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**The Role of Unemployment in Wage Determination:
Further Evidence on the Wage Curve from Turkey**

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by

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Abstract

This paper presents an empirical estimation of the correlation between wages and regional unemployment rates in Turkey, more specifically it explores the role of regional unemployment rates in wage determination. The analysis builds upon a series of recent empirical studies on the wage-unemployment relationship, now commonly known as "the wage curve," a downward sloping curve in wage-unemployment space. The existing studies are for most part in advanced market economies, while this paper presents one of the few attempts at a wage curve analysis within the context of a developing market economy. A cross-sectional estimation of micro level individual wage data for the Turkish labor market in 1994, suggest a statistically significant negative correlation between wages and regional unemployment rates. Separate regressions for men and women, however, show a wage curve to exist only in the male labor market. The study also presents the results on other variables of wage determination such as returns to schooling, returns to age, job tenure, gender, industrial and occupational affiliation of the worker, economic sector and union status.

I. Introduction

In recent years there has been an increasing interest in empirical analyses of the wage-unemployment relationship, now commonly known as "the wage curve," a downward sloping curve in wage-unemployment space. These studies all find a statistically significant negative relationship between wages and unemployment. More specifically they show that the unemployment rate, whether in the worker's geographic region or industry, is one of the wage determinants. Controlling for personal, industry and regional characteristics, two identical workers are shown to receive different levels of pay given different unemployment rates in their respective regions or industries; the higher the unemployment rate in the worker's region or industry, the lower is her wage. As distinct from the Phillips curve, which entails an empirically derived negative correlation between the *growth rate* of money wages and the unemployment rate based on *macro* level *time se*ries data, the wage curve is derived from an estimation of *cross-sectional microeconomic data* where the *level* of the unemployment rate enters the wage equation as an independent variable with a statistically significant negative coefficient.

The most comprehensive empirical study on the topic is by Blanchflower and Oswald (1994), who present findings on the wage curve in 12 countries. Consequently, researchers in other countries have conducted similar empirical analyses with parallel results pointing towards what seems to be a "universal" wage curve (Canziani, 1997; Johansen, 1995; Janssens and Konings, 1998; Pannenberg and Schwarze, 1998; Baltagi and Blien, 1998; Baltagi, Blien and Wolf, 2000). The existing studies, however, are limited for most part to advanced market economies of the North. To the best of our knowledge, of the 20 countries where researchers have explored the existence of a wage curve, only three are countries of the South. Namely, South Korea and India (Blanchflower and Oswald, 1994); and Cote D'Ivoire (Hoddinott, 1996).

This paper aims to conduct an empirical analysis of the correlation between wages and unemployment rates in another developing market economy, namely Turkey. Countrywide individual wage data became accessible for the first time in Turkey through *the Labor Force Participation and Wage Structure Survey* which was conducted by the State Institute of Statistics in 1995. Using this database we test for the existence of a wage curve in Turkey while controlling for other determinants of wages. The results on

variables such as age, job tenure, level of education, gender, union status, economic sector, industry and occupation, are also noted, as they provide a first-time nationwide *microeconometric* empirical analysis of wage determination in the labor market in Turkey.

The rest of the paper is organized as follows. Section II sets a background consisting of a short theoretical context and a summary review of empirical studies on the wage curve from various countries, as well as the relevant literature on the labor market in Turkey. A description of the data and methodology is provided in Section III. Section IV entails a discussion of the empirical findings on the wage curve in Turkey as well as an overview of the findings on other determinants of wages. Finally Section V summarizes our conclusions.

II. Issue and Evidence

Orthodox thinking in economics regarding the relationship between wages and unemployment is based in the context of the neoclassical supply and demand model of the labor market. Here the marginal productivity of labor sets the demand for labor which, given the supply of labor, determines the market-clearing wage rate. As long as the wage rate is this market-clearing wage rate there is no unemployment. If, for any market imperfection, the going wage rate is set above the market-clearing rate, then labor supply exceeds demand, resulting in unemployment. Implicit in this model is a causal relationship, in which a wage rate set above the market clearing, equilibrium rate by "non-market" factors such as minimum wage legislation, labor unions, etc., leads to unemployment. This suggests not only a positive correlation between wages and unemployment contrary to that observed in the wage curve studies, but also predicts a reverse causality such that: the higher is the actual wage rate over and above the equilibrium rate, the higher will be the level of unemployment.[1]

Critiques of neoclassical economics have pointed out, however, the observed persistence of some level of unemployment in all market economies and the absence of the type of wage flexibility foreseen by the supply and demand model of the labor market in order to achieve the market-clearing rate. In response to these critiques, a series of what can be

called "imperfect competition models" of the labor market were developed to explain why the empirical facts did not comply with the neoclassical model.

Imperfect competition models characterize the wage setting process in various forms, depending on the institutional, historical or technical aspects of the labor markets they attempt to address. Wage bargain models, for instance, characterize wage-setting as a bargaining process between union-member workers and price-setting firms who exercise their monopoly power to compete over as large a share of the output as they can get (Carlin and Soskice 1990). Unemployment acts as a crucial factor determining the wage-setting powers of the workers *vis a vis* the firms, and as such the outcomes of the wage bargain. As unemployment falls, the bargaining power of the workers rise, and so does the claim by workers for a target real wage sought through negotiations. While other forms of the imperfect competition models such as efficiency wage models or insider-outsider models place the emphasis on other aspects of wage determination, they still foresee a negative correlation between unemployment and wages for the same basic reason that higher levels of unemployment tilt the power relationships to the advantage of the employers and the disadvantage of the workers leading to lower wage levels (Salop, 1979; Shapiro and Stiglitz, 1984; Yellen, 1984).[2]

The dampening effect of unemployment on wages is postulated also by classical Marxian economics, where the so-called reserve army of labor, i.e. the surplus of unemployed workers, is foreseen as an integral feature of market economy, rather than as a market imperfection. The reserve army serves the function of a disciplining device on the labor force, which forces them to work harder and for less. The causal relationship runs again from unemployment to wages in that the independent variable here is the fluctuations in the size of the reserve army of labor (Marx, 1865; Rowthorn, 1980; Shaikh, 1991). "Industrial leaders" fear any possibility of full employment because the economic insecurity created by unemployment is necessary to keep wages low and maintain work intensity and discipline on the shop floor (Kalecki 1971).[3]

Despite their distinct nature in theory, the imperfect competition and unorthodox models generate fairly similar empirical hypotheses regarding the correlation between unemployment and wages. In accounting for inter-regional or inter-industry wage differentials, both models call for a negative correlation with the unemployment rate.

In an early empirical study, Rebitzer (1988) examines the effect of unemployment in determination of unit labor costs. Using U.S. data for 1961-80, he shows that movement towards full employment increases the rate of growth of wages and reduces the rate of growth of labor productivity. Gleicher and Stevans (1991) show that a significant portion of occupational wage differentials in the U.S. are explained by the relative degree of competition among workers across firms and industries in that occupation, as measured by the occupational unemployment rate. Blackaby and Hunt (1992) use cross-section data from the U.K. to show that it is the short-term unemployment rate rather than the long-term unemployment rate that has a dampening effect on wages. In a study of pay determination Christofides and Oswald (1992) examine 600 labor contracts between 1978-84 in the private sector in Canada, to show that the real wage is a decreasing function of the level of the regional unemployment.

As mentioned in the introduction, in a substantial empirical evaluation of the negative correlation between unemployment and wages based on data in 12 countries, namely the U.S., Canada, the U.K., Federal Republic of Germany, Austria, Italy, the Netherlands, Ireland, Switzerland, Norway, South Korea and Australia, Blanchflower and Oswald (1994) argue for the existence of what seems to be a "universal wage curve." Moreover, the empirically derived regional unemployment elasticity of pay in different countries seems to cluster around -0.1: a doubling of the unemployment rate is associated with a 10% drop in pay. The lowest elasticity is in South Korea with a coefficient of –0.04 on unemployment, and the highest is in Ireland with a coefficient of –0.36. Proceeding empirical studies have also found evidence for a wage curve in other countries such as Italy and Spain (Canziani, 1997), Norway (Johansen, 1995), Belgium (Janssens and Konings, 1998), West and East Germany (Baltagi and Blien, 1998; Baltagi, Blien and Wolf, 2000; Pannenberg and Schwarze, 1998).

The number of empirical studies, which provide detailed analyses of wage determination in Turkey, is limited mostly due to lack of individual level data. There are no specific empirical studies on the correlation between wages and unemployment. In a discussion of the institutional character of wage determination in the Turkish labor market, Şenses (1994, 1996) argues that the protection provided by institutional arrangements have disabled high unemployment rates from bringing

about wage restraints. Hence he suggests that there is lack of a close link between unemployment and wages rendering Phillips Curve type of analyses superfluous. Metin (1995), on the other hand, in an empirical estimation of wage determination in Turkey for 1963-88, argues that the unemployment rate is determined by real wages, labor productivity and inflation pointing to a reverse causal relationship as predicted by neoclassical theory.

Onaran (1999) offers the only empirical study on the effect of unemployment in wage determination in Turkey. Based on panel data of 26 sub-sectors of private manufacturing industry between 1974-95, she uses macro data to estimate the relationship between the percentage change in real unit labor costs and the change in the unemployment rate in three periods of different economic policies.[4] For the period of 1989-95, Onaran finds a negative and significant coefficient of -0.095 on the unemployment rate. This implies that during the 1989-95 period, a rise of 10% in the unemployment rate leads to a 0.95% decline in real unit labor costs.[5]

III. Data and Methodology

Our source for the wage data in Turkey is the Labor Force Participation and Wage Structure Survey, which was conducted by the State Institute of Statistics (SIS) in early 1995, taking November 1994 as the reference point. The survey covers a random sample of approximately 2,800 workplaces with 10 or more employees in all seven geographical regions of Turkey, in three industries, namely manufacturing, mining & quarrying, and electricity, gas & water. A total of 74,000 workers are surveyed through their employers. The survey provides both firm- and worker-related information. Firm-level information entails variables such as geographic region, industry, public/private sector, total number of workers, whether the firm is under collective bargaining agreement. Worker-level information includes variables such as the worker's age, sex, level of education, number of years on the job, occupation, type of social security coverage, number of weekly work hours, and monthly salary.

The only missing variable in this survey for a wage curve analysis is the regional unemployment rate. Turkey consists of seven geographical regions, which is reported for

each worker included in the 1994 SIS Wage Survey, and a proper wage curve type analysis requires the 1994 unemployment rates for these seven regions. Unfortunately, SIS has not published data on regional unemployment rates for 1994. There are, however, two sources of data which can be used to derive proxies.

The 1990 Population Census provides disaggregated data on provincial unemployment rates from which the regional rates for 1990 were obtained. We have then up scaled the 1990 regional unemployment rates for 1994 according to the percentage change in the countrywide average unemployment rate. Here the main drawback is the implicit assumption that there is no significant change in the interregional distribution of unemployment between 1990 and 1994.

Another source of data on unemployment is the SIS Income and Consumption Survey of 1994, which provides disaggregated data by the seven geographical regions. Here the definition of unemployment is not the internationally used ILO standard. The time frame used as a reference for the unemployment question, for instance, is longer than a week. Yet these figures provide a good proxy for the interregional distribution of local unemployment rates for the year 1994. Further details about the derivation of the regional unemployment rates are provided in the appendix.

The following empirical analysis consists of the standard log-linear cross-sectional regression used by Blanchflower and Oswald. The regression tests for the existence and characteristics of a wage curve in the labor market in Turkey for the year 1994.

The general form of the estimated model is:

$$\log W_{ir} = \alpha + \beta \log U_r + \delta X_{ir} + \varepsilon_{ir}$$

where W_{ir} stands for the wage of individual i observed in region r; and U_r is the unemployment rate in region r. X_{ir} is a set of measured characteristics of individual i (age and its square, gender and education), institutional variables (whether the worker's workplace is covered under collective labor bargaining and a private sector dummy) and industry and occupation dummies.

The number of regional unemployment observations is one year by seven regions, and the number of wage observations is one year by 73,151 workers. An important handicap of our data was its limitation to a single year cross-section combined with the limited number of local unemployment observations. This meant that we were unable to control for regional effects, a shortcoming of our analysis which we hope can be addressed as detailed data becomes available and accessible in Turkey.[6]

IV. Results

Row 1 of Table 1 shows the results on unemployment elasticity of pay using different sources of unemployment data. Column 1 shows the results using regional unemployment rates from the 1990 Population Census, and column 2, from the 1994 Income Survey.[7] Cross-sectional regression analyses using either set of regional unemployment rates derived from different sources all point towards a statistically significant negative relation between wages and regional unemployment rates. In other words, a wage curve exists in the labor market in Turkey.

Depending on the source of the regional unemployment data, the unemployment elasticity of pay ranges from a low of –0.067 to a high of –0.088. This implies that a rise of 10% in the regional unemployment rate leads to anywhere from approximately a 0.9% to 0.7% decline in wages controlling for other wage determinants such as education, age, gender, industry or occupational affiliation and institutional factors.[8] The magnitude of the elasticity we find for Turkey is in the range of the unemployment elasticities of pay reported from other countries which, as noted above, are dispersed closely around –0.1.

The rest of Table 1 presents the detailed findings on other variables of the wage equation. While the main purpose of our paper is to test for the existence of a wage curve in the labor market in Turkey, the findings on the other control variables are also worth noting since to the best of our knowledge this is the first study that uses countrywide microeconomic data to estimate a wage equation. Moreover, these findings provide further insights into the types of factors that interact with the local unemployment rate in determination of wage rates.

As can be seen in comparing the two columns in Table 1, the use of different sets of regional unemployment data does not affect the coefficients on the personal control variables in any significant manner. All the personal control variables standard in the human capital model as well as the institutional factors and industrial and occupational affiliation turn out to be statistically significant and carry the expected signs.

(Table 1 about here)

In Table 1, the coefficients on age and its square show that the returns to age are positive and decline with increases in age, as predicted by the human capital model. The positive coefficient on the age variable, controlling for other variables, implies approximately 6% annual return to age and is highly significant. The negative coefficient on age squared shows that the incremental returns to age decreases as the years of experience increase. The age variable was used interchangeably with the job tenure variable also included in our database and yielded similar results as predicted.

The positive coefficient on the male dummy shows that the mean salary of male workers is higher by 8% than the mean salary of female workers controlling for all the other explanatory variables.[9] It should be noted here, however, that estimations excluding institutional factors and industrial and occupational dummies, finds the gender wage differential three times higher at 24%. The inclusion of the latter set of variables, which account for industrial and occupational segregation of women in the labor market, as well as their lack of representation in the unionized labor force, leads to a significant decrease in the wage differential.

The coefficients of the education dummies indicate as expected a positive rate of return to schooling. Controlling for all the other factors, the mean wage of the workers who have completed anywhere from five to eight years of primary schooling is higher by 8% than for those who are illiterate or who have had less than primary compulsory education. The mean wage of the workers who have completed high school or equivalent of 11 to 12 years of schooling earn 25% more than illiterate. This figure is 55% for college and university graduates.

Most of the industry and occupation dummies, which are added to capture the effects of the productivity and profitability differences on wages, are also statistically significant and carry the expected signs. Industry dummies for petroleum & chemicals or machinery and metal goods manufacturing have the highest positive coefficients indicating relatively higher pay in these capital-intensive, high technology industries which have relatively high productivity. On the other hand, low technology, low productivity, labor-intensive industries such as textiles manufacturing, forestry products & furniture manufacturing, or mining and quarrying carry negative coefficients indicating relatively lower pay. Similarly the occupational dummies for high level managers or scientific and technical staff yield positive and high coefficients reflecting higher pay for these human capital-intensive occupations which require an advanced level of education and complex skills.

As mentioned in the background section above, among the variables, which are postulated by the wage bargain theories to affect wage determination, are institutional factors such as the level of union organizing in the labor force, use of collective bargaining structures, implementation of labor laws, etc. In our case, we used two variables in our database, namely "whether the workplace is covered by collective labor bargaining" and "the type of economic sector" (private/public) to reflect some of the institutional pressures in wage determination.

The coverage of the work place under collective labor bargaining, a common institution of wage determination in the unionised sector of the economy in Turkey, proved to be a highly significant and positive determinant of the wage level. The coefficient on this variable shows that controlling for other factors, the coverage of the workplace under collective labor bargaining raises wages by as much as 71%.

We find a significant and negative coefficient on the private sector dummy. Accordingly, the mean wage in the private sector is 49% lower than the public sector. This finding is not surprising in view of the economic crisis in Turkey in Spring of 1994, six months prior to the reference period used in the SIS Wage Survey. One of the important consequences of this crisis was a series of cost-reducing measures undertaken by private sector firms such as lay-offs, wage reductions, division of large firms into smaller units in order to avoid certain labor law requirements for bigger firms. The

public sector enterprises could not revert to many of these strategies given their strict surveillance under labor law.

Given the insights provided by the findings on these various variables of wage determination, it is natural also to take a look at the wage curves by disaggregated groups of workers such as private vs. public sector workers, male vs. female, young vs. old, educated vs. less educated. Table 2 presents the results of estimations of the wage equation separately for different categories of workers.

(Table 2 about here)

The results in Table 2 show that not only the magnitude but also the sign and the significance of the coefficient on the unemployment term vary greatly for different categories of workers. In looking at disaggregated wage curves of different groups of workers, the generally proposed hypothesis following from theory, is that the lower the bargaining power of a category of workers, the higher would be their elasticity of pay. Several studies using US or UK data, have confirmed this hypothesis with some mixed results, also pointing out to the existence of fairly different labor markets for workers of different genders, ethnicities, classes, etc. (Katz and Kruger, 1991; Blanchflower and Oswald, 1994; Boushey 1998).

In the case of the labor market data from Turkey, the results similarly point to the diversity of labor market dynamics for different categories of workers. Looking at the sectoral differences, while we do find that a wage curve exists both in the public and the private sector, pay elasticity in the latter is three times as high as that in the former. This finding is in line with the above-reported result on the highly significant negative coefficient on the private sector dummy. While the wage determination process in the public sector is subject to a centrally determined bureaucracy and under more strict surveillance by labor regulations, the private sector entails unregulated market dynamics of the kind depicted by most of the theoretical models described in Section II above.

An interesting insight is provided through disaggregating the wage curve by gender. The unemployment elasticity of wages for men is substantially higher than that found for the mixed sample; an estimation for men in the private sector nearly doubles the pay

elasticity from –0.088 to –0.164. On the other hand, we find a positive and significant coefficient on the unemployment elasticity of pay for the all women sample. Estimated for women in the private sector, the coefficient is much smaller, still positive but statistically insignificant. In other words, the wage curve does not exist for women in the private sector, while for a mixed sector sample of women, pay levels seem to respond positively to the local unemployment rates. This finding is echoed in a study of the wage curve in Belgium where Janssens and Konings (1998) find a positive but statistically insignificant unemployment elasticity of pay for women. The authors interpret this finding as the female labor market being more competitive and less influenced by union bargaining than the male labor market.

In the case of Turkey, we believe the best interpretation of the lack of evidence of a female wage curve to be related to the specific dynamics of female labor force participation that is clearly distinct from that of men. Women's labor force participation rates in urban areas of Turkey are typically about one quarter that of men's. For a vast majority of women from low-education, low-income backgrounds, work for pay is something that they do at younger ages prior to marriage or childbirth. In the case of married women, except for those career women with higher education, paid work is for most part out of pure financial necessity in meeting family needs. Otherwise, women are expected and in some cases prefer to assume family roles as a priority. The implications of this very different female labor force participation dynamics is that women of low-skill, low-pay groups respond to tightening labor markets by complete withdrawal from the workforce and they shift to assume their traditional roles as homemakers. This leaves the female labor force in tight labor markets comprised more heavily of women from high-skill, high-pay categories, with higher bargaining power. Hence the seemingly positive or statistically insignificant correlation between local unemployment rates and female wages.

The rest of Table 2 excludes the public sector and the female work force, and looks at different categories of men in the private sector where the wage curve story seems to apply more accurately. Estimations of the wage equation for different education groups show that the elasticity of pay decreases parallel to the increase in the level of education and hence it can be argued parallel to the increase in bargaining power.. For workers in

the highest level of educational category of "college or above", we do not find any evidence for a statistically significant wage curve.

Estimations for different age groups point to a trend of decreasing wage elasticity with increasing age. In the highest age category of "above 50 years old", the coefficient on unemployment ceases to have any statistical significance similar to the highest educational category of workers. The only exception to the rule is the youngest age category of "25 years old or younger", where the elasticity of pay is lower than those in the middle age categories. Considering the common phenomenon of young workers living in a family home and working for supplementary income, the lower elasticity of pay can be interpreted as a sign of their relatively greater protection from the negative effects of a tightening labor market, in a similar vein to that of women.

Another interpretation of the lack of wage responsiveness to unemployment among women and young workers could also be found in their relatively low wages. Being close to the subsistence level of income, any rise in unemployment might fail to depress their wages any further. For instance, in our data we find that the distribution of wages of women and young workers is compressed within a narrow scale close to the subsistence level. For the all men sample, however, wages are spread in a wider scale concentrated towards relatively higher wages than the distribution observed for women or younger workers.

Estimations of the wage equation for different occupational categories also confirm the hypothesis of the association between lower unemployment elasticity of pay and higher bargaining power. For the high-skill, high-education occupational categories of "scientific, professional, technical workers" and "administrative, executive and managerial workers", we do not find any evidence of a statistically significant wage curve although the coefficient on unemployment is negative. Yet for the other lower-skill, lower-education categories with less bargaining power, there is a statistically significant negative correlation between local unemployment and pay. The coefficient on unemployment is highest for the lowest-skill occupations of "production and related workers" and "agricultural and related workers".

V. Conclusion

A wage curve does exist in Turkey. Consistent with the findings from previous studies on labor markets in different countries, we have established that the local rate of unemployment is a statistically significant determinant of wages. The labor market in Turkey exhibits a negative unemployment elasticity of pay. Our findings also confirm the significance of other standard factors commonly used in empirical studies of wage determination.

Estimations of the wage equation for different categories of workers have confirmed the expected correlation between lower bargaining power and higher elasticity of pay. The only exceptions to the rule were young workers and women, whose pay had little or no responsiveness to local unemployment. We suggested two possible interpretations which had to do either with the unique characteristics of their labor force participation or with the compression of their wages close to the subsistence level of pay. Whatever interpretation we take, the results point to the existence of a segregated labor market in Turkey.

Certainly the performance and trustability of our empirical analysis could be further improved by more accurate data, primarily time series data on wage and unemployment and data at a greater level of disaggregation than merely seven geographical regions which would allow for control of regional effects. From the point of view of the literature in Turkey, we hope that our study opens further avenues into more informed and detailed discussions of wage determination and improvement of accessible data sources.

Nevertheless our findings on the wage-unemployment correlation in the Turkish labor market are consistent with the findings of the international literature on the topic. By adding Turkey onto the list of countries where the existence of a negative unemployment of elasticity of pay has been empirically confirmed, we contribute further evidence to the argument for the existence of a universal wage curve.

Appendix: Data on Regional Unemployment Rates

The most recent unemployment data available at some level of regional disaggregation in Turkey is in the 1990 Population Census published by the State Institute of Statistics (SIS). This data entails, for the 73 provinces of Turkey, the actual numbers of economically active population, as well as its breakdown into employed population and unemployed population. In the 1994 Wage Survey data, which was provided to us by SIS, the level of geographic disaggregation was by seven regions. Hence to find the unemployment rates for these seven regions, we have grouped the provincial labor force participation data of the 1990 Population Census into these seven regions and have derived the regional unemployment rates for 1990. Then we have up scaled these derived 1990 rates for 1994 according to the percentage change in the countrywide official unemployment rate from 1990 to 1994. As the regional distribution of the unemployment rates was the same for both sets of data, the regression analyses of the wage curve provided almost identical results. Hence in the *Results* section above, only the regressions using the 1990 regional unemployment rates are presented. In combining the 1990 regional unemployment rates with 1994 wage data for a wage curve analysis, we had to make an assumption that there is no significant change in the interregional distribution of unemployment from 1990 to 1994.

Another set of proxies for the 1994 regional unemployment rates were derived from the SIS Income and Consumption Survey of 1994 which provides various employment data disaggregated by the seven geographical regions. The employment/unemployment questions take the complete year of 1994 (12 months) as the reference period. As a proxy for regional unemployment we have derived the ratio of the number of people in each region who reported that "they have **not** worked in the past twelve months because they did not have a job" to the number of people who have reported that they have worked for pay in the year 1994. The internationally used ILO definition of unemployment, on the other hand, is limited by a reference period of one week; and applies a three-step procedure for the identification of the unemployed: they have not worked during the reference week, were looking for a job and are ready to start work immediately in the following week if offered a job.

While neither data set provides us with the accurate levels of regional unemployment rates in 1994, they do provide a good proxy for the interregional distribution of local unemployment rates in 1994. Since the wage curve analysis is concerned with the interregional distribution of unemployment rates rather than their actual levels, we believe these proxies to be sufficient for our purposes.

Notes

[1] The so-called "compensating differentials" model is another theory in economics which postulates a positive correlation between local unemployment rates and wages. Here it is suggested that workers in high unemployment areas are compensated by relatively higher wages for the undesirable characteristics of their regions.

[2] Efficiency wage models, for instance, involve employers strategically setting wages above the market-clearing level despite the absence of union participation in wage setting. Firms prefer to use such a strategy in order increase workers motivation and hence productivity. The wage set by the employer has been called the "efficiency wage" to indicate the advantages of the higher wage from the firm's perspective for inducing improved productivity and reducing unit costs. The rate of unemployment enters the model in determining the shirking utility of the worker which is based, among other things, on the probability of finding another job if dismissed due to shirking or the probability of being unemployed when dismissed and living on unemployment benefits. As unemployment increases, the efficiency wage needed to discourage shirking decreases., hence a negative correlation between wages and unemployment.

[3] See also Goodwin 1967 and Shaikh 1991 and 1983 for a dynamic business cycle interpretation of this classical model.

[4] Onaran's analysis is conducted in three periods of different economic policies: the period of 1974-79, the import substitution phase; the period of 1980-88, the first phase of structural adjustment which marks a shift to export-led industrialization; and the period of 1989-95, the second phase of structural adjustment when liberalization of capital movements takes place. For the first period, Onaran finds a positive but insignificant coefficient on unemployment; for the second phase there is a negative but again insignificant coefficient on unemployment.

[5] Onaran argues that part of the real wage gains of the early 1990s can be explained by decreases in the rate of unemployment, which was caused by expansionary macroeconomic policies. She suggests that in this period the intensification of trade union activity coincided with the favorable economic conditions for the capitalists, thus making it possible for the working class to reflect the results of the decline in the unemployment rate to their wages. Only the 1994 crisis and the consequent stabilization package, which resulted in a 0.4% rise in the unemployment rate, changed the balance of power at the expense of labor again leading to a 27.2% decline in unit labor costs in private manufacturing industry.

[6] Researchers in a few other countries, namely Australia, Switzerland and India faced similar constraints, and were unable to control for regional effects.

[7] The coefficient on the local unemployment variable depends on the inter-regional distribution of unemployment rates rather than their actual levels. Hence analyses using either the regional unemployment rates of the 1990 Population Census or those upgraded for 1994 using percentage change from 1990 to 1994 in the countrywide average unemployment rate provided identical coefficients. However, the local unemployment rates calculated on the basis of the SIS Income and Consumption Survey of 1994 had a slightly different inter-regional distribution and hence the resulting unemployment elasticity of pay was somewhat different.

[8] A common critique of the wage curve analysis is that it combines a large number of individual wage observations with a small number of observations on local unemployment rate leading to within group disturbance correlation that results in superficially t statistics. Following these critiques by Moulton (1990) and Card (1995), researchers including Blanchflower and Oswald re-estimated the regressions with cell means as observations to find a negative and statistically significant coefficient on unemployment. In the case of Turkey, regression using cell means is limited to merely seven observation points for seven regions disabling the inclusion of all our explanatory variables. Trials using the regional unemployment rate and the gender variable as regressors, provided a statistically negative unemployment elasticity of pay.

[9] For interpretation of the coefficients on the dummy variables in a semi logarithmic regression equation, we find the antilog of the coefficient; subtract 1 from this antilog, which gives us the percentage change in the dependent variable, in our case the wage. See Gujarati (1995), pg. 525-26.

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Table 1. The Wage Curve in Turkey: Determinants of Wages

	(1) Unemployment 1990	(2) Unemployment 1994
Log U	-0.088**	- 0.067**
	(0.008)	(0.004)
Age	0.059**	0.059**
	(0.001)	(0.001)
Age Squared	-0.0006**	- 0.0006**
	(0.000)	(0.000)
Male	0.076**	0.079**
	(0.005)	(0.005)
Primary school	0.081**	0.078*
	(0.008)	(0.008)
High school	0.225**	0.223**
	(0.009)	(0.009)
College and above	0.442**	0.439**
	(0.011)	(0.011)
Private Sector	- 0.401**	- 0.404**
	(0.005)	(0.005)
Collective Labor Bargaining	0.540**	0.539**
	(0.004)	(0.004)
Industry Dummies	Yes(11)	Yes(11)
Mining and quarrying	- 0.066**	- 0.066**
	(0.008)	(0.008)
Manufacturing textiles	-0.086**	-0.086**
	(0.006)	(0.006)
Manufacturing forestry products & furniture	-0.137**	-0.137**
	(0.009)	(0.009)
Manufacturing paper products	0.026*	0.024*
	(0.009)	(0.009)
Manufacturing chemicals, petroleum, coal, etc.	0.210*	0.209*
	(0.007)	(0.007)
Manufacturing stone & earth ware	0.023*	0.023*
	(0.008)	(0.008)
Manufacturing main metal industry	0.091**	0.091**
	(0.008)	(0.008)
Manufacturing metal goods, machinery, transport vehicles, etc.	0.120**	0.118**
	(0.006)	(0.006)
Manufacturing other manufactured goods	0.035	0.030
	(0.018)	(0.018)
Electricity, gas and hot water production and distribution	0.208**	0.209**
	(0.009)	(0.009)
Water collection, purification & distribution	-0.383**	-0.380**
	(0.009)	(0.009)
Occupation Dummies	Yes(7)	Yes(7)
Scientific, technical, professional & related workers	0.212**	0.204**
	(0.430)	(0.430)
Administrative, executive and managerial workers	0.395**	0.387**
	(0.044)	(0.044)
Clerical and related workers	0.032	0.024
	(0.042)	(0.042)
Commerce and sales workers	0.242**	0.233**
	(0.044)	(0.044)
Service workers	0.028	0.021
	(0.042)	(0.042)

Production workers, transport	**0.137***	**0.128***
equipment operators and laborers	(0.042)	(0.042)
Constant	**7.647****	**7.626****
	(0.50)	(0.049)
Adjusted R^2	**0.567**	**0.568**
F	**3681.86**	**3696.94**
DF	**73151**	**73151**

Notes: The dependent variable is the natural logarithm of monthly salary. Standard errors are in parentheses. * significant at 5% significance level; ** significant at 1% significance level.

Table 2. The Disaggregated Wage Curves: Unemployment Elasticities of Pay for different categories of workers

Categories of Workers	Regional U	Adj. R^2	N
All	-0.088** (0.008)	0.567	73177
Private sector	-0.135** (0.011)	0.466	50488
Public sector	-0.043** (0.012)	0.401	22688
All men	-0.113** (0.009)	0.571	62973
All women	0.114** (0.024)	0.482	10203
Men in private sector	-0.164** (0.012)	0.474	41924
Women in private sector	0.051 (0.026)	0.411	8563
PRIVATE SECTOR MEN ONLY ↓			
By educational categories			
Less than primary schooling	-0.228** (0.036)	0.478	2472
Primary or high school education	-0.172** (0.012)	0.428	36881
College education	-0.029 (0.066)	0.314	3056
By age			
Age 25 years old or younger	-0.136** (0.021)	0.191	7815
Between 25 and 35 years of age	-0.189** (0.017)	0.395	19773
Between 35 and 50 years	-0.174** (0.023)	0.440	13390
Older than 50 years of age	-0.120 (0.084)	0.486	1091
By occupational categories			
Scientific, technical or professional workers	-0.017 (0.076)	0.330	1916
Administrative, executive and managerial workers	-0.233 (0.113)	0.322	1204
Clerical and related workers	-0.287** (0.053)	0.434	2519
Commerce and sales workers	-0.430** (0.101)	0.490	974
Service workers	-0.215** (0.040)	0.470	2575
Agricultural, animal husbandry, forestry workers and fishermen	-0.856** (0.246)	0.450	60
Production and related workers, transport equipment operators and laborers	-0.153** (0.012)	0.449	32670

Notes: The dependent variable is the natural logarithm of monthly salary. Standard errors are in parentheses. * significant at 5% significance level; ** significant at 1% significance level.