the size differentials modest, while this mitigating labor-supply effect is weaker for informal jobs.

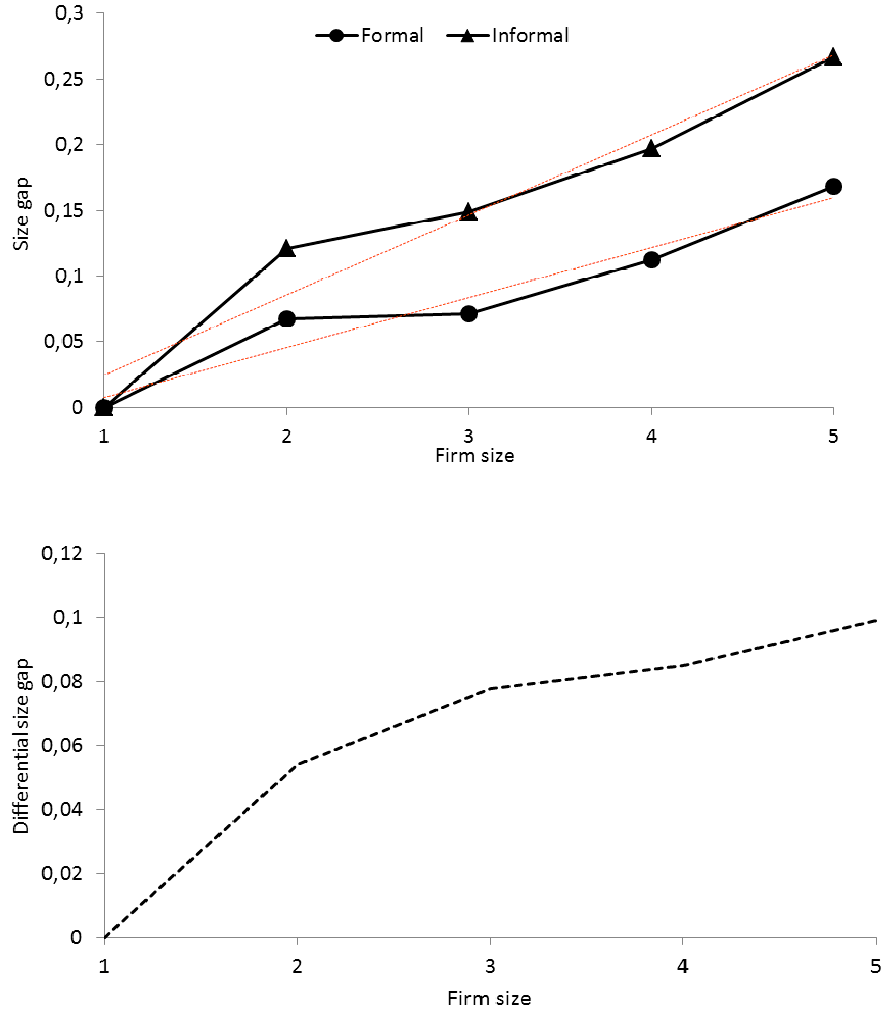
Table 2. Results for Firm-size Gap Regressions

Dependent variable: Natural logarithm of monthly wages				
	Formal		**Informal**	
Co-variate	**Coefficient**	**(SE)**	**Coefficient**	**(SE)**
Size 1	omitted		Omitted	
Size 2	0.067***	(0.0002)	0.121***	(0.0003)
Size 3	0.071***	(0.0002)	0.149***	(0.0004)
Size 4	0.112***	(0.0002)	0.197***	(0.0005)
Size 5	0.168***	(0.0002)	0.267***	(0.0010)
Female	-0.115***	(0.0001)	-0.217***	(0.0003)
Married	0.079***	(0.0001)	0.049***	(0.0003)
Full-time job	0.299***	(0.0005)	0.676***	(0.0007)
Permanent job	0.181***	(0.0004)	0.116***	(0.0004)
Primary school	0.0005	(0.0003)	0.007***	(0.0004)
Middle school	0.068***	(0.0003)	-0.003***	(0.0004)
High school	0.151***	(0.0003)	0.085***	(0.0005)
Voc. High school	0.167***	(0.0003)	0.083***	(0.0005)
College & above	0.378***	(0.0004)	0.224***	(0.0008)
Age	0.046***	(0.0001)	0.044***	(0.0001)
$Age^2/100$	-0.048***	(0.0001)	-0.052***	(0.0001)
Year dummies	Yes		Yes	
Region dummies	Yes		Yes	
Occupation dum.	Yes		Yes	
Industry dum.	Yes		Yes	
Constant	5.471***	(0.0017)	5.470***	(0.0023)
# of Observ.	446,416		139,353	
R^2	0.57		0.41	

Note: Size 1, male, non-married, part-time, and no degree categories are the ignored dummy variables; so, the coefficients are interpreted relative to these categories. Appropriate frequency weights are used.

How the tax mechanism operates is obvious; however, the second mechanism might be more complicated to conceptualize. The second mechanism may be operating for a number of reasons. First, larger firms, on average, may have greater skill requirements, both for their formal and informal jobs.

Figure 1. Plot of the Size-gap Estimates



Note: The upper panel describes the firm-size wage gap relative to size 1 for both formal and informal jobs. For example, a typical formal job at a size 4 firm pays 11.2% more than a formal job at a size 1 firm, while this gap is 19.7% for a typical informal job. The red dashed lines are simply reference lines indicating the slope differential between the two black lines. To make this differential more concrete, the lower panel plots the vertical distance between the two lines in the upper panel. See Table 1 for the exact numbers used to construct the plots.

However, informal jobs with higher skill requirements may fail to attract many applicants, since skilled workers are expected to opt for formal jobs. Second, information on job opportunities in informal jobs is most likely disseminated through informal job-search networks (such as relatives, friends, neighbors, and other acquaintances) rather than formal channels (such as ads). This can potentially reduce the size of the applicant pool for informal jobs. Finally, applicants may be valuing other job-specific (pecuniary and/or non-pecuniary) amenities along with pay. This kind of amenity package is weaker in informal jobs, by definition. This weakness may itself lead to a smaller applicant pool in informal jobs, if the weight assigned to these side amenities is high enough.

In addition to the size coefficients, we would also like to comment on the other empirically relevant coefficients. As the education-related dummies suggest, returns to schooling are lower for informal workers. Relative to the workers with no degree, a college (and above) graduate makes 39% more in formal employment, whereas this number is as low as 22% in informal employment. Therefore, it looks as if there is a mismatch of workers to companies in the informal sector, which results in ineffective use of the education they obtained. The idea of mismatch is elaborated further in Balkan and Tumen (2013).

4.2. Gender Gap, Firm Size, and Informal Employment

The estimation procedure for the gender wage gap is similar to that of the firm-size wage gap. The following Mincerian wage equation is generally used to estimate the gender wage gap in the literature:

$$\ln w_i = \alpha + \theta M_i + \beta' X_i + \in_i, \quad (2)$$

where $\ln w_i$ is the natural logarithm of wages, M_i is a dummy variable taking the value 1 if the worker is male and 0 if female, X_i is a vector of observed co-variates for individual i, and $\in_i$ is a random error term. The coefficient θ is the estimated gender pay gap. We run 10 separate regressions for the formality status of the job and the size category of the firm; that is, we run separate regressions for formal and informal employment in each size category, controlling for the observed cvariates.

The results are presented in Tables 3, 4, and 5. Specifically, Table 3 reports the results for the 2006-2009 period, Table 4 the results for the 2010-2012 period, and Table 5 the pooled results. Note that only the coefficients of the "female" dummy are reported in these tables.

Table 3. Results for Gender Gap Regressions for 2006-2009

Dependent variable: Natural logarithm of monthly wages (2006-2009)				
	Formal		**Informal**	
Co-variate	**Coefficient**	**(SE)**	**Coefficient**	**(SE)**
Size 1	-0.096***	(0.0004)	-0.242***	(0.0006)
Size 2	-0.124***	(0.0005)	-0.163***	(0.0009)
Size 3	-0.116***	(0.0003)	-0.153***	(0.0009)
Size 4	-0.108***	(0.0003)	-0.149***	(0.0013)
Size 5	-0.105***	(0.0004)	-0.132***	(0.0035)

Note: Estimation results for the gender pay gap based on10 different regressions. Appropriate sampling weights are used in all calculations.

Table 4. Results for Gender Gap Regressions for 2010-2012

Dependent variable: Natural logarithm of monthly wages (2010-2012)				
	Formal		**Informal**	
Co-variate	**Coefficient**	**(SE)**	**Coefficient**	**(SE)**
Size 1	-0.112***	(0.0004)	-0.237***	(0.0007)
Size 2	-0.120***	(0.0004)	-0.172***	(0.0011)
Size 3	-0.103***	(0.0003)	-0.166***	(0.0011)
Size 4	-0.107***	(0.0003)	-0.153***	(0.0016)
Size 5	-0.110***	(0.0004)	-0.063***	(0.0034)

Note: Estimation results for the gender pay gap based on 10 different regressions. Appropriate sampling weights are used in all calculations.

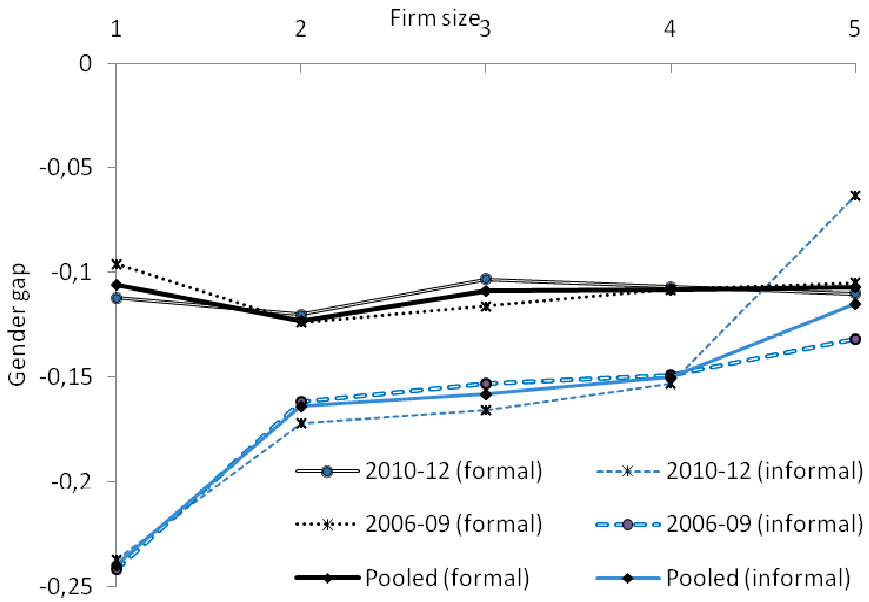
Table 5. Results for Gender Gap Regressions (Pooled)

Dependent variable: Natural logarithm of monthly wages (Pooled)				
	Formal		**Informal**	
Co-variate	**Coefficient**	**(SE)**	**Coefficient**	**(SE)**
Size 1	-0.106***	(0.0003)	-0.240***	(0.0004)
Size 2	-0.123***	(0.0003)	-0.164***	(0.0007)
Size 3	-0.109***	(0.0002)	-0.158***	(0.0007)
Size 4	-0.108***	(0.0002)	-0.150***	(0.0010)
Size 5	-0.107***	(0.0003)	-0.115***	(0.0025)

Note: Estimation results for the gender pay gap based on 10 different regressions. Appropriate sampling weights are used in all calculations.

The other coefficients are ignored for sake of brevity. The control variables include marital status, age (as a quadratic polynomial), education dummies, job permanency, and full-time/part-time work status, as well as year, region, industry, and occupation dummies. Figure 2 visualizes our estimates.

Figure 2. Plot of the Gender-gap Estimates



Note: This figure describes the gender pay gaps as a function of firm size for both formal and informal employment. See Tables 3, 4, and 5 for the exact numbers used to construct the plots.

Observe that the gender pay gap with respect to size is roughly constant for formal employment. The coefficients roughly vary between 0.10 and 0.12 in all regressions, and this variation is of a negligible magnitude. Therefore, we calculate an average gender wage gap for formal employment of approximately 11% in Turkey. On the other hand, informal employment displays a totally different pattern. In terms of the pooled estimates, the gender wage gap for informal employment is 24% in the smallest businesses and around 11.5% in the largest ones. Moreover, we observe a monotonic decline in the informal gender gap as the firm size goes up. Notice that the informal gender gap in the largest companies is almost equal to the average formal gender gap.

Another notable observation is that the informal gender gap in the largest firm-size category is much smaller than the formal gender gap in the post-crisis period—although it was larger in the pre-crisis period. This suggests that, based on data from the 2010-2012 period, the informal employment in the largest firms offers more egalitarian opportunities to women than the formal employment in the same institutions. We conjecture that the underlying force behind this finding might be the implementation of employment-subsidy programs in the post-crisis era in Turkish labor markets. Balkan, Baskaya, and Tumen (2014) show that these programs have been effective in raising the employment prospects for older women (i.e., women of age 30 or above) relative to the employment prospects for older men. Employment subsidies might have induced marginal informal female workers, who had been looking for formal jobs, to switch to formal jobs by reducing their costs to the employers.

If this is the case, then the remaining informal female workers in the largest corporations would only be the high-wage informal females for whom switching to formal status would require a much larger incentive. As a result, a basic selectivity mechanism—which may have stemmed from the subsidy program—might be the underlying force.

Further theoretical and empirical implications of these results, along with explicit links to labor-market discrimination, are discussed in detail by Akar et al. (2013). But there is one point that needs to be emphasized. The literature suggests that the observed male-female pay differences are larger for informal jobs than formal ones [see, e.g., Tansel (2000) and Tansel and Kan (2012)]. If it is assumed that the coefficient of the gender dummy in a Mincerian regression can be attributed to gender discrimination in the labor market, this means that informal jobs are more discriminatory against women. Our findings bring an intriguing insight into this discussion. We show that informal jobs are indeed more discriminatory against women than formal jobs in small firms; however, in large firms, informal jobs are less discriminatory against (or more egalitarian toward) women than formal jobs, at least for a specific time period [see Figure 2].

There is a well-documented fact that there are both "good" (i.e., upper-tier) and "bad" (i.e., lower-tier) informal jobs.[16] The two new facts we document in this paper might be suggesting that the "good" informal jobs are mostly offered by large firms, possibly reflected in the observed formal-informal differences in firm-size and gender pay gaps. Further information on job-related characteristics is needed to make more concrete statements on this issue.

[16] See, e.g., Fields (1990). See also Acemoglu (2001) for a theoretical discussion of good jobs versus bad jobs.

4.3. Policy Implications

There are two provocative policy implications of our results in the areas of economic development and institutional forces. One of the main messages that our results communicate is that informal employment is a major cause of large wage differentials in an economy. However, this mechanism is also linked to the economy-wide size distribution. If there are many small operators and only a few large corporations in the economy, and if there is widespread informality among small firms, then the size distribution of businesses itself imposes considerable wage differentials. So the main question is whether it is the informality or the size distribution that is driving these differentials. It is well known that the share of small firms—as well as the share of informal firms—declines along the development path. Therefore, the first policy implication may be that governments should not specifically focus on reducing wage differentials; instead, their focus should be on economic development. Wage differentials (i.e., both gender and/or size gaps) will eventually become smaller as the economy grows further and a greater proportion of big companies emerges. This result is a first-order implication of our estimates. Akar et al. (2013) discuss these issues in greater detail.

However, cross-country data suggest that wage differentials in some developed countries (such as the United States) are quite large; thus, high development levels alone may not be enough to shrink wage differentials. Then, institutional forces, e.g, the law-and-order factors, come into play. Labor-market institutions, such as minimum -wage laws, unionism, and unemployment-compensation schemes, certainly affect wage differentials. That said, our paper does not address these institutional factors, and further research is needed to understand the link between the firm-size dimension of the economy and its labor market institutions.

5. Concluding Remarks

In this paper, we document two new findings on the firm-size and gender pay gaps along the formal-informal divide. First, we show that the firm-size wage gap is larger for informal employment than formal employment. Second, we find that the gender pay gap is independent of firm size for formal employment, while it is a decreasing function of firm size for informal employment. This is the first paper in the literature presenting the role of firm size in earnings gaps for formal and informal employment in a systematic way. We will be searching for theoretical explanations of these phenomena in our ongoing work.

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