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THE DETERMINANTS OF CHILD LABOR IN URBAN TURKEY

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Abstract

The main challenge tackled by this study is to estimate a structural equation for children's employment as a function of parental and own wages, which are assumed to be simultaneously determined with the child's employment status. The results indicate that employment of children is responsive to own and paternal wages but not to maternal wages. However, maternal education exerts an appreciable negative effect particularly on girl child's employment. Unearned income is also found to negatively affect child labor. The data further indicate that children from poorer families stand at a higher risk of employment.

1. Introduction

Employment of children is a common phenomenon in many developing countries including Turkey. One need not to go to rural areas to see children engaged in economic activities. In cities, they work as street vendors, as apprentices and blue-collar workers in small (and sometimes large) establishments, and as service sector workers in restaurants, coffee houses and the like. Many more work in family establishments as unpaid family workers.

Official estimates of child workers stand at little over 0.5 million among 6-14 year olds and 1.1 million among 15-17 year olds. These figures put the child employment rate at 4.2 percent for the former age group and at 28 percent for the latter age group.[1] Although these figures are based on a nationwide household survey, some scholars and activists claim that the incidence of child labor is grossly underestimated. The limited availability of data reflects the fact that child labor has only recently moved onto the agenda of the Turkish government and the general public with the implementation in 1992 of the International Program on the Elimination of Child Labor (IPEC), an ILO initiative. Though certain sections of the Turkish society regarded the initiative as yet another 'protectionist' act by the Western countries, by and large the program received wide acceptance and increased public awareness and concern toward child labor. Partly as a measure to curb child labor, in 1997 the government of Turkey rose compulsory years of schooling from 5 to 8 years, and in 1998 signed ILO Convention 138 which in effect raised the minimum age of employment to 15 years.[2] Furthermore, in 2001 Turkey ratified ILO Convention 182 that calls for the elimination of the worst forms of child labor.

Children in the 15-17 year age group have been relatively less well studied. Until recently, the labor force surveys in Turkey considered everyone 12 years of age and over as part of the potential labor force. Parallel to the changes made in compulsory education, the lower age limit was raised in 2000 to 15 years. Thus, the standard labor force questions posed to adults are also asked of this group of children. If children happen not to be working, surveys inquire into why they do not work rather than asking the reasons for their employment. However, it should be mentioned that the ratification of ILO Convention 182 signals a change in the attitude of the State toward the employment of older children as the Convention takes age 18 as its benchmark. There has also been a lot of discussion on extending compulsory education to 11 years, which has been echoed in the development plans. A recent report by the ILO indicates that globally 42 percent of 15-17 year olds are engaged in hazardous work (excluding such worst forms as prostitution, trafficking etc.) that calls for immediate action.[3] Although what constitutes hazardous work is yet to be defined for Turkey, we suspect the global rate to be a rather conservative measure especially for urban areas where small-scale industrial establishments are prevalent and where long hours of work is the rule rather than the exception. Hence, considering that both younger and older children are potentially open to exploitation having not achieved majority in many spheres[4] this paper treats everyone younger than 18 years of age as a child.

Employment of children is a concern since it may negatively affect their welfare. The work they do and/or the employment relation they are in may impede their mental, physical and psychological development. In fact, as will be illustrated in the paper, many work for very long hours with little pay. Long hours of work may have serious consequences as it may leave very little time for recreational activities and for those who work all year round, it might simply make schooling impossible. Entry into the labor market at too early an age may thus reduce children's future welfare as adults as well as the productive capacity of the country. Thus, child labor is a social concern as well.

However, there is also the argument that light work might be beneficial for children to some extent, as it is a form of socialization. In fact under certain conditions, it might very well increase their welfare. A number of studies point out that many child workers also attend school and in some cases it is the earnings from work that make their schooling possible.[5] Understanding the work patterns of children and the factors that lead them to work is important precisely because of the multifaceted nature of child labor. Being categorically against all forms of child labor would be equivalent to closing our eyes to the very often impoverished state of children and their families and is unlikely to do them any good. In an effort to distinguish work that may potentially impede children's development and therefore might be deemed undesirable, we have chosen to consider as 'child workers' only those children who work on average for 14 or more hours per week. The choice of the cut-off point is in line with ILO's definition of light work, which is permissible. Children in light work constitute 1.5 percent of the working children in our data.

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1 State Institute of Statistics (SIS), *Turkiye'de Calisan Cocuklar (Child Labor in Turkey)* (Ankara: SIS, 2001).

2 ILO Convention 138 stipulates age 13 as the minimum age for light work.

3 ILO, Every Child Counts: New Global Estimates on Child Labor (Geneva: ILO, 2002)

4 The definition of the child is rather confusing in Turkey as it takes on different meanings according to the context in which it is used (see Atila Hancioglu, Ismet Koc and Meltem Dayioglu, The State of Children and Women in Turkey: Perspectives in the Context of the CRC and CEDAW (Ankara: UNICEF, 2000). Although Turkey is a signatory to the Convention on the Rights of the Child which recognizes everyone below the age of 18 as children, the Convention has not succeeded in providing a common understanding.

5 Harry Patrinos and George Pscharopoulos, "Family Size, Schooling and Child Labor in Peru: An Empirical Anlaysis", *Journal of Population Economics*, 10 (1997): 387-405; William Myers, "Urban Working Children: A Comparison of Four Surveys from South America", *International Labour Review*, 128 (1989): 321-35.

Despite the growing abundance of research elsewhere, the number of studies that attempt to establish causality between the employment of children and their socio-economic background in Turkey is very limited. T. Bulutay looks at the nature of child labor in Turkey from a macro-perspective. He argues that poverty, low productivity, rapid population growth, inadequate education, tradition and culture play a role in giving rise to child labor.[6] I. Tunali, using household-level micro-data, investigates the work and schooling outcomes of male and female children aged 6-14 years. He finds child's age and gender, parental education and the region of residence to be important determinants of child labor. Specifically, the results of the study indicate that older male children residing in rural areas have a much higher likelihood of employment. Low parental education is another important factor that pushes children to the labor market.[7] Due to the nature of the data set employed, Tunali (1996) does not explicitly consider the impact of parental and child wages and family unearned income on child employment which, as will be discussed below, constitute the main areas of inquiry for this paper.

The main challenge tackled by this study is to estimate a structural equation for children's employment as a function of parental and own wages, which are assumed to be simultaneously determined with the child's employment status. The paper also examines the impact on child labor of various household characteristics including household material well-being and parental education. Given our main aim and the fact that wage work for both adults and children is relatively uncommon in rural Turkey, which is dominated by small-scale family-run agricultural establishments[8], we limit ourselves to urban areas where, admittedly, the incidence of child labor is lower. Taking into account the finding of the other studies that individual and household characteristics may exert differing effects on the labor supply behavior of girls and boys, all analyses are disaggregated by gender.

The rest of the paper is organized as follows. Section two describes the data set employed and gives a brief account of the household characteristics and the employment patterns of children. Section three discusses the theoretical approaches put forward to explain child labor and outlines the empirical specification of the model employed. Section four presents the results on the determinants of child labor. Section five concludes the paper.

[6] Tuncer Bulutay, *Child Labour in Turkey* (Ankara: ILO and SIS, 1995).

[7] Insan Tunali, "Education and Work: Experiences of 6-14 Year Old Children in Turkey", *Education and the Labour Market in Turkey*, ed. T. Bulutay (Ankara: SIS, 1996): 106-143. I. Tunali does not correct for household income so that it is not clear whether it is the inferior schooling of children's parents per se that leads them to work or the low household in come due to low schooling.

[8] Wage employment including casual work comprises 20% of the rural work force.

2. Data and Employment Patterns of Children

The data for this study comes from the 1994 Income Distribution Survey (IDS) conducted by the State Institute of Statistics (SIS). It covers 80,380 individuals from 18,264 urban households. From this, 12,747 children in the 12-17 age category belonging to 7,809 households are drawn. Fully, 93 percent of these are the children of the household head.[9] The remaining children had to be dropped since the survey only provides the relationship of these children to the household head, which makes it impossible to identify their parents. For the very same reason, children residing in households where 'multiple mothers' were present had to be excluded.[10] Further exclusions include ever-married children still residing with the family (55 cases) and children with parents over the age of 65 (86 cases). The former are excluded since it is conceivable for such children to set up separate decision-making units within the household of their parents. The latter are dropped because our aim is to study the impact of the labor market earnings of parents on the incidence of child labor. With all these exclusions the working sample is reduced to 11,683 children.

The strength of the present data set is that it is the most extensive survey conducted to date to analyze the labor market behavior and income generation of individuals in Turkey. It provides detailed information on individual labor market outcomes such as the occupation held, job status, earnings from primary and secondary jobs and unearned income. Despite the richness of the data set, it has an important drawback. It provides labor market information only for those 12 years of age and above. However, this might not prove to be a serious problem for the current study since child labor in urban areas becomes especially an issue beyond age 12. Official estimates indicate that children in the 6-11 year age group only constitute 10.7 percent of the working children aged 6-14 and only 2.5 percent of those aged 6-17. They have an overall employment rate of 1.3 percent.[11]

The mean employment rate of children age 12-17 is 13.2 percent.[12] As is apparent from Figure 1, older children in general and male children in particular stand at a higher risk of employment. The figure also indicates that should we draw a trend-line to indicate what the employment rate of younger children would be, the predicted rates will be rather low around 0-4 percent. The gender

[9] The data do not identify whether the persons that have been termed the father and the mother of the child are actually the child's biological parents.

[10] Although polygamy is illegal in Turkey, unregistered religious marriages still do take place albeit in small numbers. Therefore it is possible to observe more than one 'mother' in a given household (in our data in 0.5% of all households).

[11] SIS, *Turkiye'de Calisan Cocuklar (Child Labor in Turkey)*.

[12] Sampling weights are applied to all summary tables.

employment gap is observed for all age groups though as children get older, it tends to widen. The comparison of the mean rates reveals that male children's employment rate (18.6 percent) is almost two and a half times that of female children (7.5 percent).[13]

The 1994 IDS inquired about the jobs held over the entire year in 1994[14], the months worked in each job and the actual hours worked per week at the main job, which was taken to be the one that took up the longest time. The overwhelming majority of children (97 percent) did not change jobs over the reference period.[15] So, contrary to the popular view, children are not haphazardly engaging in any job they can get, but rather seem to stick to (and in a sense 'invest' in) the particular job that they have chosen or that the family has chosen for them. In fact, among those who have not changed jobs over the year, the mean number of years at the present job is found to be 2.4 years.

Table 1 presents some key characteristics of working children that might help draw out the household characteristics and the main work patterns of children. Wage employment constitutes the most common form of child employment in urban Turkey. A little over three quarters of working children are employed as wage earners. Of the remaining quarter, over 90 percent work as unpaid family workers and the rest are self-employed. Although the above pattern of employment holds for both male and female children, non-wage employment is slightly more common among females, and is virtually always in the form of unpaid family work.[16]

As shown in Table 1, the most striking aspect about working children is their long hours of work; the mean rate per week being 51.1 hours. Compared to male children, females work six hours less, on average, per week. They are also found to work fewer months over the year. While male children work for an average of 10.1 months, the corresponding figure for female children is 8.9 months. Again, the gender gap in work time might simply stem from the sexual division of labor, whereby male children are mostly engaged in economic activities, while female children are more involved in domestic work. Since the data set we employ only provides information on economic activities, the work efforts of female children are underestimated.

Another important characteristic of working children is their relative educational attainment vis-à-vis non-working children. In the present data set, we do not observe the current school enrollment status of children. Since it is common for schools in urban places (especially in large cities) to operate in double shifts, it is quite possible for children to attend school part of the day and spend the rest of the day at work. However, the data do provide the child's highest diploma, so that we can investigate the issue in terms of educational deficiency. Correcting for age, the data indicate that working children have, on average, fewer years of schooling (Table 1). Based on these findings it might be tempting to conclude that work adversely affects children's schooling. However, this might not be so, as it might very well be that working children's relatively poorer socioeconomic background reduces their schooling as well as results in work, with no direct causal impact between work and schooling. Or it could be that the causality is running from failure in school to work.[17] Since the available data do not permit us to infer causality, we simply note the inverse relationship between work and schooling. Another interesting observation is that irrespective of their employment status (again correcting for age differences), male children are better educated. It seems that families have a preference toward the schooling of their sons, although such an investigation is beyond the scope of this study.

The scope of children's activities is rather limited. Over 90 percent are clustered into less than a dozen activities. In fact, as shown in Table 2[18], the activities open to male and female children are quite distinct reflecting the recurrent theme in the Turkish labor market, which is segregation along gender lines. Female children are primarily employed in agriculture[19], both as wage earners and unpaid family workers, and in textile manufacturing. They are totally absent in a number of activities that are deemed 'masculine' such as auto repair and construction or from others which require serving male clientele such as work at restaurants, bars and coffee houses. Male children, on the other hand, are more evenly spread out among the dozen activities, though underrepresented in agricultural work and in textiles – the female domain.

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[13] Our definition of work does not take into consideration domestic work, a type of work in which female children are increasingly more likely to engage in as they get older. For evidence in support of this argument in Turkey, see; SIS, *Turkiye'de Calisan Cocuklar (Child Labor in Turkey)*; I. Tunali, "Education and Work: Experiences of 6-14 Year Old Children in Turkey".

[14] The data were collected retrospectively in January 1995 with the reference period being the year of 1994.

[15] Those who hold the same job over the reference period are the ones for whom no change in the occupation held, economic activity and job status is observed. A change in workplace is not considered to be a job change.

[16] Unpaid family workers can be considered a distinct group in the sense that they can be relatively easily categorized as being employed due to the more integrated work and home environment. However, the employment of the 14-hour cut-off point to identify child workers avoids the problem of any arbitrariness in their classification.

[17] For a test of causality see Ragui Assaad, Deborah Levison and Nadia Zibani, "The Effect of Child Work on School Enrollment in Egypt" (University of Minnesota, mimeographed, 2001).

[18] Expansion factors are not employed in Table 2. The sampling structure does not allow the detailed economic activities to be expanded to the whole population. Therefore, the distribution of children into various activities relates only to the sample employed.

[19] The urban-rural demarcation is based on settlement size with urban areas being those with a population of over 20,000. Since the demarcation is not based on type of activity, agricultural work can be found, and in fact, is common in many of the smaller cities.

The earnings of children are also of prime interest. Table 1 reports the average annual earnings of children by taking into account only those who work for pay. To place these figures in a meaningful context, we have devised two measures. The first shows the size of children's earnings as a proportion of the earnings of the child and his/her parents. The second measure shows the size of children's earnings as a proportion of total household income. According to the first measure the annual earnings of children who work for pay make up 21.2 percent of the total earnings of the child and his/her parents. This figure is somewhat higher for female working children primarily because their parental earnings are significantly lower. In terms of the second measure, children's contributions amount to 13.2 percent of household income (inclusive of children's income). In about one fifth of households there is more than one child working for pay. Among such households, the contribution of children to the household budget is close to 25 percent.

Compared to non-working children, the parents of working children are relatively less educated, though they are slightly older. (Note also that working children are older than their non-working counterparts.) One end result of the lower education level of parents is their lower earnings. A comparison of the observed hourly wages of children's parents indicates that working children have parents who are relatively less well-paid. Likewise, the household unearned income is relatively lower for employed children.

The observation that working children have lower parental and household income naturally leads to the issue of poverty. In the literature, low household income or poverty is often cited as the most important cause of child labor.[20] I. Tunali (1996) notes that the employment of children can be taken as an indicator of "economic distress" (p. 118). To investigate the relationship between household income and child labor, the sample is divided into per capita household income quintiles (excluding the earnings of children).[21] As shown in panel A of Table 3, the employment rate of children in lower quintiles is much higher than in upper quintiles. However, it is interesting to note the rather high rates of employment for boys at upper quintiles. The panel B of Table 3 shows the distribution of working children across the income quintiles. Fifty five percent of working children are found in the bottom two quintiles. Figure 2 illustrates, in yet another way, the significance of children's contributions to household income. Ignoring any possible labor supply adjustments on the part of the other household members, withdrawing children from the labor market reduces the incomes of especially the lower income households in a significant way as illustrated by an increase in the proportion of households at lower income levels. The vertical line in Figure 2 indicates the poverty line, which is taken to be half the median income. While only 14 percent of households fall below the poverty line when children's earnings are included, the incidence of poverty would increase to 26 percent if children were to cease being a source of income for the household, assuming no labor supply adjustment on the part of the other members of the household.

[20] Tuncer Bulutay, *Education and the Labour Market in Turkey*; Christian Grootaert and Ravi Kanbur, "Child Labor: An Economic Perspective", *International Labour Review* (1995) 134: 187-203.

21 Consumption expenditures would have been a better indicator of the relative household well-being. But in the absence of such data, annual household income had to be used.

3. Theoretical Framework

Two basic approaches are used in the literature to analyze the intra-household resource allocation problem: the household production model and bargaining models. The standard household production model considers the household as maximizing a common utility function subject to the full-income constraint.[22] In this framework, the household combines the home time of its members with market goods that are acquired through market labor time to produce utility yielding commodities. The optimal time allocation between market work and non-market activities results from this optimization process. The household production model has been used widely in analyzing the issue of child labor.[23]

Bargaining models[24] on the other hand reject the common household utility function, which arises either when all household members share the same utility function or that a dictator (often more benevolent than selfish) determines the function to be maximized. In these models, because the utilities of different household members differ, they have an interest in allocating more of the

[22] Gary S. Becker, "A Theory of the Allocation of Time" *Economic Journal* (1965) 75: 493-517; Becker, *A Treatise on the Family* (Cambridge, MA: Harvard University Press, 1981); Ruben Gronau, "The Intrafamily Allocation of Time: The Value of the Housewifes' Time", *American Economic Review* (1973) 63: 634-51.

[23] Mark R. Rosenzweig and Robert Evenson, "Fertility, Schooling, and Economic Contribution of Children in Rural India: An Econometric Analysis", *Econometrica*, (1977) 45: 1065-79. Rosenzweig, "Household and Non-Household Activities of Youths: Issues of Modeling, Data and Estimation Strategies", *Child Work, Poverty and Underdevelopment*, ed. G. Rodgers and G. Standing (Geneva: ILO): 215-243. Many others that followed Rosenzwieg and Evenson analyzed the time allocation of children between work, leisure and schooling. Apart from the work cited in the text see for instance, Victor Levy, "Cropping Pattern, Mechanization, Child Labor, and Fertility Behavior in a Farming Economy: Rural Egypt", *Economic Development and Cultural Change* (1985) 33: 777-791; Emmanuel Skoufias, "Market Wages, Family Composition and the Time Allocation of Children in Agricultural Households" *Journal of Development Studies* (1994) 30: 335-360; Deborah Levison, Karine S. Moe and Felicia Knaul, "Youth Education and Work in Mexico", *World Development* (2001) 29:167-188.

[24] Marilyn Manser and Murray Brown, "Marriage and Household Decision Making: A Bargaining Analysis", *International Economic Review* (1980) 21:31-44; Marjorie B. McElroy and Mary Jean Horney, "Nash-Bargained Household Decisions: Towards a Generalization of the Theory of Demand", *International Economic Review* (1981) 22: 333-49; Nancy Folbre, "Hearts and Spades: Paradigms of Household Economics", *World Development* (1986) 14: 245-55.

household resources toward the production of commodities that they enjoy the most. Within this framework, the allocation of resources depends on the relative bargaining strength of individual household members. There are a relatively small number of studies that investigate the issue of child labor from the bargaining perspective.[25]

Although the two sets of models rest on different assumptions and envisage different mechanisms that bring about the optimal allocation of resources, the reduced form demand equations for commodities and the labor supply equation depend on the same set of exogenous variables namely prices, wages and unearned income. As suggested by many authors,[26] one possible way of testing the common utility model is to test whether or not unearned income in the hands of different household members has different effects on the outcome. Although in the employed data set we have information on unearned income accruing to each member of the household, we have opted not to utilize this information as the data in hand do not truly lend themselves to the type of analysis we would wish to pursue. We suspect that the data collection procedure attributes an unduly large portion of household unearned income to the father of the child without paying due attention to the degree of control exerted over it. What we want to measure here is the differentiated consumption behavior of the household member of different sexes, and not whether or not they have 'title' to the income source that is attributed to them. We feel that having 'title' to the income source is not synonymous with having *control* over it.

In a recent theoretical paper K. Basu and P. H. Van (1998) take a somewhat different approach to the two sets of models we have outlined above. They consider the possibility of multiple equilibria emerging in situations where a potential for child labor exists; a 'good' equilibrium where no children work and a 'bad' equilibrium where children work.[27] Basu and Van build their model around altruistic parents who send their children to work if and only if household income excluding children's contributions fall short of some exogenously determined minimum. Furthermore, they assume that adult labor can be substituted for child labor. They argue that a sufficient increase in adult wages (through a ban on child labor under certain circumstances) can have the effect of reducing the incidence of child labor.

Based on the above models, children's employment can be expressed as follows:

$$L_{ki} = \Sigma_j \alpha_{kj} W_{ij} + \beta_k V_i + \gamma_k X_i + \varepsilon_{ki} \qquad (1)$$

where k indexes two groups of children; males and females, j indexes the child, his/her mother and father, i the household. V_i is the unearned income of the household and X_i is a vector of other characteristics of the child and/or the household. ε_{ki} is the error term.

The dependent variable is the employment of children at any time over the 12-month period in 1994. Even if the child is employed only a part of the year, the dependent variable takes the value of 1, otherwise 0. Incidentally, we might be including in here, children who work only during the summer months. Children who report three or fewer months of work over the year constitute roughly 14 percent of all working children. We opted not to exclude such children from the analysis for the main reason that they work for very long hours (on average 41 hours per week). Even though such summer work does not compete with schooling for the child's time, the long hours may take their toll in various ways. It is also quite likely that the summer work will be extended into the school year and thereby rendering the child unable to start school on time or to attend school on a regular basis. We later undertake sensitivity analysis to evaluate the impact on the results of removing children from the working sample who worked three or fewer months over the year.

Since the wages of parents and those of the child indicate the opportunity cost of time, it is interesting to determine whether children's employment is sensitive to parental and/or own wages. However, due to endogeneity wages cannot be used directly but need to be predicted using appropriate instruments. Since prediction is based exclusively on data from wage earners, this in effect means that wages are imputed for the self-employed, unpaid family workers and those who are not employed. To correct for non-random selection into the wage sub-sample, we estimate selectivity-corrected earnings functions using the Heckman procedure. Selectivity correction is necessary in estimating earnings functions not only for mothers and children, the majority of whom are not employed, but also for fathers since a significant proportion of them are self-employed (35 percent). Since our data set does not provide information on physical capital, it was not possible to estimate a separate earnings function for the self-employed. The estimation procedure for the selectivity corrected earnings functions for adult males and females and for male and female children is described in the Appendix. Tables A1 and A2 (in the appendix) provide the auxiliary regression results that are employed to predict the wages of adults and children. The issue of

[25] For review see: Kaushik Basu, "Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards", *Journal of Economic Literature* (1999) 37: 1083-1119.

[26] Marjorie B. McElroy and Mary Jean Horney, "Nash-Bargained Household Decisions: Towards a Generalization of the Theory of Demand"; Duncan Thomas, "Intra-household Resource Allocation: An Inferential Approach", *Journal of Human Resources* (1990) 25: 635-64; John Strauss and Duncan Thomas, "Human Resources: Empirical Modeling of Household and Family Decisions", *Handbook of Development Economics*, ed. J. Behrman and T. N. Srinivasan (Amsterdam: Elsevier, 1995) 3: 1888-2023.

[27] Kaushik Basu and Pham. H. Van "The Economics of Child Labor," *American Economic Review 88, no.3* (1998): 412-427.

identification as it relates to the use of predicted wages in the structural participation equation is discussed below.

Besides the predicted wages of children and their parents, other individual and household level characteristics considered in the model are the age of the child, parental schooling, household unearned income and the existence of a farm enterprise, as proxied by the amount of land owned by the household. Age of the child is expected to affect his/her employment above and beyond its possible effect on wages. As the child grows older, especially in the case of male children, the expectation of him/her being employed rises. Considering that age might have a nonlinear effect on the employment of children, age squared is also added to the model. Likewise, parental education is expected to affect children's employment above and beyond its effect on parental wages. More educated parents are thought to make use of available resources more wisely and/or they might simply have a different preference structure that might work to the benefit of children. For instance, having educated parents may affect the child's likelihood of participation partly because of the higher parental wages but also possibly (and negatively) because more educated parents become more aware of the risks associated with employment at young ages.

Likewise, holding all other factors constant, having a farm will increase the chances that the child will also be employed as work is readily available. The availability of such work in a household enterprise in effect reduces job search costs and eliminates the risk of placing the child in the 'wrong hands'. The amount of land owned by the household can also signify greater household wealth and can therefore have a negative effect on child labor.[28] Which of these effects predominates will determine the sign of the coefficient of the land ownership variable. In an attempt to partially control for the wealth effect, we have also included imputed rent in household unearned income. Another proxy for the presence of a household enterprise is presence or the number of self-employed adult males in the household.[29] Because of the potential endogeneity of such a variable, we refrain from using it, except in one circumstance as explained below.

The unearned income of the household is expected to negatively affect the participation of children. We conjecture that we might not be able to capture the full income effect through this variable for the simple reason that compared to earnings, unearned income is more prone to fluctuations over the year. Moreover, since the data we employ were collected retrospectively, there might be an element of underreporting. However, there is no reason to believe that households with and without working children will have a differentiated reporting behavior.

Besides the structural equation, a reduced form analysis is also attempted where instead of using predicted wages for parents and children, factors that determine wages are included. The covariates include the ages of parents and children, parental education and a set of demand side factors that are used in identifying predicted wages of adults and children. These demand side factors or 'potential identifiers' naturally do not appear in equation 1 but are used in auxiliary regressions in predicting wages (see appendix). They consist of provincial level variables that define the adult and child labor markets or both.[30] For instance, the proportion of adult men employed in the public sector and the proportion of wage earners with union membership within the province are used as potential explanatory variables that determine wages of adult males but do not affect the employment of children directly. Likewise, to describe the adult female labor market the proportion of female provincial population employed in white-collar occupations is used. This measure not only indicates the availability of white-collar jobs but the openness of local labor markets to female workers.

As discussed in Section II, the nature of child labor differs along gender lines. This finding implies that the mechanism that determines wages is likely to be different for male and female children. As possible factors that determine child wages and not necessarily their employment directly (and hence work to identify their predicted wages) we have employed the following provincial level variables: the average hourly wages of male blue collar workers with less than secondary education, the proportion of such workers employed in small establishments, the proportion of self-employed men, industrial structure of the province as revealed by the employment share of manufacturing, services, trade and agriculture. The first two variables reflect the conjecture that children compete with adult workers (of low educational background) for manual jobs and therefore, the prevalence of such work will have a bearing on children's wages. These variables are calculated from the current data set and due to data limitations could only be constructed on the basis of adult males, which render them more useful in determining the wages of male children. The proportion of self-employed men in the provincial workforce reflects the demand for child labor by small establishments (less than 10 employees) since such establishments constitute the main source of employment (60 percent) for children. The industrial structure of the province as it relates to demand for child labor is also included in wage equations. These factors can potentially affect the adult labor

[28] The amount of land owned is assumed to be a long-term decision variable and that it is unlikely to be endogenous to the decision to put the child to work.

[29] The general approach adopted in the literature is to treat the labor supply decision of adult males to be independent of the labor supply decision of adult females and children in their household, but not vice versa.

[30] For the most part, these provincial level variables are calculated from the 1990 Population Census and appended to the data. Exceptions include proportion of self-employed men, male union membership, and public sector employment.

market and therefore, they are also added to the wage equations of adult males and females.

Although the alternative reduced-form specification can be regarded as less restrictive,[31] as it allows the aforementioned factors to affect the employment of children through various channels, wages being one of these, it actually does not reveal the mechanism through which the covariates promote or discourage children's employment. Therefore, from the perspective of policy making, structural analysis seems to be more useful.

Following the recent theoretical work of K. Basu and P. Van (1998), both specifications are extended further by taking into account the relative material welfare of the household by introducing a set of dummy variables indicating the relative position of the household in the income distribution. For this purpose, on the basis of annual per capita non-child household income, households are divided into five equal income groups. The aim here is not only to establish whether or not poor households have a higher propensity of child labor but to see whether controlling for household income in yet another way (besides the household unearned income variable) changes the employment response of children to the identified covariates, in particular to adult and own wages.

In all specifications outlined above, additional regressors include the seven regions of the country. Although incomes and earnings are corrected for possible cost of living differences, they are still included to account for the different market conditions prevailing in various parts of the country. There are also a small number of children without a mother or a father (Table 1). In reduced form estimates, the absent father is controlled for through the inclusion of a dummy variable that takes the value of one for children without a father in the household. A similar correction could have been carried out for children without mothers as well but the number of observations is found to be too small to produce meaningful estimates. Therefore, we opted to exclude such children from the estimation.[32] Structural equations on the other hand are estimated on the basis of two-parent households, the reason being our inability to impute wages for absent fathers. This matter is taken up again in the next section.

4. Determinants of Child Labor

4.1 The Role of Adult and Child Wages and Unearned Income

The estimation results for the participation equations, presented in Table 4, indicate that the girl child's employment is responsive to own and father's wages but not to mother's wage. The boy child's employment, on the other hand, is only responsive to father's wage. The results further indicate that a 10 percent increase in own wages increases the likelihood of the reference girl's employment by 0.4 percentage points. Judged against the predicted employment rate of 4 percent, which results when the prediction is based on the mean characteristics of female children, the results indicate that a 10 percent increase in hourly wages increases the predicted employment rate of female children by 10 percent. A plausible explanation for the greater responsiveness of female children's employment to own wages might lie in their greater opportunity cost of time at home, just as the labor supply of adult women is more elastic than that of men.

Mother's wage does not seem to play a role in determining the employment of either male or female children. This finding hardly comes as a surprise since only a small proportion of women in urban areas (16.6 percent) actually join the labor market which means that the majority of children have mothers who are not employed - though it must be mentioned that a greater proportion of working children have working mothers (18.8 percent). Under the rather slim probability of maternal employment, mothers' potential wages have little bearing on children's employment.

An increase in father's wage on the other hand is highly instrumental in withdrawing children from the labor market supporting the claim in the literature that an improvement in adult wages, in our case adult male wages, will result in a decline in the incidence of child labor. The marginal effects indicate that a 10 percent increase in adult male hourly wages reduces the employment probability of male and female children by 2 and 0.5 percentage points respectively. Evaluating these marginal effects against the predicted mean employment rates of 10.1 percent and 4 percent for male and female children respectively, it can be deduced that male children's employment is more elastic to changes in paternal wages (relative changes in probability being 20 percent vs. 12 percent). This finding might simply stem from the fact that fathers and sons are closer substitutes in production compared to fathers and daughters. Sons are forced to work when the employment prospects of their fathers are poor, and can remain at school when the father has good employment prospects. Given the prevalent gender segregation in work tasks in urban Turkey, the greater portion of the wage effect observed for girls must be due to the income rather than the substitution effect.

The coefficient on household unearned income is negative and significant for both groups of children, indicating a lower likelihood of child employment with higher household income.[33] However, it should be mentioned that girls' work is

[31] See for example, Melisa Binder and David Scrogin, "Labor Force Participation and Household Work of Urban Schoolchildren in Mexico: Characteristics and Consequences", *Economic Development and Cultural Change* (1999), 48:123-154.

32 The exclusion of children without mothers did not change the mean values of regressors or the estimation results in a significant way.

[33] In relating unearned income coefficients to the coefficient on fathers earnings caution must be exercised: the former variable is measured over a year in million TL whereas the latter is in logs and shows hourly earnings in TL.

equally responsive to unearned income as boys' work. Although a slightly higher unearned income coefficient is recorded for female children, the difference is not statistically significant. When we separate out the father's unearned income and use it as a separate regressor, we observe that it is not significant for male children but significant and negative for female children. The mother's unearned income on the other hand is insignificant (though negative) for both children. What seems to be generating the negative income coefficient in boys' participation equation is the general wealth status of the family as measured by imputed rent.

Turning to the role of maternal and paternal schooling, we observe a significant impact stemming from mother's but not father's schooling. It seems that father's schooling mainly works to reduce child labor indirectly through increased paternal wages. Women's schooling on the other hand seems to have an independent impact on child employment. An additional year of schooling is expected to reduce male and female children's participation by 0.7 and 0.5 percentage points respectively. Although the difference in the absolute marginal effects is not statistically significant, maternal schooling seems to be more instrumental in withdrawing female children from the labor market when the relative impact on the probability of employment is considered. This result parallels the general finding in the literature that mother's education is an important determinant of children's well-being, in particular that of their daughters.[34]

The child's age is a rather important determinant of boys' likelihood of employment, above and beyond its impact on own wages. As the male child grows older, the risk that he will be employed rises though at a decreasing rate. In the case of the girl child, age does not seem to have an independent impact on her participation in market work. Again, this does not rule out her employment in domestic chores, which our work definition excludes.

The greater work availability made possible by the higher amounts of land owned by the household more than compensates for the wealth effect of the land leading to a positive coefficient for the land ownership variable. Being in different parts of the country also affects the likelihood of children's employment. In particular, male children who live in the Aegean and the Marmara Regions and the Black Sea Coast have a much higher likelihood of employment as opposed to those living in Southeast Anatolia which is the most underdeveloped region of the country. Likewise, female children residing in the Aegean Region and the Black Sea Coast have a significantly higher probability of employment. The higher likelihood of child employment in the Black Sea Region can be attributed to the relatively more important role agriculture plays in the region's economy. The Aegean and Marmara Regions on the other hand are very industrial with the manufacturing sector, textiles in particular, constituting an important source of employment for both the adults and children.

34 See, e.g., John Strauss and Duncan Thomas, "Human Resources: Empirical Modeling of Household and Family Decisions"; D. Thomas, "Like Father, Like Son; Like Mother, Like Daughter: Parental Resources and Child Height", Journal of Human Resources (1994) 29:950-88.

4.2 Sensitivity Analysis

As mentioned earlier, the working sample might include those children who might have worked only during the summer months. Since the data do not provide information on which months of the year the children were employed, we make the assumption that they are comprised of those who worked less than the summer holidays, which is three months in Turkey. To see whether the results discussed earlier change when these children are excluded from the working sample or are re-grouped among non-workers we run a series of estimations. The results (not presented here) indicate that in either case, apart from children's responsiveness to own wages, the main findings remain intact.

Estimations based on the alternative sample result in a slight increase in boy's responsiveness to own wages such that at 10 percent level of significance, boy's employment is found to respond positively to own wage changes. On the contrary, female children's responsiveness to own wages decreases. Although the coefficient is still positive, it is no longer significant at conventional levels. In the boys' case, the increase can be explained by the fact that in the absence of schooling, the opportunity cost of time is lower so that excluding boys who work only during summer pulls the point estimate up. In the case of female children, the fall indicates that those who work for more than three months must have lower opportunity cost of time compared to others working only during the summer months. A plausible explanation for this result is that girls in the former category have a lower probability of school attendance and therefore, a lower opportunity cost of time. Indeed, correcting for age, females who only work three or fewer months are found to be slightly more educated.

The final issue that needs to be addressed concerning the structural estimates is the possibility that the standard errors obtained from probit estimations are understated due to the presence of predicted regressors. In order to get consistently estimated standard errors, we bootstrapped the entire estimation procedure, including the own and parental wage predictions and the structural participation equation.[35] The standard errors reported in the tables are the bootstrap standard errors. The comparison of the corrected and uncorrected standard errors reveals that the latter are either roughly the same as the former or are somewhat underestimated (especially those pertaining to predicted

35 Bootstrap estimation results are based on 500 replications, which is considered to be adequate for obtaining fairly good estimates of standard errors. The resultin g bias in the estimations is less than 25% of the standard errors and hence, can be safely ignored (Bradley Efron and Robert J. Tibshirani, An Introduction to the Bootstrap (NY: Chapman & Hall, 1993)).

regressors). For instance, while regular probit results indicate that boy child's employment response to own wage changes is negative and significant at 5 percent, bootstrapped results indicate an insignificant response.

4.3 Reduced Form Specification

In reduced form estimations we consider children who not only live with both parents but also those whose fathers might be temporarily or permanently absent from the household. In this specification, instead of using the predicted wages of children and adults, we employ the factors that determine the wages. In place of the individual characteristics of the absent fathers we employ relevant sample averages. The only exception is made for unearned income. Since in the absence of the father, the unearned income, if any, accrues to another household member (primarily to the mother in our case), we assign zero income to absent fathers.

The results of the reduced form specifications are presented in Table 5. The general conclusions drawn from structural analysis holds in reduced form as well: Older children, especially males, are more likely to be employed; mothers' schooling and household unearned income reduce children's employment; child labor is more prevalent in more developed regions of the country. As argued before, reduced form models do not reveal the channel through which the identified covariates work to produce the observed results. For instance, the fact that mother's schooling affects the likelihood of children's employment primarily through non-labor market channels is revealed by the structural equation. This finding indicates that semi-formal/informal community based programs can be possible avenues of intervention.[36]

Not having a father in the household does not seem to play a significant role in affecting the likelihood of children's employment. This finding is important for two reasons. First, it provides further evidence that our structural estimates are likely to hold not only for children living with both parents, on which they are based, but for the entire sample as well. Second, it supports our conjecture that household unearned income is underreported. This was the main reason why we opted to exclude children with absent fathers from the structural equations. When the entire sample is considered and an indicator dummy is added to the structural equations to control for absent fathers, quite curiously a negative coefficient on the absent father dummy results (not presented here). In other words, in households where the father is absent, children seem to have a lower likelihood of employment. This rather surprising observation is noted by a number of researchers, some offering the explanation that the presence of a father might be important for networking and placing the child at a job.[37] Though this explanation might be important to some extent, it seems to us that the main reason for this result is the underreporting of unearned income, which could be an important income source for households with absent fathers. It is quite likely that the remittances sent by absent fathers working oversees (mostly Western Europe) or in larger cities might get underreported more often than unearned income from other sources. Likewise if the father is deceased or permanently absent from the household for other reasons (e.g. divorce or separation), the household might receive transfers from the State or private sources. Underreporting may result from the fact that these transfers may not be received on a regular basis, which may be the case especially with in-kind transfers originating from private sources.

Whether the father's absence is permanent or temporary may be quite important as it determines the source of unearned income received by the household. This is one reason why a number of researchers have emphasized the importance of identifying fathers who are absent temporarily or permanently.[38] The claim is that fathers who are temporarily absent are likely to remain in contact with their families and might support them financially making the employment of children less likely (assuming that they have a higher earnings potential in the non-local labor market). Where the father is permanently absent, the expectation is for children, especially for boys, to substitute for absent fathers. Indeed, in reduced form equations we find the coefficient on the temporarily absent father dummy to be negative and the coefficient on the permanently absent father to be positive - though both are insignificant. However, when this differentiation is utilized in the structural equations, both indicators of father absenteeism remain significant and negative. We conjecture that to the extent that paternal earnings is an important determinant of child labor (which is shown to be the case here), the failure to fully control for it in household unearned income reflects itself in the absent father dummy as a negative coefficient.

[36] A number of NGOs and semi-government bodies have been instrumental in implementing various programs for young and adult women. For instance, the Mother Child Education Foundation (ACEV) runs adult education programs in various provinces. The GAP administration (a semi-government body) has been instrumental in establishing Multi-purpose Community Centers (CATOM) where a wide variety of programs are developed to meet various needs of women in Southeastern Anatolia.

[37] Melisa Binder and David Scrogin, "Labor Force Participation and Household Work of Urban Schoolchildren in Mexico: Characteristics and Consequences"; Deborah Levison, "Household Composition and Early Human Capital Formation: Evidence from Brazil on Children's Labor Force Work and Schooling" (University of Minnesota, mimeographed, 1997).

[38] Permanently and temporarily absent fathers are determined by looking at the marital status of the mothers. If the mother is divorced, widowed or separated, we assume that the father is permanently absent. If, on the other hand, the father is not present in the household but that the mother is married, the father is assumed to be absent temporarily. See, Ragui Assaad, Deborah Levison and Nadia Zibani, "The Effect of Child Work on School Enrollment in Egypt"; I. Tunali, "Education and Work: Experiences of 6-14 Year Old Children in Turkey".

Note further that households where the father is absent constitute the overwhelming majority of female headed households.[39] As would be expected, such households receive a relatively larger amount of transfers, yet their income from earnings is disproportionately lower. In particular, in households where the father is permanently absent, over one third of children are found in the bottom quintile. (This might partly arise due to underreported unearned income.) Even if we assume that mother's preference in such households is toward the non-employment of their children and that this is the main reason behind the negative coefficient on the absent father dummy, we should be seeing a larger number of such children at school. In terms of grade completion (corrected for age) there does not seem to be a significant difference between children with and without fathers present in the household.

4.4 Household Welfare and Child Labor

Household income taken as a measure of general household welfare is often cited as an important determinant of child labor. Accordingly, households who are at the lower end of the income distribution are expected to experience higher incidence of child labor. However, the link between household welfare or poverty and child labor is not firmly established in the economic literature. While some studies find household welfare to be weakly related to child labor, others find it to be an important determinant of the time allocation of children.[40]

Many of the recent studies employ the Luxury Axiom of K. Basu and P. H. Van (1998) who claim that not sending children to work is a luxury that only relatively better off households could possibly afford. In order to see the way in which household welfare is related to child labor in Turkey and to test whether the impact of covariates identified earlier change in any significant way, when income is controlled for, we extend the structural model presented earlier by introducing a set of dummies indicating the income quintile in which the household falls.[41] Although the welfare indicators are constructed based on what can be regarded as a relatively long-term indicator of well-being, annual non-child household income is still a potentially endogenous variable.

Table 6 presents the results of the extended model. The explanatory power of the model improves slightly for both male and female children. In both cases, the coefficients on the explanatory variables and their marginal effects do not change significantly from the results discussed earlier. The only exception is observed for the coefficient on the own wage variable for male children, which increases slightly becoming significant at 10 percent level. Therefore, we limit our discussion here to the estimated coefficients on the income variables.

The likelihood of employment for male children is found to be higher only for the bottom quintile. Being in the bottom quintile as opposed to the top quintile increases the probability of boys' employment by 4.7 percentage points. In the case of female children, the risk of employment seems to be higher in households at the bottom 40 percent of the income distribution. However, the marginal effects do not statistically differ across the two income quintiles indicating that a movement up in the income distribution does not significantly reduce female children's employment unless they move beyond the second quintile. There seems to be a higher income-threshold for girls compared to boys beyond which the household's position in the income distribution has no bearing on the incidence of child labor. This finding combined with the higher schooling attainment of boys compared to girls hint that the household might be trying to keep the male child out of the labor market and at school except when the family is in absolute need of the male child's contribution. Female children's schooling on the other hand is probably easier to do without in lower income households (since it is possibly considered as a luxury) in the interest of creating another source of income for the household.

In recent years, the need to adopt a holistic approach to policy intervention in the area of child labor has been emphasized where the employment, schooling and income dynamics are considered as integral parts of a larger process that affects child labor. Within this approach addressing the material needs of the household has taken on a paramount importance. Utilizing the results of the extended model, the next section discusses the implications of some of the interventions put into place in Turkey to curb child labor.

4.5 Simulations under Different Scenarios

Under the assumption that low household income/poverty is the main determinant of child labor, a number of projects, mostly carried out within the framework of IPEC (International Program on the Elimination of Child Labor), have aimed at increasing household incomes in localities where a high incidence of child labor is observed. While some of these projects tried to increase household income through in-cash and/or in-kind transfers, others opted to encourage households to start their own business via micro-credit programs.

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[39] Household head is usually the father of the child. In his absence, child's mother assumes the household head status. In less than 1% of the cases the mother of the child is found to assume household headship though the father is present in the household.

[40] See for instance; Sudharshan Canagarajah and Harold Coulombe, "Child Labor and Schooling in Ghana" (Policy Research Working Paper 1844, World Bank, 1997); Niels-Hugo Blunch and Dorte Verner "Revisiting the Link between Poverty and Child Labor: the Ghanaian Experience" (Policy Research Working Paper 2488, World Bank, 2000); Vani K. Borooah "The Welfare of Children in Central India: Econometric Analysis and Policy Simulation," *Oxford Development Studies 28 no.3* (2000): 263-287; Ranjan Ray "Analysis of Child Labour in Peru and Pakistan: A Comparative Study," *Journal of Population Economic 13, no.1* (2000): 3-19.

[41] We have also constructed an extended model for the reduced form specification. Since neither the coefficients on the original covariates nor those on income quintiles (discussed below) change in a any significant way, in the interest of brevity, we have opted not to present them.

To be able to evaluate the effects of the presence of home-based establishment on child labor, we extend the structural model further by including a dummy variable taking the value of one for households where there is at least one self-employed male member in the household.[42] We had established earlier that the incidence of child labor is higher among households that own land, which is another proxy for home-based establishments. Since the micro-credit programs hardly ever provide funds large enough to enable a family to buy their own plot of land, we leave the land endowment of the household unchanged.

Using the mean characteristics of children from households at the bottom quintile and coefficients estimated for the entire sample, we ran a series of simulations under different scenarios to establish the expected impact of the implemented policies on the incidence of child labor. The predictions reported in this section are again obtained through the bootstrapping procedure and the standard errors associated with them are given in parentheses next to the predicted figures.

The predicted probability of child employment among poor households is found to be 16.7 percent (s.e. 0.01) for male and 5.6 percent (s.e. 0.01) for female children. Programs that aim to reduce child labor by encouraging poor households to set up their own businesses are not likely to realize their goal of fewer working children. Assuming that before the implementation of the program a household establishment does not exist, its creation is predicted to drastically increase the incidence of child labor among poor households; the change being from 15 percent (s.e. 0.01) to 24.4 percent (s.e. 0.02) in the case of male and from 5.2 percent (s.e. 0.01) to 7.3 percent (s.e. 0.01) for female children. This result follows from the fact that child labor is more common in households where a household enterprise exists. C. Grootaert (1999) arriving at a similar result warns that "household enterprises are a double-edged sword". For poverty alleviation programs not to have the adverse effect of increasing child labor at the expense of child schooling, he advocates that proper incentives be created within the poverty alleviation programs to encourage child schooling.[43]

The figures cited above are generated under the scenario that the household is not able to generate enough income through its enterprise to push itself to the next income bracket. Even if the resulting increase in income is such that the household finds itself in the second quintile, the incidence of male child labor (18.3 percent. s.e. 0.02) in the household with enterprises is still higher than what we started out with. However, it should also be mentioned that often the amount of credit provided is too small to enable families to generate a substantial amount of income to allow for upward mobility so that we should expect a higher rather than a lower incidence of child labor. These exercises clearly indicate that the form of assistance provided to the poor households carries great importance for the incidence of child labor.

Notwithstanding the predicted adverse effect of income generation programs in the form of higher child labor, they are highly favored primarily because of the assumption that children's working conditions improve when they work for their family members rather than for an unrelated employer. In many of the implemented projects, reduction in child labor has not been the sole objective, they have also aimed to improve the working conditions of children. Despite the fact that the two objectives can be in contradiction at times, if the latter is the primary objective, then micro-credit type programs might help to increase child welfare.[44] Although such an investigation is beyond the scope of the current study, simply judged from the perspective of hours of work, children employed in household-based establishments are found to work for substantially fewer hours per week and number of weeks per year. If indeed, children fare better in the employment of their kin, what policy makers need to decide is how much more child labor can be tolerated in the interest of employing children under better conditions.

Transfers can also be used in withdrawing children from the labor market and in re-orienting them toward school. Admittedly they currently constitute a relatively less favored tool in combating child labor and in empowering the poor because of the limited resource base of implementing institutions, among other reasons. Our results point out that indeed transfers can be of use in withdrawing children from the labor market but that quite large sums are needed to produce a visible impact on child labor. Allowing for the reallocation of some households into higher income brackets, a transfer equal to one standard deviation in unearned income decreases the incidence of child labor in the bottom quintile by less than a single percentage point. D. Levison arrives at a similar conclusion for Brazilian children.[45]

The relatively smaller impact of transfers can in part be attributed to the fact that we employ a relatively long-term definition of income, whereas the true role of unearned income might be felt in poor households in the short-run by way of buffering children against financial crisis. If this is so, in an environment of

[42] As discussed earlier in the text, this is a potentially endogenous variable. We have chosen to utilize the employment status of only the adult male household members in the belief that they are likely to be less dependent on the labor supply decision of the other household members.

[43] See page 56 of : Christiaan Grootaert, "Child Labor in Cote d'Ivoire," *The Policy Analysis of Child Labor: A Comparative Study,* ed. C. Grootaert and H. Patrinos (NY: St. Martin's Press, 1999).

[44] In a study on the determinants of school attainment in Turkey, A. Tansel finds the likelihood of boy child's school attendance to be reduced when the father is self-employed. This is yet another factor to be considered in evaluating the effects of micro-credit programs on the welfare of children. (Aysit Tansel "Determinants of school attainment of boys and girls in Turkey: Individual, household and community factors" *Economics of Education Review 21* (2002): 455-470.)

[45] Deborah Levison, "Household Composition and Early Human Capital Formation: Evidence from Brazil on Children's Labor Force Work and Schooling".

imperfect capital markets, transfers can be used to mitigate the impact of unforeseen events that challenge the welfare of the household and therefore, necessitate the employment of children even if for short durations. Currently, apart from sporadic assistance provided by a handful of NGOs, the most important institution that provides regular cash and in kind transfers to needy families on behalf of the State are the Social Services and Child Protection Agency and the Social Solidarity Foundations. However, due to their bureaucratic structures it is doubtful that they can be flexible enough to provide funds to help families overcome short-term shocks.

5. Conclusion

Employment of female children is found to be responsive to both own and paternal wages. Male children's employment, on the other hand is found to be highly responsive to paternal wages but only weakly responsive, if at all, to own wage changes. Consequently, an improvement in child wages is expected to push more children (mostly females) to employment, while improvement in adult male wages is expected to pull them out. Structural estimates further indicate that fathers and sons are closer substitutes in production than fathers and daughters. Maternal wages do not seem to have an impact on child employment, which we believe to stem fromthe fact that they are rarely realized.

In an alternative specification, instead of child and parental wages, individual and household characteristics that are thought to determine child and adult wages are used to analyze their effect on child labor. Both in the reduced form and structural equations maternal education is found to be instrumental in withdrawing children (especially females) from the labor market. The positive role of maternal education on various dimensions of child welfare is well-established in the economic literature. The paper provides yet another reason why special attention needs to be paid to women's schooling. Although Turkey has taken major strides in improving women's education, much is yet to be done. The 1990 Population Census reports that 34 percent of adult women in Turkey are illiterate.[46] Special education programs especially aimed at poorer sections and regions of the country need to be launched to alleviate the educational status of women in Turkey.

The child's age is also found to be an important determinant of boy's likelihood of employment above and beyond its impact on wages. For female children, age seems to be a factor in determining their wages but not directly their employment. So far, the child labor projects implemented in Turkey have primarily focused on younger children (15 years and less.) The results of our study indicate that, more attention needs to be paid to the welfare of older children.

[46] SIS, *1990 Census of Population* (Ankara: SIS, 1993).

An increase in household unearned income reduces the probability of children's employment. Furthermore, the incidence of child labor is found to be higher among relatively poorer households. These findings make the on-going economic crisis in Turkey all the more alarming as the declining purchasing power of especially the lower income groups and the deteriorating labor market conditions for adults might very well push more children to the labor market. To help mitigate the effects of the crisis special programs need to be implemented. The 'Social Risk Mitigation Project' funded by the Word Bank was launched in September 2001 with the aim of helping out the most vulnerable sections of the society. Although the project does not have a specific goal of reducing child labor, it aims to alleviate poverty, which can potentially help reduce child labor.

As the simulation exercises indicate certain interventions such as micro-credit programs geared toward the establishment of a household enterprise might actually lead to an increase in child labor. Effective program development requires the evaluation of different responses of various groups of children to socio-economic variables. This necessitates further research on child labor especially on female children and children working on the streets on whom very little research exists.

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Figure 1: Employment of Children by Age

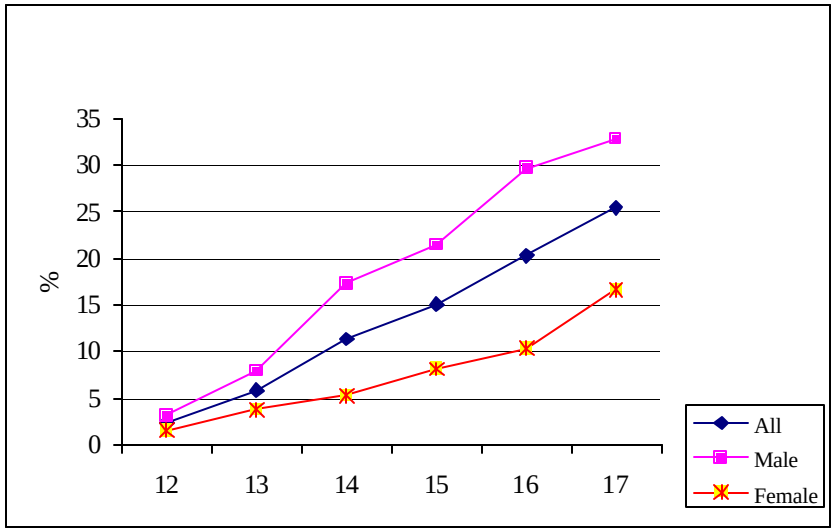

Figure 2: Household's Position in Income Distribution

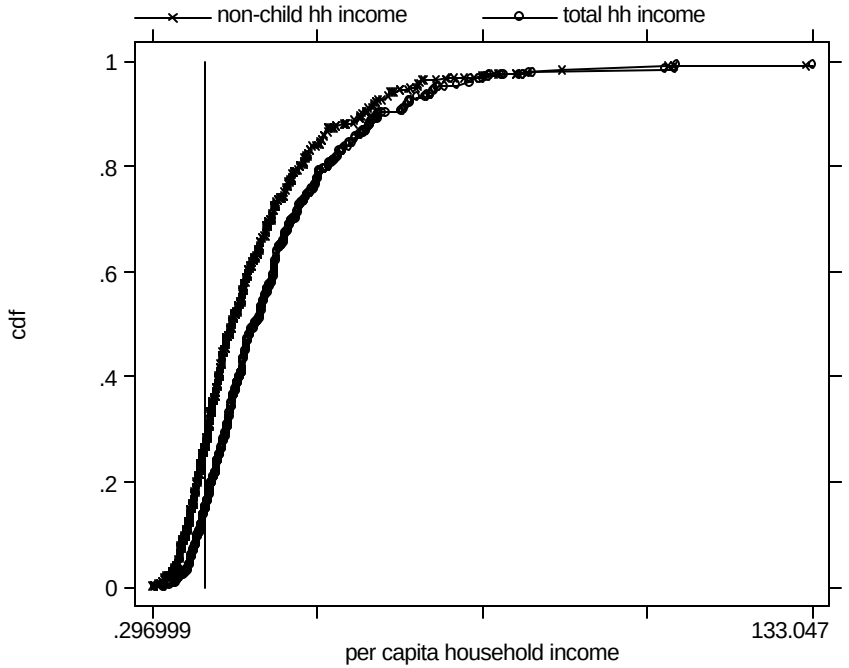

Table 1: Summary Statistics for Children (12-17 years)

Child's characteristics	Working Children[a]			Non-Working Children		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Age	15.48	15.47	15.52	14.3	14.24	14.35
	(1.41)	(1.39)	(1.46)	(1.7)	(1.71)	(1.68)
Years of schooling	5.57	5.61	5.46	5.84	5.97	5.72
	(1.72)	(1.66)	(1.85)	(2.09)	(2.02)	(2.15)
Hours of work per week	51.14	52.67	47.08			
	(14.71)	(12.8)	(15.49)			
Wage earner (%)	75.83	78.34	68.98			
Child's hourly wages[b]	9360.1	8921.6	10718.1			
	(7444.3)	(7486.4)	(7143.4)			
Annual earnings of children[c]	20.45	20.75	19.51			
(millions of TL)	(17.43)	(17.73)	(16.44)			
Proportion of total annual earnings[d]	21.09	19.87	26.45			
Proportion of annual household income (including children's income)	13.19	12.87	14.38			
Mother's schooling	2.83	2.88	2.71	4.21	4.28	4.14
	(2.58)	(2.57)	(2.59)	(3.64)	(3.62)	(3.66)
Father's schooling	4.65	4.63	4.7	6.48	6.54	6.41
	(2.34)	(2.22)	(2.65)	(3.76)	(3.73)	(3.79)
Mother's age	40.37	40.32	40.52	39.33	39.22	39.43
	(6.40)	(6.51)	(6.06)	(5.91)	(5.88)	(5.94)
Father's age	44.57	44.29	45.35	43.65	43.54	43.74
	(7.38)	(7.24)	(7.69)	(6.67)	(6.55)	(6.79)
Mother's hourly wages[b]	14218	14359	14031	28507	30876	26496
	(9348)	(9489)	(9155)	(22117)	(23865)	(20300)
Father's hourly wages[b]	27941	28020	27712	40824	41353	40299
	(19323)	(20207)	(16460)	(48634)	(56286)	(39619)
Household unearned income[e]	29.1	29	29.37	40.63	40.53	40.73
(annual - million TL)	(47.53)	(51.18)	(35.73)	(78.63)	(84.57)	(72.46)
Land owned (in hectare)[f]	3.59	3.36	4.19	1.73	1.63	1.83
	(19.63)	(20.16)	(18.07)	(15.89)	(14.18)	(17.38)
Mother absent (%)	1.35	1.85	0	0.57	0.46	0.67
Father absent (%)	7.33	7.09	7.96	5.46	4.66	6.23
Temporary absence	6.68	6.41	7.44	4.15	3.27	5
Permanent absence	0.64	0.69	0.52	1.31	1.39	1.23
Number of observations	1,307	932	375	10,375	5,067	5,308

Notes: Figures in parentheses are standard deviations.
All income figures are deflated to allow for regional price variations using 1987 CPI.
[a] excludes children whose actual hours of work are less than 14hrs per week.
[b] includes only wage-earners.
[c] excludes children who reported zero earnings (384 cases).
[d] includes children's and parents' earnings for the relevant group of children.
[e] includes those with zero unearned income.
[f] includes those with no land.

Table 2: Distribution of working children across industries

	All Working Children		Wage Earners	
	Male	**Female**	**Male**	**Female**
Agriculture*	11.5	50	3.9	26
Manufacturing				
Food, Beverage, Tobacco	3.5	4.5	3.7	5.9
Textiles, Wearing Apparel, Leather*	11.1	23.2	14	35.3
Furniture Manufacturing*	6.8		8.8	
Other Manufacturing*	11.6	4.1	14.8	7.8
Construction*	4		4.8	
Whole Sale and Retail*				
Auto Repair*	11.9		14.9	
Retail Sales*	15.3	6.1	10.3	6.4
Repair of Home App./Personal Items*	3.2		3.1	
Other	3.1	2.9	3	4.4
Hotels and Restaurants*				
Restaurants, bars, coffee houses etc*	8.4		8.5	
Social, Personal Services				
Barber Shops, Coiffure	4.5	4.2	6.1	6.9
Total	94.9	95	95.9	92.7

Note: *indicates significant difference between male and female children at 5% level.
Empty cells indicate very small proportions. To highlight relatively more important industries they have been omitted from the presentation.

Table 3: Employment of Children and Poverty

A. Employment rate of children by income quintiles (%)

	All	**Male**	**Female**
Bottom 20%	17.74	25.16	10.12
Second 20%	14.43	20.12	8.25
Third 20%	12.77	17.23	7.90
Fourth 20%	11.31	15.38	6.78
Top 20%	7.7	12.36	2.23

B. Distribution of employed children across income quintiles (%)

	All	**Male**	**Female**
Bottom 20%	32.36	31.79	33.9
Second 20%	23.14	22.97	23.61
Third 20%	19.05	18.34	20.98
Fourth 20%	15.82	15.5	16.71
Top 20%	9.63	11.41	4.79

Note: Based on per capita non-child annual household income.

Table 4: Probit Coefficient Estimates and Marginal Effects for the Probability of Work

Variable names	Male Children			Female Children		
	Coefficients		Marginal Effects	Coefficients		Marginal Effects
Predicted log hourly earnings of:						
Child	0.221		0.039	0.48	***	0.041
	(0.153)		(0.027)	(0.164)		(0.013)
Mother	0.036		0.006	0.263		0.023
	(0.301)		(0.052)	(0.312)		(0.026)
Father	-1.135	***	-0.201	-0.553	*	-0.048
	(0.262)		(0.045)	(0.293)		(0.024)
Child's						
Age	1.478	***	0.262	0.491		0.042
	(0.284)		(0.048)	(0.356)		(0.03)
Age squared (1/100)	-4.268	***	-0.757	-1.22		-0.105
	(0.966)		(0.163)	(1.214)		(0.102)
Years of schooling of:						
Mother	-0.042	*	-0.007	-0.06	**	-0.005
	(0.025)		(0.004)	(0.028)		(0.002)
Father	-0.009		-0.002	-0.017		-0.001
	(0.02)		(0.004)	(0.024)		(0.002)
Household unearned income	-0.003	***	-0.0005	-0.003	***	-0.0003
(annual - millions of TL)	(0.001)		(0.0002)	(0.001)		(0.0001)
Land owned (hectars)	0.006	***	0.001	0.006	***	0.0005
	(0.002)		(0.0003)	(0.002)		(0.0001)
Regions (ref:Southeast Anatolia)						
Marmara	0.75	***	0.184	0.581	***	0.074
	(0.122)		(0.037)	(0.152)		(0.026)
Aegean	0.74	***	0.184	1.011	***	0.172
	(0.141)		(0.044)	(0.193)		(0.05)
Mediterranean	0.36	***	0.075	0.473	***	0.055
	(0.107)		(0.025)	(0.183)		(0.028)
Central Anatolia	0.501	***	0.109	0.348	*	0.037
	(0.124)		(0.031)	(0.186)		(0.023)
Black Sea Coast	0.675	***	0.156	0.931	***	0.136
	(0.105)		(0.029)	(0.145)		(0.03)
Eastern Anatolia	0.274	**	0.055	0.219		0.021
	(0.12)		(0.026)	(0.148)		(0.016)
Constant	-4.372			-7.37		
	(3.948)			(4.864)		
Log likelihood	-2017.93			-1108.63		
Number of observations	5679			5361		

Notes: Bootstrap standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
For discrete variables, change in probability is given when the dummy variable is 1 and 0.

Table 5: Probit coefficient estimates and marginal effects for the probability of work - Reduced Form

Variable names	Male Children			Female Children		
	Coefficients		Marginal Effects	Coefficients		Marginal Effects
Child's						
Age	1.459	***	0.246	0.643	*	0.053
	(0.278)		(0.046)	(0.358)		(0.029)
Age squared (1/100)	-4.053	***	-0.683	-1.575		-0.129
	(0.941)		(0.156)	(1.213)		(0.099)
Mother's						
Age	-0.038		-0.006	0.1	*	0.008
	(0.039)		(0.007)	(0.055)		(0.005)
Age squared (1/100)	3.639		0.613	-11.221	*	-0.921
	(4.576)		(0.771)	(6.399)		(0.525)
Schooling	-0.058	***	-0.01	-0.042	***	-0.003
	(0.009)		(0.002)	(0.012)		(0.001)
Father's						
Age	-0.053		-0.009	-0.069		-0.006
	(0.039)		(0.007)	(0.05)		(0.004)
Age squared (1/100)	0.052		0.009	0.073		0.006
	(0.041)		(0.007)	(0.052)		(0.004)
Schooling	-0.094	***	-0.016	-0.055	***	-0.004
	(0.009)		(0.002)	(0.011)		(0.001)
Temporarily absent father	-0.066		-0.011	-0.047		-0.004
	(0.223)		(0.034)	(0.263)		(0.02)
Permanently absent father	0.163		0.03	0.149		0.014
	(0.113)		(0.023)	(0.146)		(0.015)
Household unearned income	-0.002	***	-0.0004	-0.003	***	-0.0003
(annual - millions of TL)	(0.001)		(0.0001)	(0.001)		(0.0001)
Land owned (hectars)	0.006	***	0.001	0.006	***	0.001
	(0.001)		(0.0002)	(0.001)		(0.0001)
Provincial level variables						
Share of manufacturing in	9.165	***	1.544	4.874	**	0.4
employment	(2.191)		(0.367)	(2.325)		(0.19)
Share of agriculture in employment	7.352	***	1.239	4.097	***	0.336
	(1.733)		(0.291)	(1.466)		(0.12)
Share of trade in employment	11.746	***	1.979	6.863	**	0.563
	(4.04)		(0.680)	(3.185)		(0.26)
Share of services in employment	4.602	*	0.775			
	(2.490)		(0.419)			
Prop. of male wage earners in public	-0.748	*	-0.126	-1.482	***	-0.122
sector	(0.43)		(0.072)	(0.406)		(0.033)
Prop. of male wage earners with	0.471		0.079	-0.396		-0.032
union membership	(0.452)		(0.076)	(0.611)		(0.05)

Table 5: Cont'd.

Variable names	Male Children Coefficients		Male Children Marginal Effects	Female Children Coefficients		Female Children Marginal Effects
Prop. of self-employed among				0.832		0.068
Working men				(0.983)		(0.081)
Av. log hourly wages of blue collar	0.187		0.032			
male wage earners	(0.274)		(0.046)			
Share of blue collar male workers in	2.069	***	0.349			
small establishments	(0.409)		(0.069)			
Prop. of women holding white collar	10.452	**	1.761	12.217	*	1.002
jobs	(5.268)		(0.887)	(6.865)		(0.564)
Regions (ref:Southeast Anatolia)						
Marmara	0.61	***	0.136	0.189		0.018
	(0.176)		(0.049)	(0.24)		(0.025)
Aegean	0.773	***	0.188	0.576	***	0.072
	(0.165)		(0.052)	(0.214)		(0.037)
Mediterranean	0.361	***	0.071	0.139		0.013
	(0.12)		(0.027)	(0.151)		(0.015)
Central Anatolia	0.91		0.22	0.454	***	0.049
	(0.125)	***	(0.038)	(0.163)		(0.022)
Black Sea Coast	0.926		0.223	0.994	***	0.144
	(0.146)	***	(0.045)	(0.184)		(0.04)
Eastern Anatolia	0.758		0.174	0.687	***	0.084
	(0.13)	***	(0.037)	(0.173)		(0.029)
Constant	-20.965	***		-11.47	***	
	(4.037)			(3.1)		
Log likelihood	-2067.62			-1153.96		
Number of observations	5973			5658		

Notes: Robust standard errors in parentheses.
significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Probit coefficient estimates and marginal effects for the probability of work - Extended Model

Variable names	Male Children Coefficients		Male Children Marginal Effects	Female Children Coefficients		Female Children Marginal Effects
Predicted log hourly earnings of:						
Child	0.264	*	0.047	0.476	***	0.041
	(0.146)		(0.025)	(0.168)		(0.014)
Mother	0.031		0.006	0.323		0.028
	(0.294)		(0.051)	(0.273)		(0.023)
Father	-1.144	***	-0.202	-0.543	*	-0.047
	(0.248)		(0.043)	(0.291)		(0.024)
Child's						
Age	1.473	***	0.26	0.489		0.042
	(0.284)		(0.048)	(0.368)		(0.03)
Age squared (1/100)	-4.262	***	-0.753	-1.204		-0.103
	(0.96)		(0.162)	(1.243)		(0.103)
Years of schooling of:						
Mother	-0.034		-0.006	-0.06	**	-0.005
	(0.025)		(0.004)	(0.025)		(0.002)
Father	-0.002		-0.0004	-0.014		-0.001
	(0.02)		(0.004)	(0.025)		(0.002)
Household unearned income	-0.002	**	-0.0004	-0.003	***	-0.0002
(annual - millions of TL)	(0.001)		(0.0002)	(0.001)		(0.0001)
Land owned (hectars)	0.006	***	0.001	0.006	***	0.001
	(0.002)		(0.0003)	(0.002)		(0.0001)
Income quintiles						
Household in lowest quintile	0.243	***	0.046	0.268	*	0.025
	(0.093)		(0.019)	(0.144)		(0.015)
Household in second quintile	0.085		0.015	0.258	*	0.025
	(0.09)		(0.016)	(0.143)		(0.016)
Household in third quintile	-0.043		-0.007	0.155		0.014
	(0.092)		(0.015)	(0.138)		(0.014)
Household in fourth quintile	-0.05		-0.009	0.169		0.016
	(0.088)		(0.015)	(0.138)		(0.014)
Regions (ref: Southeast Anatolia)						
Marmara	0.829	***	0.208	0.621	***	0.081
	(0.122)		(0.039)	(0.176)		(0.031)
Aegean	0.822	***	0.21	1.051	***	0.182
	(0.143)		(0.047)	(0.204)		(0.056)
Mediterranean	0.417	***	0.088	0.503	**	0.059
	(0.112)		(0.028)	(0.203)		(0.033)
Central Anatolia	0.547	***	0.121	0.376	**	0.04
	(0.126)		(0.034)	(0.183)		(0.024)

Table 6: Cont'd.

Variable names	Male Children Coefficients		Male Children Marginal Effects	Female Children Coefficients		Female Children Marginal Effects
Black Sea Coast	0.753	***	0.178	0.966	***	0.143
	(0.113)		(0.033)	(0.157)		(0.034)
Eastern Anatolia	0.322	***	0.065	0.234		0.023
	(0.123)		(0.028)	(0.173)		(0.019)
Constant	-4.757			-8.247	*	
	(3.729)			(4.748)		
Log likelihood	-1997.15			-1105.93		
Number of observations	5679			5361		

Notes: Bootstrap standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A1: Heckman selection and OLS results for adult men and women age 20-64

Earnings Equation Variables	Men Heckman		Men OLS	Women Heckman		Women OLS
Experience	0.069	***	0.068	0.04	***	0.035
	(0.003)		(0.003)	(0.007)		(0.007)
Experience Squared (1/100)	-0.109		-0.107	-0.061	***	-0.049
	(0.006)	***	(0.006)	(0.015)		(0.015)
Education (ref: illiterate)						
Literate/ No Diploma	0.041		0.043	0.155		0.148
	(0.043)		(0.043)	(0.109)		(0.109)
Primary school	0.223	***	0.225	0.286	***	0.293
	(0.033)		(0.033)	(0.065)		(0.065)
Junior high school	0.411	***	0.412	0.706	***	0.661
	(0.037)		(0.037)	(0.085)		(0.085)
High school	0.734	***	0.734	1.19	***	1.077
	(0.035)		(0.035)	(0.070)		(0.065)
University	1.173	***	1.172	1.818	***	1.597
	(0.036)		(0.036)	(0.086)		(0.064)
Provincial level variables						
Prop. of women holding white collar jobs				11.555	***	11.566
				(3.281)		(3.292)
Share of manufacturing in employment				4.519	***	4.551
				(1.133)		(1.136)
Share of agriculture in employment				2.391	***	2.377
				(0.685)		(0.688)
Share of trade in employment	1.383	***	1.371			
	(0.231)		(0.230)			
Prop. of male wage earners in public sector	0.345	***	0.343			
	(0.074)		(0.074)			
Prop. of male wage earners with	0.37	***	0.361			
with union membership	(0.094)		(0.094)			
Constant	8.528	***	8.545	6.412	***	6.777
	(0.057)		(0.053)	(0.600)		(0.597)
Selection Equation Variables						
Age	0.104	***		0.141	***	
	(0.008)			(0.011)		
Age squared (1/100)	-0.164	***		-0.184	***	
	(0.009)			(0.014)		
Education (ref: illiterate)						
Literate/ No Diploma	-0.145	**		0.004		
	(0.065)			(0.066)		
Primary school	-0.154	***		-0.053		
	(0.050)			(0.042)		

Table A1: Heckman selection and OLS results for adult men and women age 20-64

	Men		Women	
Earnings Equation Variables	**Heckman**	**OLS**	**Heckman**	**OLS**
Junior high school	0.038		0.423 ***	
	(0.06)		(0.063)	
High school	0.158 ***		1.075 ***	
	(0.060)		(0.053)	
University	0.505 ***		2.352 ***	
	(0.073)		(0.073)	
Household Unearned Income	-0.003 ***		-0.002 ***	
	(0.001)		(0.001)	
Widowed			0.451 ***	
			(0.065)	
Prop. of self-employed among working men	-2.161 ***			
(provincial level variable)	(0.227)			
Constant	-0.552 ***		-4.455 ***	
	(0.164)		(0.223)	
Rho	0.038		0.219	
	(0.044)		(0.058)	
Number of observations	17212	9944	19336	1749
R-squared		0.27		0.44
Log-likelihood	-18949.8		-6055.52	
Wald test for rho=0: prob>chi2=	0.39		0	

Notes: Robust standard errors in parentheses.
Regions are omitted to keep the presentation simple.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A2: Heckman selection and OLS results for male and female children age 12-17

	Male Children		Female Children	
Earnings Equation Variables	**Heckman**	**OLS**	**Heckman**	**OLS**
Age	0.076	0.125 ***	0.107 **	0.099 ***
	(0.068)	(0.019)	(0.042)	(0.035)
Provincial level variables				
Av. log hourly wages of blue collar male wage earners	1.626 ***	1.644 ***		
	(0.291)	(0.299)		
Share of blue collar male workers in small establishments	1.131 *	1.206 **		
	(0.588)	(0.601)		
Share of manufacturing in employment	9.176 ***	8.832 ***	7.788 ***	7.734 ***
	(2.532)	(2.496)	(2.679)	(2.734)
Share of agriculture in employment	4.224 *	3.782 *	1.595 *	1.575 *
	(2.174)	(2.066)	(0.834)	(0.845)
Share of trade in employment	5.603	4.628		
	(4.295)	(4.088)		
Share of services in employment	5.988 **	5.41 *		
	(3.047)	(2.913)		
Prop. of self-employed among working men			4.409 ***	4.396 ***
			(1.424)	(1.472)
Constant	-13.145 ***	-14.159 ***	4.791 ***	5.045 ***
	(4.262)	(4.196)	(1.392)	(1.126)
Selection Equation Variables				
Age	1.274 ***		0.874 *	
	(0.338)		(0.470)	
Age squared (1/100)	-3.531 ***		-2.194	
	(1.138)		(1.577)	
Household Unearned Income	-0.005		-0.006 ***	
	(0.001) ***		(0.001)	
Constant	-12.25		-9.822 ***	
	(2.478) ***		(3.496)	
Rho	-0.414		0.083	
	(0.463)		(0.282)	
Number of observations	6000	677	5683	204
R-squared		0.22		0.21
Log-likelihood	-2573.54		-957.63	
Wald test for rho=0: prob>chi2=	0.43		0.77	

Notes: Robust standard errors in parentheses.
Regions are omitted to keep the presentation simple.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A3: Probit coefficient estimates for the probability of work used in simulation

Variable names	Male Children Coefficients		Male Children Marginal Effects	Female Children Coefficients		Female Children Marginal Effects
Predicted log hourly earnings of:						
Child	0.287	**	0.05	0.457	***	0.039
	(0.143)		(0.024)	(0.161)		(0.013)
Mother	0.051		0.009	0.339		0.029
	(0.29)		(0.049)	(0.312)		(0.025)
Father	-1.042	***	-0.181	-0.461		-0.039
	(0.242)		(0.041)	(0.292)		(0.024)
Child's						
Age	1.524	***	0.264	0.493		0.042
	(0.283)		(0.047)	(0.359)		(0.029)
Age squared (1/100)	-4.436	***	-0.769	-1.207		-0.102
	(0.956)		(0.159)	(1.225)		(0.1)
Years of schooling of:						
Mother	-0.036		-0.006	-0.061	**	-0.005
	(0.025)		(0.004)	(0.028)		(0.002)
Father	-0.001		-0.0001	-0.015		-0.001
	(0.02)		(0.003)	(0.024)		(0.002)
Household unearned income	-0.002	**	-0.0003	-0.002	**	-0.0002
(annual - millions of TL)	(0.001)		(0.0002)	(0.001)		(0.0001)
Land owned (hectars)	0.005	**	0.001	0.006	***	0.0005
	(0.002)		(0.0003)	(0.002)		(0.0001)
Family establishment	0.343	***	0.065	0.173	**	0.016
	(0.054)		(0.011)	(0.068)		(0.006)
Income quintiles						
Household in lowest quintile	0.457	***	0.09	0.377	***	0.037
	(0.102)		(0.022)	(0.135)		(0.015)
Household in second quintile	0.247	***	0.047	0.337	**	0.034
	(0.095)		(0.019)	(0.131)		(0.015)
Household in third quintile	0.094		0.017	0.23	*	0.022
	(0.096)		(0.018)	(0.135)		(0.015)
Household in fourth quintile	0.049		0.009	0.216		0.021
	(0.092)		(0.016)	(0.132)		(0.014)
Regions (ref:Southeast Anatolia)						
Marmara	0.851	***	0.213	0.626	***	0.081
	(0.121)		(0.038)	(0.154)		(0.027)
Aegean	0.841	***	0.214	1.056	***	0.183
	(0.142)		(0.046)	(0.193)		(0.051)
Mediterranean	0.423	***	0.088	0.486	***	0.056
	(0.112)		(0.027)	(0.178)		(0.026)

Table A3: Cont'd.

Variable names	Male Children Coefficients		Male Children Marginal Effects	Female Children Coefficients		Female Children Marginal Effects
Central Anatolia	0.579	***	0.128	0.377	**	0.04
	(0.126)		(0.034)	(0.184)		(0.023)
Black Sea Coast	0.774	***	0.182	0.965	***	0.142
	(0.113)		(0.033)	(0.144)		(0.03)
Eastern Anatolia	0.292	**	0.057	0.207		0.02
	(0.123)		(0.027)	(0.148)		(0.015)
Constant	-6.833	*		-9.244	*	
	(3.71)			(4.852)		
Log likelihood	-1983.49			-1102.46		
Number of observations	5679			5361		

Notes: Bootstrap standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A4: Summary statistics for provincial level variables

	Working Children[a]			Non-Working Children		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Provincial level variables						
Share of manufacturing in employment	0.18	0.18	0.17	0.16	0.16	0.16
	(0.12)	(0.12)	(0.11)	(0.11)	(0.11)	(0.11)
Share of agriculture in employment	0.4	0.39	0.44	0.43	0.43	0.43
	(0.28)	(0.28)	(0.27)	(0.26)	(0.26)	(0.26)
Share of trade in employment	0.11	0.12	0.11	0.1	0.11	0.1
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Share of services in employment	0.16	0.16	0.15	0.16	0.16	0.16
	(0.06)	(0.06)	(0.05)	(0.07)	(0.06)	(0.07)
Prop. of male wage earners in public sector	0.29	0.29	0.3	0.33	0.33	0.33
	(0.13)	(0.13)	(0.13)	(0.15)	(0.15)	(0.15)
Prop. of male wage earners with union membership	0.12	0.12	0.12	0.13	0.13	0.13
	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.06)
Prop. of self-employed among working men	0.2	0.19	0.2	0.19	0.19	0.19
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Prop. of women holding white collar jobs	0.05	0.05	0.05	0.05	0.05	0.05
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Share of blue collar male wage earners in small establishments	0.46	0.46	0.46	0.45	0.45	0.45
	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)
Av. log hourly wages of blue collar male wage earners	9.94	9.94	9.93	9.93	9.93	9.93
	(0.19)	(0.19)	(0.18)	(0.18)	(0.18)	(0.19)
Regions						
Marmara	0.4	0.42	0.33	0.31	0.32	0.31
	(0.49)	(0.49)	(0.47)	(0.46)	(0.47)	(0.46)
Aegean	0.13	0.13	0.15	0.11	0.11	0.1
	(0.34)	(0.33)	(0.36)	(0.31)	(0.32)	(0.30)
Mediterranean	0.1	0.11	0.1	0.14	0.14	0.14
	(0.30)	(0.31)	(0.30)	(0.35)	(0.35)	(0.34)
Central Anatolia	0.12	0.12	0.1	0.19	0.2	0.18
	(0.32)	(0.33)	(0.30)	(0.39)	(0.40)	(0.38)
Black Sea Coast	0.14	0.12	0.22	0.08	0.07	0.08
	(0.35)	(0.32)	(0.41)	(0.26)	(0.27)	(0.26)
Eastern Anatolia	0.02	0.03	0.02	0.06	0.06	0.06
	(0.15)	(0.16)	(0.15)	(0.24)	(0.24)	(0.24)
Southeast Anatolia	0.08	0.08	0.08	0.12	0.12	0.12
	(0.27)	(0.27)	(0.27)	(0.32)	(0.32)	(0.32)
Number of observations	1,307	932	375	10,375	5,067	5,308

Notes: Figures in parentheses are standard deviations.
[a] excludes children whose actual hours of work are less than 14 hours per week.

Appendix: Estimation of Earnings Functions

The first two panels in Table A1 presents the results of the earnings function for adult men using the Heckman procedure and OLS respectively. In the Heckman procedure the excluded variables used to identify the earnings functions are household unearned income and the proportion of self-employed men in the province where the individual resides. These variables are thought to be instrumental in men's decision of whether or not to enter wage employment, but are assumed not to play a role in determining their wages. The first panel in Table A1 indicates that all the exclusion variables are statistically significant and that selection is not an issue for men. Therefore, father's wages are predicted using the OLS results.

The third panel in Table A1 presents the results of earnings function estimates for adult women (of whom only 16.6 percent are employed) using the Heckman procedure. The identifying variables are household unearned income and the marital status of the woman in question – in particular whether she is widowed or not. Both of these covariates are expected to affect women's participation but not their wages. The results indicate selection to be an issue for women. The selection term lambda or the inverse Mill's ratio is positive which indicates that unobservables that make women's wage employment more likely also increase their earnings potential. Due to selection, mother's wages are predicted based on the selectivity corrected earnings function.

The hourly earnings for male and female children are predicted using separate earnings functions and are presented in Table A2. The observation that the nature of male and female children's employment differ from each other has led us to conjecture that the earnings determination process would also differ between genders. Indeed testing for the equality of the covariates reveals that the earnings functions structurally differ between the two groups. In the Heckman procedure, the identifying variable for both the male and female children is the household unearned income. The Heckman procedure also indicates selection not to be an issue for either group. Therefore, in predicting the earnings of children we have opted to use the OLS results.