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SECTORAL EMPLOYMENT AND LABOR COSTS: ELASTICITY EVIDENCE ON TURKEY

SEKTÖREL İSTİHDAM VE İŞGÜCÜ MALİYETLERİ: TÜRKİYE'DE ESNEKLİK DEĞERLERİ

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ABSTRACT

A recurrent theme in employment policies is that reduction of labor costs would increase employment. This study aims to obtain a value for the employment elasticity of labor cost in Turkey through estimation of a sectoral employment equation. Using 3-digit ISIC Rev 3 industry data obtained from TURKSTAT, the present study performs a panel analysis. The calculated elasticities are positive, contradicting theoretical expectation., and pointing that cost reduction may not be a valid tool for employment expansion. It is also argued that the problem with the sign may be due to the data used and may actually be supportive of a wage curve.

JEL Codes: J30, C23, C68

Keywords: Labor cost, employment, panel analysis

I. INTRODUCTİON

One frequently encountered point in employment related debates is that high labor costs would decrease employment. Thus one widespread policy recommendation is that labor costs should be reduced to reduce unemployment. Hence, the connection between employment and labor cost is a crucial input for employment related policy debates.

Relating to theoretical justification on the link between cost and employment, many works abound. For example, the dynamics presented by Telli, Voyvoda and Yeldan (2006) focuses on the demand side of the labor market. That is, the causality is from the decreasing labor costs to decreasing production costs that lead to increased input demand and thus a fall in unemployment.

Briefly outlining the neoclassical approach, Bowles and Boyer (1995: 143) argues that real wage increases decrease labor demand either through firms' substitution between alternative inputs or through substitution of production from domestic producers to foreign producers, purely as a response to input cost. Bowles and Boyer (1995: 143-144) also outlines the Keynesian framework and states that wage, and thus labor cost, is not only the determinant of labor demand, but is also a component of consumers' demand for produced goods. Therefore, an increase in labor cost may boost employment through increases in aggregate demand in the economy.

It is possible that high unemployment rates may lead to an erosion of workers' bargaining power, resulting in lower wages. The unemployment elasticity of wage in this case would be negative. Such an approach is a crude description of the wage curve as put forward especially by Blanchflower and Oswald (1994).

The aim of this study is to obtain a value for the employment elasticity of labor cost in Turkey through estimation of a sectoral employment equation. The calculation of labor cost and employment elasticity serves three purposes. Firstly; the direction of the relationship between employment and labor cost would have strong implications on employment policy debate. If labor cost of production is positively related to labor demand, reduction of labor cost would not be a valid argument for enhancing employment. Secondly; calculation of labor cost and employment elasticity would provide a rule of thumb on employment policies, for the calculated elasticity figure shows how much change needs to be introduced to the labor cost in order to attain a given change in employment. Thirdly; an additional contribution would be to comment on whether neoclassical or Keynesian approach to labor cost and employment relationship is more appropriate for the Turkish case.

Even though the wage curve appears as the appropriate tool for the aim, a careful consideration reveals that this is not the case. Earlier studies of the wage equation date back to early 1970s. Examining unemployment in 12 US cities, Hall (1970) plots 1966 city pays and unemployment, identifying a positive relationship between these variables. Hall (1972) improves by regressing a cross-section data of nominal wage on unemployment, but with a t statistic of just over 2. Hall's findings became subject to heavy criticism from Brookings Paper discussants due to the questionable fit of data. The debates led to further research built upon larger, pooled data sets with conflicting conclusions. Even though Hall's conclusions were confirmed by Reza (1978), Behman (1978) finds little support for a positive relation between unemployment and real wage.

Despite the controversies in 1970s, it became established in 1980s that there is a considerable effect of spatial forces on unemployment and wages. Adams (1985) tackled the notion that given the difficulty of migrating between regions, moving to a high wage region is considered an investment and is undertaken despite the possibility of unemployment. Topel (1986) also constructs a model in which workers' spatial choice is an investment decision; contributing to the orthodoxization of the idea that regional pay is closely related to regional unemployment. This line of thinking led to the microeconometric panel studies that relate regional pay and unemployment and to Blanchflower and Oswald (1994); a comprehensive analysis of wage curves in a number of countries.

Having established a theoretical basis for the wage equation, the literature moves on to the estimation of the equation for various countries between mid 1990s and 2006. Blanchflower and Oswald (2005) list a considerable literature of such estimations. Included in this biography is a wage curve estimate for Turkey by İlkkaracan and Selim (2003).

The inappropriateness of a wage curve for the purpose of this study stems from three points. Firstly, the aim of this study is to examine the demand-side of the labor market by focusing on labor costs. The theory underlying the wage curve, however, is a supply side mechanism that takes into consideration the decision process of workers. Second reason is the availability of data. Even though wage curve estimation has been performed for Turkey, extending the performed study is nearly impossible due to data limitations as stated by İlkkaracan and Selim (2003). Thirdly, the wage curve does not match the aim of this study conceptually. While a wage curve focuses on the effect of wage on labor supply, the current study aims to measure the labor demand effect of labor costs.

Thus the current study chooses sectoral employment estimation over spatial wage curve estimation. Given the relatively limited literature on determinants of sectoral employment, the current study aims to contribute by filling this gap as well.

The next section provides a brief review of the literature on sectoral employment and presents the mathematical model of the study. The third section explains the data sources and identifies the econometric model with explanations on the estimation methodology to be employed. Fourth section includes the estimation results while the conclusion of the paper is presented in the fifth section.

II. THE MODEL

The theoretical model is constructed by making use of first order conditions of firm profit maximization problem. The theory on obtaining static labor demand from Cobb-Douglas, CES, generalized Leontieff and translog technology for two factors of production and several factors cases have been outlined by Hamermesh (1986) and Hamermesh (1993). Such an approach has been employed by various studies that focus on sectoral employment; examples with perfect competition assumption include Bhandari and Heshmati (2005) and Kunce (2006). Bhalotra (1998) on the other hand employs a set-up with imperfect competition and mark-up pricing by firms.

Production:

In order to develop a theoretical model, it has been assumed that firms employ two inputs, labor and capital, in production of the final good and operate in a perfectly competitive setting. The sectoral production technology is assumed Cobb-Douglas:

$$Q_i(K_i, L_i) = A\, K_i^{\alpha} \;\; L_i^{\beta} \qquad (1)$$

Where K and L are capital and labor respectively.It should be noted that the production technology is specified for various sectors, denoted by the index i.

Profit Maximization and Labor Demand:

Given the production function in (1), the profit function of a representative industry i can be summarized as follows:

$$\Pi_i = Q_i(K_i, L_i) - w_i L_i - r_i K_i \qquad (2)$$

where w and r denote what we will name as factor cost coefficients. Note that the product price has been normalized to 1.

Keeping in mind that the firm chooses level of capital and labor to be used in production and takes technology, A, as given, the first order condition for labor yields:

$$L_i = \beta \; \frac{Q_i}{w_i} \qquad (3)$$

as the demand for labor in sector i. The obtained functional form indicates that the demand for labor can be considered as:

$$L_i = f\,(Q_i, w_i) \qquad (4)$$

That is, labor demand is a function of sectoral output and labor costs. This approach provides the foundation for the empirical model and the equation to be estimated.

A more general approach to obtaining the labor demand function would assume imperfect competition and include perfect competition as a special case. The resulting labor demand in this case would include the number of firms in a sector as one of the determinants of labor demand. In order to account for such a case, one can consider the labor demand function as:

$$L_i = f\,(Q_i, w_i, n_i) \qquad (5)$$

where ni represents the number of firms in sector i.

As an addition to sectoral output, labor costs and the number of firms, a number of variables have also been used in the literature to explain the demand for labor. But it should be noted that most empirical research on labor demand employs individual or firm based panel data. Therefore it is possible for such studies to benefit from available data unique to cross section units, for example human capital aspect of labor. However, the current study aims a sectoral analysis and thus does not benefit from large panel databases that contain detailed information on specific workers and their education and experience levels. Hence, the current study is forced by data limitations to diverge from the established labor demand research in terms of variables included in estimation.

Another approach is to include macro policy variables like money supply and government expenditures in the model. However, the appropriateness of such an approach is questionable. The effect of expansionary or contractionary monetary and fiscal policy would be observed through the fluctuations in sectoral output, Qi, and inclusion of such macro variables in addition to output introduces the possibility of “double counting” policy effects. Also, given that labor demand decision is a micro decision taken at the firm level, it may be argued that macro variables should not enter the labor demand function. Following such reasoning, Heshmati and Ncube (1998) introduce policy variables as components of labor demand variance rather than variables of static labor demand.

A considerable number of studies also examine trade and employment interaction. Such studies introduce openness to trade as a variable to labor demand equation. It can be argued that as a sector’s decreasing international competitiveness may be observed through a fall in the ratio of imports covered by imports. The effect of such a variable, however, is not clearly explained by empirical literature, especially for the developing countries, as pointed out by Fajnzylber and Amloney (2000: 1-2). For the Turkish case, Krishna, Mitra and Chinoy (2001) state that the hypothesis of no relationship between trade and labor demand can not be rejected. Hence, an indicator of trade openness is not included as a variable.

III. DATA AND ECONOMETRİC CONSİDERATİONS

The data used is the Annual Manufacturing Industry Statistics (MIS) prepared by TURKSTAT and has been obtained by placing an order to TURKSTAT. The database includes information on the number of firms, labor cost, output and the number of workers that receive payments for 3-digit ISIC Rev 3 industries between years 1992-2000.

The choice of the time period is primarily due to two reasons. Firstly, the time period represents a relatively homogeneous era in terms of economic structure. The structural adjustment of Turkish economy in 1980s has been completed by 1992. After the crisis of November 2000 and February 2001, Turkish economy shifts to a policy framework that emphasizes low inflation coupled with relevant institutional arrangements, especially central bank independence. The time period from 1992 to 2000 is bracketed by these major shifts. Secondly, there is a data limitation after 2000. A brief search through the publications on TURKSTAT’s website reveals that the latest Annual Manufacturing Industry Statistics, a source that includes detailed sectoral data with consistent classifications, is available for year 2001 latest.

The analyzed sectors are listed in Table 1 at the appendix. The study includes 57 3-digit industries for 9 years; a total of 513 observations. The labor cost and output data are provided in millions of Turkish Liras, which have been converted to millions of US dollars using the exchange rate data from the Electronic Data Delivery System of the Central Bank of the Republic of Turkey. This enables evading the complications arising from the high inflation rates Turkey has experienced during 1990s.

Building upon the theoretical considerations stated in the previous section, the estimated equation has been formulated as:

$$\ln T_{it} = \beta_0 + \beta_1 \ln Q_{it} + \beta_2 \ln w_{it} + \beta_3 n_{it} + e_{it} \quad (6)$$

where the natural logarithm of all variables is taken so that the estimated coefficients are elasticities. Keep in mind that Q represents output, w is wage (or labor cost) and n is the number of firms.

Given that the error term, e, obeys the classical assumptions, equation (6) can be optimally estimated by ordinary least squares approach. On the other hand, assuming that the intercept varies across cross-section units introduces a broad range of econometric specifications. It is possible to assume that the intercept varies across time and sectors (a two-way model) or that it varies across time or sectors (a one-way model). The present study assumes that the intercept varies across only sectors so that the econometric model is a one-way model.

A method to take into account such variations in intercept includes redefinition of the error term as follows:

$$e_{it} = \alpha_i + \eta_{it} \quad (7)$$

where η it is assumed not to correlate with the explanatory variables. The term αi is time- invariant and represents cross-section specific effects. This formulation allows the introduction of the fixed effect model (where αi is correlated with explanatory variables) and the random effects model (where αi is not correlated with explanatory variables).

In the case of random effects model, direct application of OLS on (6) augmented with (7) leads to understated standard errors and less efficient coefficient estimates as compared to generalized least squares (GLS) method. The complication introduced to the error term results in autocorrelation and thus necessitates generalized least squares (GLS) estimation to obtain coefficients.

Estimation of coefficients is simpler in the case of fixed effects model; cross-section specific effects are captured by a group of dummy variables included in the model such that:

$$\ln T = \beta_0 + D\alpha + \beta_1 \ln Q + \beta_2 \ln w + \beta_3 n + \eta \quad (8)$$

where D is the matrix of dummies for each cross-section unit. Obviously, the model faces the problem of collinearity created by the dummies included in the model. Thus, making use of the symmetric idempotent matrix M = I –

D(D'D)-1D' the model is transformed such that variables are deviations from means. Applying OLS to such transformed model yields the model coefficients, also called the within estimators.

IV. ECONOMETRİC RESULTS

Prior to applying OLS to the pooled data set, it should be noted that the data set contains a diverse group of sectors. It is logical to expect that the coefficients estimated for these sectors are not homogeneous and a criterion to separate these sectors into groups is necessary. One simple approach is to consider the per worker capital to identify capital intensive sectors and group these sectors accordingly. The TURKSTAT data includes installed total power in KwH for the sectors as well. Using this data as a proxy for capital, a proxy for capital per worker can be calculated. In order to accomplish this, installed power per worker is calculated for all sectors and all years. Then the average for each sector across years 1992-2000 is taken. The result for each sector is presented in Table 1 in the Appendix. As the next step, the average of averages for the sectors is calculated to be 11.38 KwH per worker. The sectors with lower values are labeled as low capital intensity sectors while sectors with higher rates are the high capital intensity sectors.

The question addressed at this stage is whether the coefficients estimated for all sectors are homogeneous. Such a concern can be addressed by a Chow test, basically an F test, as stated in Woolridge (2003: 431-432) and performed by Kunce (2006). A calculated F statistic of 2.59 is adequate to reject the null hypothesis of homogeneous coefficients across all industries. That is, rather than pooling all sectors, they should be divided into two groups as low and high capital intensive sectors and estimations should be performed separately.

Tables 2 and 3 present the pooled OLS, fixed effect (FE) and random effect (RE) results for low capital intensive and high capital intensive sectors respectively. Choosing between alternative formulations of estimation is possible through a group of tests. Firstly, an F-test can be conducted to choose between OLS and FE models. Underlying idea is to test the joint significance of the dummy variables included in the FE model. Specifically, the conducted test checks the null hypothesis that $\alpha_i = 0$. The calculated test statistics is $F(41, 333) = 25.38$ and leads to the conclusion that the dummy coefficients are jointly significant. Hence FE is chosen over OLS.

The next step is to choose between FE and RE specifications by checking whether α_i is correlated with the explanatory variables or not. Hausman (1978) presents a method to conduct this test. The logic of this test rests on two points; firstly, if the α_i terms are uncorrelated with explanatory variables, the RE estimator is consistent and efficient whereas FE estimator is consistent but not efficient. Secondly, if α_i terms are correlated with explanatory variables, FE estimator is consistent and efficient but now RE estimator is inconsistent. The difference leads to the Hausman test. The null hypothesis is that the errors are not correlated with explanatory variables so that the random effects model is valid. The calculation of the test statistic yields a value of 44.09 and clearly rejects the null hypothesis that the valid model is RE and favors FE. Therefore it is concluded that FE model is the preferred model for low capital intensity sectors.

Table 3 presents OLS, FE and RE estimates for high capital intensity sectors. As was the case for the low capital intensity sectors, the joint significance of the dummies in FE model is performed by an F-test. The calculated value, F(14, 117) = 27.19 rejects the null hypothesis that dummy variable coefficients are zero and favors the FE model. A Hausman test yields a calculated test statistic of 30.29, indicating that FE should be chosen over RE.

As can be seen in Tables 2 and 3, number of firms in an industry, output and labor cost are found to be positively related to the number of workers employed. All the coefficients are statistically significant with high t and z values. Explanatory powers of regressions are very high as displayed by the calculated R-squared values for both group of sectors and all the employed models.

As the variables of the model are all in natural logarithm, the calculated coefficients are all elasticities. The FE model indicates that the output elasticity of number of workers in a low capital intensity industry is 0.18. That is, a 1% increase in output (which is in millions of US dollars) leads to a 0.18% increase in the number of people employed. Similarly, a 1% increase in the number of firms leads to a 0.33% increase in the number of workers employed. In a high capital intensity sector, a 1% increase in output causes about 0.27% increase in the number of workers employed while a 1% increase in the number of firms creates a 0.27% increase in the number of employed workers.

The main concern of this study is on the relationship between labor cost and the number of workers employed. The calculated coefficients are 0.35 for low capital intensity sectors and 0.28 for high capital intensity sectors. It is surprising to have a positive relationship between labor cost and the number of workers employed and the situation is not consistent with the economic model put forward above.

It may be considered that the reason for this inconsistency is the used dataset. The present study implicitly assumes that firms will react to the labor costs, which are assumed to be correctly reported in TURKSTAT's database. The idea is that as labor cost increases, employers will react by using less labor. However, it is possible that the data of TURKSTAT simply reports the labor cost of the workers that have already been employed. Therefore, what the data actually tells may be that as more workers are employed, the cost of labor increases. Hence there is a positive correlation between labor cost and the number of workers employed.

V. CONCLUSİONS

This study has aimed to calculate the labor cost elasticity of number of workers in manufacturing industry sectors in Turkey. The obtained value is positive for both low and high capital intensive sectors, contradicting the theoretical formulation on labor demand. The numerical elasticity values are 0.35 for low capital intensity sectors and 0.28 for high capital intensity sectors. For a fixed labor supply, these figures would indicate low unemployment elasticity of labor cost for manufacturing industry.

For a time period from 1950s to 1970s, Holden and Peel (1979) calculates the effects of employment benefits as a ratio of earnings for Netherlands, UK and USA. Reported finding is a positive relationship of employment rate to earnings and a negative relationship to benefits. The elasticity implied by Holden and Peel (1979) is 0.06 for Netherlands, 0.01 for UK and 0.12 for USA. The variation may be due to the fact that Holden and Peel (1979) include lagged dependent variables in conducted analysis, which imply that the elasticity of current employment rate to past employment rate ranges from 0.2 in the case of USA to 0.52 in the case of UK.

For the Turkish case; Gürsel, Levent, Taştı, Yörükoğlu, Erçevik and Tercan (2002: 163) reports for the time period of 1992 to 1997 that larger firms are more sensitive to labor costs. Reported coefficients are sensitive to estimation approaches; static estimations imply a positive relationship between cost and employment, whereas dynamic estimations that include lagged dependent variable of labor yield positive values. For 1989 to 1995, Onaran (2000:208)reports a negative relationship between changes in the real labor costs and changes in the unemployment rate; implying a positive relationship between employment and labor cost.

Wage curve estimation for Turkey by İlkkaracan and Selim (2003) gives a negative effect of unemployment on wages. That is; as unemployment increases, wages fall. For a given labor supply, this would indicate that there is actually a positive relationship between employment and labor cost. Thus the present study can be taken to confirm the wage curve evidence, if one is prepared to disregard the inconsistency between the present study and the wage curve set- up in terms of causality between variables.

The obtained results can also be taken to be supportive of a demand related expansion mechanism, along the lines of Keynesian macroeconomics, at work. That is, a given increase in wages may trigger a fall in labor demand. However, increased wages would cause demand to increase, through income increases. Then, output expands and employment increases. Thus there may be two contradicting forces at work, with the net effect being an increase in employment. Hence labor cost reduction might actually be a contractionary policy due to secondary demand effects; a point that should be seriously considered by policy makers.

Leaving theoretical justification aside, one possible reason for positive elasticity may be due to the endogeneity problem. In technical terms, there may be endogeneity in the model due to the simultaneity of labor cost and employment. The causality is dubious; does employment cause labor costs or do labor costs determine employment? A further study can take two paths in terms of econometric improvement. One path is to identify instruments for the labor cost and repeat the analysis. Second path would be to conduct a two stage least squares analysis where the first stage isolates the employment wage causality, and the second stage concludes by controlling for sectoral output and firm size. The analysis may further be expanded by Granger causality tests.

Further research on the issue can benefit from dividing labor cost to wage, social security related cost and tax. One other improvement can be through expanding the time coverage of the study, preferably to cover 2000s with identification of sub-periods by structural break tests. A last improvement to be pointed here is to relate labor cost to international competitiveness. These details can be used to determine how labor cost is related to employment, and which cost items should be targeted for employment targeting policies such that international competitiveness is not hampered.

ISIC Rev 3Code	**Installed Power Per Worker**	**Sector Name**
151	7.76	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats
152	5.17	Manufacture of dairy products
153	18.20	Manufacture of grain mill products, starches and starch products, and prepared animal feeds
154	10.69	Manufacture of other food products
155	8.14	Manufacture of beverages
160	2.25	Manufacture of tobacco products
171	9.26	Spinning, weaving and finishing of textiles
172	5.08	Manufacture of other textiles
173	2.72	Manufacture of knitted and crocheted fabrics and articles
181	1.44	Manufacture of wearing apparel, except fur apparel
182	10.12	Dressing and dyeing of fur; manufacture of articles of fur
191	5.45	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness
192	3.40	Manufacture of footwear
201	10.64	Saw milling and planing of wood
202	20.08	Manufacture of products of wood, cork, straw and plaiting materials
210	26.58	Manufacture of paper and paper products
221	4.69	Publishing
222	7.85	Printing and service activities related to printing
231	10.81	Manufacture of coke oven products
232	50.16	Manufacture of refined petroleum products
241	30.37	Manufacture of basic chemicals
242	9.02	Manufacture of other chemical products
243	46.83	Manufacture of man-made fibers
251	18.30	Manufacture of rubber products

252	14.03	Manufacture of plastics products
261	16.51	Manufacture of glass and glass products
269	23.13	Manufacture of non-metallic mineral products n.e.c.
271	40.68	Manufacture of basic iron and steel
272	27.85	Manufacture of basic precious and non-ferrous metals
273	16.04	Casting of metals
281	7.50	Manufacture of structural metal products, tanks, reservoirs and steam generators
289	8.24	Manufacture of other fabricated metal products; metal working service activities
291	6.95	Manufacture of general purpose machinery
292	8.05	Manufacture of special purpose machinery
293	5.27	Manufacture of domestic appliances n.e.c.
300	0.95	Manufacture of office, accounting and computing machinery
311	15.25	Manufacture of electric motors, generators and transformers
312	3.39	Manufacture of electricity distribution and control apparatus
313	11.02	Manufacture of insulated wire and cable
314	7.73	Manufacture of accumulators, primary cells and primary batteries
315	5.79	Manufacture of electric lamps and lighting equipment
319	2.41	Manufacture of other electrical equipment n.e.c.
321	6.30	Manufacture of electronic valves and tubes and other electronic components
322	2.71	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
323	4.42	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
331	9.85	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and other purposes, except optical instruments
332	2.46	Manufacture of optical instruments and photographic equipment
333	4.51	Manufacture of watches and clocks
341	10.22	Manufacture of motor vehicles
342	7.89	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
343	8.40	Manufacture of parts and accessories for motor vehicles and their engines
351	16.76	Building and repairing of ships and boats
352	5.70	Manufacture of railway and tramway locomotives and rolling stock
353	9.29	Manufacture of aircraft and spacecraft
359	5.37	Manufacture of transport equipment n.e.c.
361	5.34	Manufacture of furniture
369	3.73	Manufacturing n.e.c.

Note: Installed power per worker has been calculated by dividing the number of wage workers by the installed power capacity of sectors. The data has been obtained from Manufacturing Industry Statistics of TURKSTAT by placing an order.

REFERENCES

ADAMS, J. D. (1985). "Permanent Differences in Unemployment and Permanent Wage Differentials" Quarterly Journal of Economics 105:255-284.

BALTAGİ, B. H. (1995). Econometric Analysis of Panel Data, John Wiley and Sons LTD.: West Sussex, England.

BEHMAN S. (1978). "Interstate Differentials in Wages and Unemployment" Industrial Relations 17: 168-188.

BHALOTRA, S. R. (1998). "The Puzzle of Jobless Growth in Indian Manufacturing" Oxford Bulletin of Economics and Statistics, 60(1),

BHANDARİ, A. K. AND A. HESHMATİ. (2005). "Labor Use and Its Adjustment in Indian Manufacturing Industries" Institute for the Study of Labor Discussion Paper Series, Discussion Paper No: 1596.

BLANCHFLOWER, D. G. AND A. J. OSWALD. (1994). The Wage Curve, MIT Press: Cambridge, Massachusetts.

BLANCHFLOWER, D. G. AND A. J. OSWALD (2005) "The Wage Curve Reloaded", NBER Working Paper 11338.

BOWLES, S. AND R. BOYER. (1995). "Wages, Aggregate Demand and Employment in An Open Economy: An Empirical Investigation" in Epstein, Gerald A. and Herbert M. Gintis (eds.) Macroeconomic Policy After the Conservative Era: Studies in Investment, Saving and Finance, Cambridge University Press.

FAJNZYLBER, P. AND W. F. MALONEY. (2000). "Labor Demand and Trade Reform in Latin America", The World Bank Policy Research Working Paper Series No: 2491.

GÜRSEL,S., H. LEVENT, E. TAŞTI, A. YÖRÜKOĞLU, A. S. ERÇEVİK AND P. TERCAN. (2002). Türkiye'de İşgücü Piyasası ve İşsizlik, TÜSİAD: İstanbul.

HALL, R. E. (1970). "Why is the Unemployment Rate so High at Full Employment?" Brookings Papers on Economic Activity 3: 369-402.

HALL, R. E. (1972). "Turnover in the Labor Force" Brookings Papers on Economic Activity 3: 709-756.

HAMERMESH, D. S. (1986). "The Demand for Labor in the Long Run" in Orley Ashenfelter and Richard Layard, eds. Handbook of Labor Economics, North-Holland Press: Amsterdam.

HAMERMESH, D. S. (1993). Labor Demand, Princeton: Princeton University Press.

HAUSMAN, J. A. (1978). "Specification Tests in Econometrics", Econometrica, 46, pp: 1251-1271.

HESHMATİ, A. AND M. NCUBE. (1998). "An Econometic Model of Employment in Zimbabwe's Manufacturing Industries" SSE/EFI Working Paper 277. (Revised in 2003)

HOLDEN, K AND PEEL, D. A. (1979). "The Determinants of the Unemployment Rate: Some Empirical Evidence", Journal of the Royal Statistical Society. Series D (The Statistician) 28(2), pp. 101-107.

HSİAO, C. (2003). Analysis of Panel Data, Cambridge University Press: Cambridge.

İLKKARACAN, I. AND R. SELİM. (2003). "The Role of Unemployment in Wage Determination: Further Evidence on the Wage Curve from Turkey" Applied Economics, 35, pp. 1589-98.

JOHNSTON, J. AND J. DİNARDO. (1997). Econometric Methods, McGraw-Hill International Editions, Singapore.

KUNCE, M. (2006). "What Factors Effect a State's Manufacturing Employment? Evidence from 1974-1994 State Panel Data" Review of Urban and Regional Development Studies,18(1).

KRİSHNA, P., D. MİTRA AND S. CHİNOY. (2000). "Trade Liberalization and Labor Demand Elasticities: Evidence from Turkey" Journal of International Economics 55:391-409.

ONARAN, Ö. (2000). "Türkiye'de Yapısal Uyum Sürecinde Emek Piyasasının Etkinliği", Toplum ve Bilim, 86 (Güz 2000).

REZA, A. M. (1978). "Geographical Differences in Earnings and Unemployment Rates" Review of Economics and Statistics 60:201-208.

TELLİ, Ç., E. VOYVODA AND E. YELDAN. (2006). "Turkish Economy Under the post-1998 IMF Program: Modeling General Equilibrium for Socially Responsible Macroeconomics". Bağımsız Sosyal Bilimciler İktisat Grubu Çalışmaları, Internet Site: http://goo.gl/sPTkF Access Date: 31 July 2011.

TOPEL, R. H. (1986). "Local Labor Markets" Journal of Political Economy, Supplement, 94: 111-143.

WOOLRİDGE, J. M. (2002). Econometric Analysis of Cross Section and Panel Data, MIT Press: Massachusetts, USA.

WOOLRİDGE, J. M. (2003). Introductory Econometrics: A Modern Approach, South-Western: Ohio, USA.